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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/817,760	03/03/2009	7500013	DZIONG 12-21-38	2094

46850 7590 02/11/2009
MENDELSON & ASSOCIATES, P.C.
1500 JOHN F. KENNEDY BLVD., SUITE 405
PHILADELPHIA, PA 19102

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 832 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 Customer Service Center of the Office of Patent Publication at (571)-272-4200.

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

Zbigniew M. Dziong, Montreal, CANADA;
Muhammad A. Qureshi, Irvine, CA;
Yung-Terng Wang, Marlboro, NJ;



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
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/817,760	04/02/2004	Zbigniew M. Dziong	DZIONG 12-21-38	2094
46850 7590 01/27/2009 MENDELSON & ASSOCIATES, P.C. 1500 JOHN F. KENNEDY BLVD., SUITE 405 PHILADELPHIA, PA 19102			EXAMINER MAUNG, ZARNI	
			ART UNIT	PAPER NUMBER
			2451	
			MAIL DATE	DELIVERY MODE
			01/27/2009	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.



UNITED STATES DEPARTMENT OF COMMERCE

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Alexandria, Virginia 22313-1450

APPLICATION NO./ CONTROL NO.	FILING DATE	FIRST NAMED INVENTOR / PATENT IN REEXAMINATION	ATTORNEY DOCKET NO.
10817760	4/2/04	DZIONG ET AL.	DZIONG 12-21-38

MENDELSON & ASSOCIATES, P.C.
1500 JOHN F. KENNEDY BLVD., SUITE 405
PHILADELPHIA, PA 19102

EXAMINER

ZARNI MAUNG

ART UNIT	PAPER
2451	20090115

DATE MAILED:

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

Commissioner for Patents

The IDS filed on November 4, 2008 and January 12, 2009 have been considered. Please see attached 1449.

/Zarni Maung/
Primary Examiner, Art Unit 2451

PTO-90C (Rev.04-03)

FORM PTO-1449 (Rev. 2-32)	U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTY. DOCKET NO. Dziong 12-21-38	SERIAL NO. 10/817,760
INFORMATION DISCLOSURE STATEMENT BY APPLICANT		APPLICANT Zbigniew M. Dziong et al.	
(Use several sheets if necessary)		FILING DATE 04/02/2004	GROUP 2451

U.S. PATENT DOCUMENTS							
EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
/Z.M./	MA	7,398,321	07/2008	Qiao et al.	709	239	
/Z.M./	MB	4,190,821	02/1980	Woodward	714	4	
/Z.M./	MC	4,594,709	06/1986	Yasue	714	4	
/Z.M./	MD	6,282,170	08/2001	Bentall et al.	370	225	
/Z.M./	ME	US 2002/0004843	01/2002	Andersson et al.	709	238	
/Z.M./	MF	6,744,727	06/2004	Liu et al.	370	228	
/Z.M./	MG	US 2004/0184402	09/2004	Alicherry et al.	370	216	
/Z.M./	MH	7,133,358	11/2006	Kano	370	221	
/Z.M./	MI	US 2004/0208547	10/2004	Sabat et al.	398	050	
/Z.M./	MJ	US 2003/0193944	10/2003	Sasagawa	370	389	
/Z.M./	MK	US 2003/0223357	12/2003	Lee	370	218	
/Z.M./	ML	US 2004/0114512	06/2004	Johri	370	225	

FOREIGN PATENT DOCUMENTS							
		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES NO

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)			

EXAMINER	/Zarni Maung/	DATE CONSIDERED	01/15/2009
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EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered.
Include copy of this form with next communication to applicant.

(Form PTO-1449)

990.0496

FORM PTO-1449 (Rev. 2-32)	U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTY. DOCKET NO. Dziong 12-21-38	SERIAL NO. 10/817,760
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/Z.M./	LA	US 7,362,709 B1	04/2008	Hui et al.	370	237	
/Z.M./	LB	US 6,205,117 B1	03/2001	Doshi et al.	370	228	
/Z.M./	LC	4,797,882	01/1989	Maxemchuk	370	94	

FOREIGN PATENT DOCUMENTS							
		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES NO

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)			
/Z.M./	LD		"Fast, Scalable, and Distributed Restoration in General Mesh Optical Networks" by Gary P. Austin et al.; Bell Labs Technical Journal; January-June 2001; pp. 67-81.
/Z.M./	LE		"Optimal Design and Evaluation of Survivable WDM Transport Networks" by Yasuhiro Miyao et al.; IEEE Journal on Selected Areas in Communications, Vol. 16, No. 7, September 1998, pp. 1190-1198.

EXAMINER	/Zarni Maung/	DATE CONSIDERED	01/15/2009
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990.0496

(Form PTO-1449)

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
 or 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 applicable. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

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

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

46850 7590 10/27/2008

MENDELSON & ASSOCIATES, P.C.
 1500 JOHN F. KENNEDY BLVD., SUITE 405
 PHILADELPHIA, PA 19102

Certificate of Transmittal

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.

Patty Giebler (Depositor's name)
Patty Giebler (Signature)
1-19-09 (Date)

APPLICATION NO.	FILING DATE	FIRST NAME OF INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/817,760	01/02/2004	Zbigniew M. Dziong	DZIONG 12-21-38	2094

TITLE OF INVENTION: CALCULATION OF LINK-DETOUR PATHS IN MESH NETWORKS

01/21/2009 MBELETE2 00000000 122325 10817760

01 FC:1501 1510.00 DA
 02 FC:1504 300.00 DA

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	01/27/2009

EXAMINER	ART UNIT	CLASS-SUBCLASS
MAUNG, ZARNI	2451	182-003000

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.

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)

Alcatel-Lucent USA Inc.
Murray Hill, NJ (US)

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 12-2325 (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 Patty Giebler
 Typed or printed name Patty Giebler

Date 1-19-09
 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.

FORM PTO-1449 (Rev. 2-32)	U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTY. DOCKET NO. Dziong 12-21-38	SERIAL NO. 10/817,760
INFORMATION DISCLOSURE STATEMENT BY APPLICANT		APPLICANT Zbigniew M. Dziong et al.	
(Use several sheets if necessary)		FILING DATE 04/02/2004	GROUP 2451

U.S. PATENT DOCUMENTS							
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	MB	4,190,821	02/1980	Woodward	714	4	
	MC	4,594,709	06/1986	Yasue	714	4	
	MD	6,282,170	08/2001	Bentall et al.	370	225	
	ME	US 2002/0004843	01/2002	Andersson et al.	709	238	
	MF	6,744,727	06/2004	Liu et al.	370	228	
	MG	US 2004/0184402	09/2004	Alicherry et al.	370	216	
	MH	7,133,358	11/2006	Kano	370	221	
	MI	US 2004/0208547	10/2004	Sabat et al.	398	050	
	MJ	US 2003/0193944	10/2003	Sasagawa	370	389	
	MK	US 2003/0223357	12/2003	Lee	370	218	
	ML	US 2004/0114512	06/2004	Johri	370	225	

FOREIGN PATENT DOCUMENTS							
		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES NO

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)			

EXAMINER	DATE CONSIDERED
----------	-----------------

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

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Re: Attorney Docket No. Dziong 12-21-38

In re application of: Zbigniew M. Dziong, Muhammad A. Qureshi and Yung-Terng Wang

Serial No.: 10/817,760
Filed: 04/02/2004
Matter No.: 990.0496

Group No.: 2451
Examiner: Zarni Maung
Phone No.: 571-272-3939

For: "Calculation of Link-Detour Paths In Mesh Networks"

INFORMATION DISCLOSURE STATEMENT

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

Dear Sir:

In accordance with 37 CFR § 1.56, this is an Information Disclosure Statement (IDS) for the above-captioned U.S. patent application. An IDS Form PTO-1449 listing references is enclosed herewith and forms a part hereof. Submission of references is not an admission that those references are in fact prior art.

Certification Under 37 CFR § 1.704(d)

- ☐ Each item of information contained in this statement was cited in a communication from a foreign patent office in a counterpart application and this communication was not received by any individual designated in § 1.56(c) more than thirty days prior to the filing of this statement.

Certification Under 37 CFR § 1.97(e)

- ☒ Each item of information contained in this statement was either (1) cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this statement or (2) not known to any individual designated in § 1.56(c) more than three months prior to the filing of this statement.

Fee Under 37 CFR § 1.97(c)

- ☐ The fee for submission of this IDS under § 1.97(c) is \$180.00 as set forth in § 1.17(p).

Petition Under 37 CFR § 1.97(d)

- ☒ This is a petition requesting consideration of an IDS under § 1.97(d). The petition fee for submission of this IDS under § 1.97(d) is \$180.00 as set forth in § 1.17(p).

Provision of Copies of References

- ☐ A copy of the non-patent literature is enclosed herewith and forms a part hereof.
- ☐ A translation of each of Reference(s) is enclosed herewith and forms a part hereof.
- ☐ A copy of the International Search Report from a corresponding PCT application is enclosed herewith.

- ☐ A copy of the European Search Report from a corresponding EPO application is enclosed herewith.
- ☐ A copy of the final U.S. office action for U.S. patent application no. _____ filed on _____ as attorney docket no. (Case name or our ref.).
- ☐ The above-captioned U.S. patent application is a
- ☐ continuation
 - ☐ divisional
 - ☐ continuation-in-part

application of U.S. application serial number _____, filed on _____ as Attorney Docket No. _____. Each of the listed references was previously cited by or submitted to the Office in the prior application. The above-captioned U.S. patent application relies upon the prior application for an earlier filing date under 35 U.S.C. 120. Pursuant to § 1.98(d), copies of the listed references are not being provided with this IDS.

Authorization to Charge Credit Card Account

- ☒ Electronic credit card payment is being made in the amount of \$180.00.

Authorization To Charge Deposit Account

- ☒ Authorization is given to charge Mendelsohn & Associates, P.C. Deposit Account No. 50-0782 any deficiency or credit any overpayment for any fee under § 1.97(c) or § 1.97(d).

It is respectfully requested that the Examiner initial and return a copy of the enclosed PTO-1449 form as confirmation that each of the documents has been considered.

Respectfully submitted,

Date: 01/12/2009
Customer No. 46850
Mendelsohn & Associates, P.C.
1500 John F. Kennedy Blvd., Suite 405
Philadelphia, Pennsylvania 19102

/Steve Mendelsohn/
Steve Mendelsohn
Registration No. 35,951
Attorney for Applicant
(215) 557-6657

Enclosures

Electronic Patent Application Fee Transmittal				
Application Number:		10817760		
Filing Date:		02-Apr-2004		
Title of Invention:		CALCULATION OF LINK-DETOUR PATHS IN MESH NETWORKS		
First Named Inventor/Applicant Name:		Zbigniew M. Dziong		
Filer:		Steve Mendelsohn/Leighann Madeksiak		
Attorney Docket Number:		DZIONG 12-21-38		
Filed as Large Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Submission- Information Disclosure Stmt	1806	1	180	180
Total in USD (\$)				180

Electronic Acknowledgement Receipt	
EFS ID:	4592231
Application Number:	10817760
International Application Number:	
Confirmation Number:	2094
Title of Invention:	CALCULATION OF LINK-DETOUR PATHS IN MESH NETWORKS
First Named Inventor/Applicant Name:	Zbigniew M. Dziong
Customer Number:	46850
Filer:	Steve Mendelsohn/Leighann Madeksiak
Filer Authorized By:	Steve Mendelsohn
Attorney Docket Number:	DZIONG 12-21-38
Receipt Date:	12-JAN-2009
Filing Date:	02-APR-2004
Time Stamp:	11:32:22
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$180
RAM confirmation Number	7200
Deposit Account	500782
Authorized User	MENDELSON,STEVE
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.16 (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 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Filed (SB/08)	PTO_1449_MA_ML.pdf	24998	no	1
			a778d16564f89ffade1508b7833a8d38a3619cba		

Warnings:

Information:

This is not an USPTO supplied IDS fillable form

2	Information Disclosure Statement Letter	IDS_10.pdf	21752	no	2
			a76ccbbd6fb8a45603eeef99c6a4e9b67b65de28		

Warnings:

Information:

3	Fee Worksheet (PTO-06)	fee-info.pdf	30645	no	2
			98fbdde5efc4ca53f6108ba1a7875e0becce01275		

Warnings:

Information:

Total Files Size (in bytes):	77395
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This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

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

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

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

New International Application Filed with the USPTO as a Receiving Office

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



UNITED STATES PATENT AND TRADEMARK OFFICE

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46850 7590 12/08/2008 MENDELSON & ASSOCIATES, P.C. 1500 JOHN F. KENNEDY BLVD., SUITE 405 PHILADELPHIA, PA 19102			EXAMINER MAUNG, ZARNI	
			ART UNIT 2451	PAPER NUMBER
			MAIL DATE 12/08/2008	DELIVERY MODE PAPER

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

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UNITED STATES DEPARTMENT OF COMMERCE

U.S. Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

APPLICATION NO./ CONTROL NO.	FILING DATE	FIRST NAMED INVENTOR / PATENT IN REEXAMINATION	ATTORNEY DOCKET NO.
10817760	4/2/04	DZIONG ET AL.	DZIONG 12-21-38

MENDELSON & ASSOCIATES, P.C.
1500 JOHN F. KENNEDY BLVD., SUITE 405
PHILADELPHIA, PA 19102

EXAMINER

ZARNI MAUNG

ART UNIT	PAPER
2451	20081125

DATE MAILED:

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

Commissioner for Patents

The IDS filed on November 4, 2008 has been considered. Please see attached 1449.

/Zarni Maung/
Primary Examiner, Art Unit 2451

FORM PTO-1449 (Rev. 2-32)	U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTY. DOCKET NO. Dziong 12-21-38	SERIAL NO. 10/817,760
INFORMATION DISCLOSURE STATEMENT BY APPLICANT		APPLICANT Zbigniew M. Dziong et al.	
(Use several sheets if necessary)		FILING DATE 04/02/2004	GROUP 2451

U.S. PATENT DOCUMENTS							
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/Z.M./	LE		"Optimal Design and Evaluation of Survivable WDM Transport Networks" by Yasuhiro Miyao et al.; IEEE Journal on Selected Areas in Communications, Vol. 16, No. 7, September 1998, pp. 1190-1198.

EXAMINER	/Zarni Maung/	DATE CONSIDERED	11/25/2008
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EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered.
Include copy of this form with next communication to applicant.

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(Form PTO-1449)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Re: Attorney Docket No. Dziong 12-21-38

In re application of: Zbigniew M. Dziong, Muhammad A. Qureshi and Yung-Terng Wang

Serial No.: 10/817,760
Filed: 04/02/2004
Matter No.: 990.0496

Group No.: 2451
Examiner: Zarni Maung
Phone No.: 571-272-3939

For: Calculation of Link-Detour Paths In Mesh Networks

INFORMATION DISCLOSURE STATEMENT

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

Dear Sir:

In accordance with 37 CFR § 1.56, this is an Information Disclosure Statement (IDS) for the above-captioned U.S. patent application. An IDS Form PTO-1449 listing references is enclosed herewith and forms a part hereof. Submission of references is not an admission that those references are in fact prior art.

Certification Under 37 CFR § 1.704(d)

- ☐ Each item of information contained in this statement was cited in a communication from a foreign patent office in a counterpart application and this communication was not received by any individual designated in § 1.56(c) more than thirty days prior to the filing of this statement.

Certification Under 37 CFR § 1.97(e)

- ☒ Each item of information contained in this statement was either (1) cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this statement or (2) not known to any individual designated in § 1.56(c) more than three months prior to the filing of this statement.

Fee Under 37 CFR § 1.97(c)

- ☐ The fee for submission of this IDS under § 1.97(c) is \$180.00 as set forth in § 1.17(p).

Petition Under 37 CFR § 1.97(d)

- ☒ This is a petition requesting consideration of an IDS under § 1.97(d). The petition fee for submission of this IDS under § 1.97(d) is \$180.00 as set forth in § 1.17(p).

Provision of Copies of References

- ☒ A copy of the non-patent literature is enclosed herewith and forms a part hereof.
- ☐ A translation of each of Reference(s) is enclosed herewith and forms a part hereof.
- ☐ A copy of the International Search Report from a corresponding PCT application is enclosed herewith.

- ☐ A copy of the European Search Report from a corresponding EPO application is enclosed herewith.
- ☐ A copy of the final U.S. office action for U.S. patent application no. _____ filed on _____ as attorney docket no. (Case name or our ref.).
- ☐ The above-captioned U.S. patent application is a
- ☐ continuation
 - ☐ divisional
 - ☐ continuation-in-part

application of U.S. application serial number _____, filed on _____ as Attorney Docket No. _____. Each of the listed references was previously cited by or submitted to the Office in the prior application. The above-captioned U.S. patent application relies upon the prior application for an earlier filing date under 35 U.S.C. 120. Pursuant to § 1.98(d), copies of the listed references are not being provided with this IDS.

Authorization To Charge Deposit Account

☒ Authorization is given to charge Mendelsohn & Associates, P.C. Deposit Account No. 50-0782 any deficiency or credit any overpayment for any fee under § 1.97(c) or § 1.97(d).

It is respectfully requested that the Examiner initial and return a copy of the enclosed PTO-1449 form as confirmation that each of the documents has been considered.

Respectfully submitted,

Date: 11-04-2008
Customer No. 46850
Mendelsohn & Associates, P.C.
1500 John F. Kennedy Blvd., Suite 405
Philadelphia, Pennsylvania 19102

/Steve Mendelsohn/
Steve Mendelsohn
Registration No. 35,951
Attorney for Applicant
(215) 557-6657

Enclosures

FORM PTO-1449 (Rev. 2-32)	U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTY. DOCKET NO. Dziong 12-21-38	SERIAL NO. 10/817,760
INFORMATION DISCLOSURE STATEMENT BY APPLICANT		APPLICANT Zbigniew M. Dziong et al.	
(Use several sheets if necessary)		FILING DATE 04/02/2004	GROUP 2451

U.S. PATENT DOCUMENTS							
EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
	LA	US 7,362,709 B1	04/2008	Hui et al.	370	237	
	LB	US 6,205,117 B1	03/2001	Doshi et al.	370	228	
	LC	4,797,882	01/1989	Maxemchuk	370	94	

FOREIGN PATENT DOCUMENTS							
		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES NO

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)							
	LD		"Fast, Scalable, and Distributed Restoration in General Mesh Optical Networks" by Gary P. Austin et al.; Bell Labs Technical Journal; January-June 2001; pp. 67-81.				
	LE		"Optimal Design and Evaluation of Survivable WDM Transport Networks" by Yasuhiro Miyao et al.; IEEE Journal on Selected Areas in Communications, Vol. 16, No. 7, September 1998, pp. 1190-1198.				

EXAMINER	DATE CONSIDERED
----------	-----------------

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

990.0496

(Form PTO-1449)

Electronic Patent Application Fee Transmittal				
Application Number:		10817760		
Filing Date:		02-Apr-2004		
Title of Invention:		CALCULATION OF LINK-DETOUR PATHS IN MESH NETWORKS		
First Named Inventor/Applicant Name:		Zbigniew M. Dziong		
Filer:		Steve Mendelsohn/Leighann Madeksiak		
Attorney Docket Number:		DZIONG 12-21-38		
Filed as Large Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Submission- Information Disclosure Stmt	1806	1	180	180
Total in USD (\$)				180

Electronic Acknowledgement Receipt	
EFS ID:	4226998
Application Number:	10817760
International Application Number:	
Confirmation Number:	2094
Title of Invention:	CALCULATION OF LINK-DETOUR PATHS IN MESH NETWORKS
First Named Inventor/Applicant Name:	Zbigniew M. Dziong
Customer Number:	46850
Filer:	Steve Mendelsohn/Leighann Madeksiak
Filer Authorized By:	Steve Mendelsohn
Attorney Docket Number:	DZIONG 12-21-38
Receipt Date:	04-NOV-2008
Filing Date:	02-APR-2004
Time Stamp:	10:59:38
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$180
RAM confirmation Number	5828
Deposit Account	500782
Authorized User	MENDELSON,STEVE
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.16 (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 1.21 (Miscellaneous fees and charges)					
File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement Letter	IDS_9.pdf	21435	no	2
			47cdb03d92ddb76fb084f575b3b43e3ccf494ab6		
Warnings:					
Information:					
2	Information Disclosure Statement (IDS) Filed (SB/08)	PTO_1449_LA_LE.pdf	24971	no	1
			a4fd94bec8c07d896d0354cda5187780fd780fb		
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
3	NPL Documents	Reference_LD.pdf	1172511	no	15
			62fd550e6c972b6bd3b4fd9af97a61a976978e8		
Warnings:					
Information:					
4	NPL Documents	Reference_LE.pdf	800899	no	9
			4d56bd3bf68d8cf9900a00d344a4c8d1a656ec12		
Warnings:					
Information:					
5	Fee Worksheet (PTO-06)	fee-info.pdf	30645	no	2
			fe75ca1c7794ce411d404627a743e847c90a3733		
Warnings:					
Information:					
Total Files Size (in bytes):			2050461		

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

NOTICE OF ALLOWANCE AND FEE(S) DUE

46850 7590 10/27/2008

MENDELSON & ASSOCIATES, P.C.
1500 JOHN F. KENNEDY BLVD., SUITE 405
PHILADELPHIA, PA 19102

EXAMINER

MAUNG, ZARNI

ART UNIT

PAPER NUMBER

2451

DATE MAILED: 10/27/2008

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/817,760	04/02/2004	Zbigniew M. Dziong	DZIONG 12-21-38	2094
TITLE OF INVENTION: CALCULATION OF LINK-DETOUR PATHS IN MESH NETWORKS				

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	01/27/2009

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

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

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

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

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

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

If the SMALL ENTITY is shown as NO:

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

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

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

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

PART B - FEE(S) TRANSMITTAL

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

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

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

46850 7590 10/27/2008

MENDELSON & ASSOCIATES, P.C.
1500 JOHN F. KENNEDY BLVD., SUITE 405
PHILADELPHIA, PA 19102

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.
10/817,760	04/02/2004	Zbigniew M. Dziong	DZIONG 12-21-38	2094

TITLE OF INVENTION: CALCULATION OF LINK-DETOUR PATHS IN MESH NETWORKS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	01/27/2009

EXAMINER	ART UNIT	CLASS-SUBCLASS
MAUNG, ZARNI	2451	182-003000

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

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

2. For printing on the patent front page, list

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

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

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

(A) NAME OF ASSIGNEE

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

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

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

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

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

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

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

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

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

Authorized Signature _____

Date _____

Typed or printed name _____

Registration No. _____

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

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



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.
10/817,760	04/02/2004	Zbigniew M. Dziong	DZIONG 12-21-38	2094
46850	7590	10/27/2008	EXAMINER	
MENDELSON & ASSOCIATES, P.C. 1500 JOHN F. KENNEDY BLVD., SUITE 405 PHILADELPHIA, PA 19102			MAUNG, ZARNI	
			ART UNIT	PAPER NUMBER
			2451	
DATE MAILED: 10/27/2008				

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 867 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 867 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.

Notice of Allowability	Application No.	Applicant(s)	
	10/817,760	DZIONG ET AL.	
	Examiner	Art Unit	
	ZARNI MAUNG	2151	

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

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

1. ☒ This communication is responsive to the amendment and remarks filed on August 12, 2008.

2. ☒ The allowed claim(s) is/are 1-22.

3. ☐ 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.

4. ☐ 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.

5. ☐ 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).

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

Attachment(s)

1. ☒ Notice of References Cited (PTO-892) 2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948) 3. ☒ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date <u>07/29/08</u> 4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material	5. ☐ Notice of Informal Patent Application 6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____. 7. ☐ Examiner's Amendment/Comment 8. ☐ Examiner's Statement of Reasons for Allowance 9. ☐ Other _____.
--	--

/Zarni Maung/ Primary Examiner, Art Unit 2151	
--	--

Notice of References Cited	Application/Control No. 10/817,760	Applicant(s)/Patent Under Reexamination DZIONG ET AL.	
	Examiner ZARNI MAUNG	Art Unit 2151	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-4,797,882	01-1989	Maxemchuk, Nicholas F.	370/406
	B	US-			
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

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

NON-PATENT DOCUMENTS

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

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

FORM PTO-1449 (Rev. 2-32)	U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTY. DOCKET NO. Dziong 12-21-38	SERIAL NO. 10/817,760
INFORMATION DISCLOSURE STATEMENT BY APPLICANT		APPLICANT Zbigniew M. Dziong et al.	
(Use several sheets if necessary)		FILING DATE 04/02/2004	GROUP 2151

U.S. PATENT DOCUMENTS							
EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
/Z.M./	KA	US 2008/0095045 A1	04/2008	Owens et al.	370	220	
/Z.M./	KB	US 7,197,008 B1	03/2007	Shabtay et al.	370	218	
/Z.M./	KC	US 6,807,653 B2	10/2004	Saito	716	2	
/Z.M./	KD	US 6,711,125 B1	03/2004	Walrand et al.	370	223	
/Z.M./	KE	US 2003/0112760 A1	06/2003	Puppa et al.	370	241.1	
/Z.M./	KF	5,933,422	08/1999	Kusano et al.	370	331	

FOREIGN PATENT DOCUMENTS							
		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES NO

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)			

EXAMINER	/Zarni Maung/	DATE CONSIDERED	10/23/2008
----------	---------------	-----------------	------------

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

Issue Classification 	Application/Control No. 10817760	Applicant(s)/Patent Under Reexamination DZIONG ET AL.
	Examiner ZARNI MAUNG	Art Unit 2151

[illegible][illegible]

NONE		Total Claims Allowed:	
		22	
(Assistant Examiner)	(Date)		
/ZARNI MAUNG/ Primary Examiner.Art Unit 2151	10/23/08	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	3

<i>Search Notes</i> 	Application/Control No. 10817760	Applicant(s)/Patent Under Reexamination DZIONG ET AL.
	Examiner Trevillian H Hightner	Art Unit 2151

SEARCHED			
Class	Subclass	Date	Examiner
709	238,239,249,250	10/23/08	ZM

SEARCH NOTES		
Search Notes	Date	Examiner
Updated East searches, NPL searches, East search results attached.	10/23/08	ZM

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner
709	238,249	10/23/08	ZM

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EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	538	(detour\$4 alternat\$6) near7 (link\$4 path connection network) near7 mesh	US-PGPUB; USPAT; EPO; JPO	OR	ON	2008/10/23 10:32
L2	20	(calculat\$5 find \$5 determin\$5) near8 1	US-PGPUB; USPAT; EPO; JPO	OR	ON	2008/10/23 10:32
L3	34	(calculat\$4 find \$5 determin\$4) near9 mesh near9 (alternat \$5 detour\$4 redund\$5)	US-PGPUB; USPAT; EPO; JPO	OR	ON	2008/10/23 10:33
L4	12050	709/238 709/239 709/249	US-PGPUB; USPAT; EPO; JPO	OR	ON	2008/10/23 10:33
L5	246401	mesh and (detour\$5 alternat\$5 redund\$6)	US-PGPUB; USPAT; EPO; JPO	OR	ON	2008/10/23 10:34
L6	646	4 and 5	US-PGPUB; USPAT; EPO; JPO	OR	ON	2008/10/23 10:34
L7	41626	(calculat\$5 find \$6 determin\$6) same mesh	US-PGPUB; USPAT; EPO; JPO	OR	ON	2008/10/23 10:34
L8	27292	5 and 7	US-PGPUB; USPAT; EPO; JPO	OR	ON	2008/10/23 10:35
L10	249656	(detour\$4 alternat\$6) near7 (link\$4 path connection network)	US-PGPUB; USPAT; EPO; JPO	OR	ON	2008/10/23 10:35

L11	2450	8 and 10	US-PGPUB; USPAT; EPO; JPO	OR	ON	2008/10/23 10:35
L12	2686	7.ab.	US-PGPUB; USPAT; EPO; JPO	OR	ON	2008/10/23 10:35
L14	105	11 and 12	US-PGPUB; USPAT; EPO; JPO	OR	ON	2008/10/23 10:36

10/23/08 10:36:41 AM

C:\Documents and Settings\zmaung\My Documents\EAST\workspaces\d.wsp

<i>Index of Claims</i> 	Application/Control No. 10817760	Applicant(s)/Patent Under Reexamination DZIONG ET AL.
	Examiner Trevillian H Highter	Art Unit 2151

✓	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	11/27/2007	10/23/2008												
1	1	✓	=												
2	2	✓	=												
3	3	✓	=												
4	4	✓	=												
5	5	✓	=												
6	6	✓	=												
7	7	✓	=												
8	8	✓	=												
9	9	✓	=												
10	10	✓	=												
12	11	✓	=												
13	12	✓	=												
14	13	✓	=												
15	14	✓	=												
16	15	✓	=												
17	16	✓	=												
18	17	✓	=												
19	18	✓	=												
20	19	✓	=												
21	20	✓	=												
22	21		=												
11	22		=												

CUSTOMER NO. 46850

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Re: Attorney Docket No. Dziong 12-21-38

In re application of: Zbigniew M. Dziong et al.

Serial No.: 10/817,760

Group Art Unit: 4152

Filed: 04/02/04

Examiner: Trevillian Highter

Matter No.: 990.0496

Phone No.: 571-270-3806

For: Calculation of Link-Detour Paths in Mesh Networks

AMENDMENT UNDER 37 CFR 1.111

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

Dear Sir:

This Amendment is filed in response to the non-final office action of 06/19/08.

CLAIMS

1 1. (currently amended) A link-based recovery method for a mesh network, the method
2 comprising:

3 developing N candidate primary paths, between a source node and a destination node for a
4 demand, as a function of N sets $\{AB_i\}$ of available bandwidths, wherein each set $\{AB_i\}$
5 corresponds to one of the N candidate primary paths, and each element AB_i of each set corresponds
6 to the available bandwidth on a link i of the corresponding candidate primary path;

7 selecting a first primary path, from the N candidate primary paths, as a function of N sets
8 $\{LC_i\}$ of link costs, wherein each set $\{LC_i\}$ corresponds to one of the N candidate primary paths,
9 and each element LC_i of each set corresponds to a link cost of a link i in the corresponding
10 candidate primary path; and

11 computing a link detour (LD) path for each link i in the first primary path as a function of a
12 set $\{ABP_i\}$ of available LD bandwidths, wherein each element ABP_i of the set $\{ABP_i\}$ is equal to
13 the minimum value from the set $\{AB_j\}$ of available bandwidths, wherein each element AB_j of the
14 set $\{AB_j\}$ corresponds to total available bandwidth on a link j in a candidate LD path for link i .

1 2. (original) The invention of claim 1, wherein:

2 each link j in each of a plurality of candidate LD paths for link i of the first primary path has
3 a link cost associated with it; and

4 computing the LD path for each link i in the first primary path comprises selecting the LD
5 path for link i as a function of link cost.

1 3. (original) The invention of claim 2, wherein computing an LD path comprises:

2 computing a sum of the link costs associated with each link j in two or more candidate LD
3 paths for link i of the first primary path to determine an LD path link cost sum; and

4 choosing the LD path for the link i of the first primary path to be the candidate LD path with
5 the smallest LD path link cost sum.

1 4. (original) The invention of claim 2, wherein each link cost is inversely related to the
2 available bandwidth on the link.

1 5. (original) The invention of claim 2, wherein each link cost is inversely related to the
2 available shared bandwidth on the link.

1 6. (original) The invention of claim 1, wherein:
2 selecting the first primary path comprises:
3 computing a sum of the link costs LC_i of all links i in each of the N candidate
4 primary path to determine a link cost sum corresponding to each candidate primary path; and
5 choosing the first primary path to be the candidate primary path with the smallest
6 link cost sum.

1 7. (original) The invention of claim 1, wherein developing the N candidate primary paths
2 and selecting the first primary path for the demand are performed at the source node.

1 8. (original) The invention of claim 1, wherein computing the link detour (LD) path for a
2 given link i in the first primary path is performed at a controlling node for link i , wherein the
3 controlling node for link i is a terminating node for link i that is immediately upstream of link i with
4 respect to the demand.

1 9. (original) The invention of claim 1, comprising:
2 calculating a LD path cost CPP_i for each link i of each candidate primary path, wherein CPP_i
3 is a function of at least the administrative weight of each link within the link detour path for link i ;
4 calculating a cost of available bandwidth CAB_i for each link i of each candidate primary
5 path, wherein CAB_i is inversely related to the available bandwidth on link i ; and
6 calculating the link cost LC_i for each link i of each candidate primary path as a function of
7 CPP_i and CAB_i .

1 10. (original) The invention of claim 9, wherein CPP_i is calculated and distributed to the
2 rest of the network by a controlling node for link i , wherein the controlling node for link i is a
3 terminating node for link i that is immediately upstream to link i with respect to the demand.

1 11. (currently amended) A protection manager for a mesh communications network, the
2 manager comprising one or more computing elements adapted to:

3 develop N candidate primary paths, between a source node and a destination node for a
4 demand, as a function of N sets $\{AB_i\}$ of available bandwidths, wherein each set $\{AB_i\}$
5 corresponds to one of the N candidate primary paths, and each element AB_i of each set corresponds
6 to the available bandwidth on a link i of the corresponding candidate primary path;

7 select a first primary path, from the N candidate primary paths, as a function of N sets $\{LC_i\}$
8 of link costs, wherein each set $\{LC_i\}$ corresponds to one of the N candidate primary paths, and each
9 element LC_i of each set corresponds to a link cost of a link i in the corresponding candidate primary
10 path; and

11 compute a link detour (LD) path for each link i in the first primary path as function of a set
12 $\{ABP_i\}$ of available LD bandwidths, wherein each element ABP_i of the set $\{ABP_i\}$ is equal to the
13 minimum value from the set $\{AB_j\}$ of available bandwidths, wherein each element AB_j of the set
14 $\{AB_j\}$ corresponds to total available bandwidth on one link j in an LD path for link i .

1 12. (original) The invention of claim 11, wherein:

2 each link j in each of a plurality of candidate LD paths for link i of the first primary path has
3 a link cost associated with it; and

4 computing the LD path for each link i in the first primary path comprises selecting the LD
5 path for link i as a function of link cost.

1 13. (original) The invention of claim 12, wherein computing an LD path comprises:

2 computing a sum of the link costs associated with each link j in two or more candidate LD
3 paths for link i of the first primary path to determine an LD path link cost sum; and

4 choosing the LD path for the link i of the first primary path to be the candidate LD path with
5 the smallest LD path link cost sum.

1 14. (original) The invention of claim 12, wherein each link cost is inversely related to the
2 available bandwidth on the link.

1 15. (original) The invention of claim 12, wherein each link cost is inversely related to the
2 available shared bandwidth on the link.

1 16. (original) The invention of claim 11, wherein:
2 selecting the first primary path comprises:
3 computing a sum of the link costs LC_i for all links i in the primary path to determine
4 a link cost sum; and
5 choosing the first primary path to be the primary path with the smallest link cost sum.

1 17. (original) The invention of claim 11, wherein developing the N candidate primary
2 paths and selecting the first primary path for the demand are performed at the source node.

1 18. (original) The invention of claim 11, wherein computing the link detour (LD) path for
2 a given link i in the first primary path is performed at a controlling node for link i , wherein the
3 controlling node for link i is a terminating node for link i that is immediately upstream of link i with
4 respect to the demand.

1 19. (original) The invention of claim 11, wherein the one or more computing elements are
2 adapted to:
3 calculate a LD path cost CPP_i for each link i of each candidate primary path, wherein CPP_i
4 is a function of at least the administrative weight of each link within the link detour path for link i ;
5 calculate a cost of available bandwidth CAB_i for each link i of each candidate primary path,
6 wherein CAB_i is inversely related to the available bandwidth on link i ; and
7 calculate the link cost LC_i for each link i of each candidate primary path as a function of
8 CPP_i and CAB_i .

1 20. (original) The invention of claim 19, wherein CPP_i is calculated and distributed to the
2 rest of the network by a controlling node for link i , wherein the controlling node for link i is a
3 terminating node for link i that is immediately upstream to link i with respect to the demand.

1 21. (new) The invention of claim 11, wherein available bandwidth on a link is defined as
2 a measure of total amount of currently unused bandwidth on the link.

1 22. (new) The invention of claim 1, wherein available bandwidth on a link is defined as a
2 measure of total amount of currently unused bandwidth on the link.

REMARKS/ARGUMENTS

Claims 1-20 were previously pending in the application. Claims 1 and 11 are amended; and new claims 21-22 are added herein. Assuming the entry of this amendment, claims 1-22 are now pending in the application. The Applicant hereby requests further examination and reconsideration of the application in view of the foregoing amendments and these remarks.

Rejections Under 35 U.S.C. 103

In paragraph 1 of the office action, the Examiner rejected claims 1 and 11 under 35 U.S.C. 103(a) as being unpatentable over Seid, in view of Harada, and further in view of Network Protection.

In paragraph 4, the Examiner rejected claims 2-3, 6, 12-13, and 16 under 35 U.S.C. 103(a) as being unpatentable over Seid, in view of Harada, in view of Network Protection, and further in view of Hassel.

In paragraph 8, the Examiner rejected claims 4-5 and 14-15 under 35 U.S.C. 103(a) as being unpatentable over Seid, in view of Harada, in view of Network Protection, in view of Hassel, and further in view of Kodialam.

In paragraph 11, the Examiner rejected claims 7 and 17 under 35 U.S.C. 103(a) as being unpatentable over Seid, in view of Harada, in view of Network Protection, and further in view of Iwata.

In paragraph 13, the Examiner rejected claims 8 and 18 under 35 U.S.C. 103(a) as being unpatentable over Seid, in view of Harada, in view of Network Protection, and further in view of Kodialam.

In paragraph 14, the Examiner rejected claims 9 and 19 under 35 U.S.C. 103(a) as being unpatentable over Seid, in view of Harada, in view of Network Protection, in view of Iwata, and further in view of Luo.

In paragraph 16, the Examiner rejected claims 10 and 20 under 35 U.S.C. 103(a) as being unpatentable over Seid, in view of Harada, in view of Network Protection, in view of Iwata, in view of Luo, and further in view of Kodialam.

For the following reasons, the Applicant submits that all of the now-pending claims are allowable over the cited references.

Claims 1 and 11

In rejecting original claim 1, the Examiner admitted that "Seid and Harada do not disclose computing a link detour (LD) path for each link i in the first primary path as a function of a set $\{ABP_i\}$ of available LD bandwidths, wherein each element ABP_i of the set $\{ABP_i\}$ is equal to the minimum value of the set $\{AB_j\}$ of available bandwidths, wherein each element AB_j of the set $\{AB_j\}$ corresponds to a link j in a candidate LD path for link i ."

Instead, the Examiner cited Network Protection as teaching the features of original claim 1 that are missing from Seid and Harada. According to the Examiner, "'protection paths uses wavelengths already assigned for protection' is interpreted as protection paths which uses bandwidth already assigned for protection (i.e. available bandwidth)." The Examiner also interpreted Network Protection's shortest path approach "as finding a path from a source node to all other nodes (i.e. each node) such that the sum of the weights is minimized."

For the following reasons, the Applicant submits that the Examiner misinterpreted the teachings in Network Protection and/or misapplied those teachings in rejecting claim 1.

As used in the present application, the term "total available bandwidth" on a link refers to a measure of the total amount of currently unused bandwidth on the link. The bandwidth is "available" because it is unused at present. A wavelength may be a unit of bandwidth on a link, but a wavelength is not, by itself, a measure of the total available bandwidth on a link. Rather, the total available bandwidth on a link may be measured by the total number of wavelengths on the link that are currently unused. Thus, a link having a total capacity of 10 wavelengths in which 3 wavelengths are already being used, may be said to have a total available bandwidth of 7 wavelengths. However, any one of those seven individual wavelengths is not itself a measure of the total available bandwidth on the link.

Network Protection teaches two different approaches to finding protection paths: a greedy approach and a shortest path approach. See, e.g., page 2, second column, lines 12-31.

According to the greedy approach, the system uses the fewest previously unused wavelengths to establish the (new) primary and protection paths jointly. *Ibid.* Network Protection's greedy approach is not an example of the approach of claim 1, because Network Protection's greedy approach is independent of the total available bandwidths on the links in those paths. In Network Protection's greedy approach, a wavelength on a link that is already used to protect an existing primary path can be shared to protect the new primary path. Such a shared wavelength is not counted when determining the total cost of the new primary and protection paths, because it was "previously used," not "previously unused." The new primary and protection paths have the fewest previously unused wavelengths. This has nothing to do with the total available bandwidth on each link in the new protection path.

According to Network Protection's shortest path approach, the primary path is first selected using a shortest path approach. The approach then selects protection paths using a shortest path algorithm in which wavelengths already assigned for protection can be used at no additional cost. *Ibid.* Like Network Protection's greedy approach, Network Protection's shortest path approach is also not an example of the approach of claim 1, because Network Protection's shortest path algorithm is also independent of the total available bandwidth on the links in those paths.

In general, as understood by those skilled in the art, a "shortest path" algorithm selects paths having the smallest number of hops (i.e., links). Counting the number of links in a path has nothing to do with the total amounts of available bandwidth on those individual links. According to Network Protection's shortest path approach, when counting the number of links in a protection path, if a link wavelength assigned to the protection path is already assigned to protect another existing primary path, then that link is not counted when determining the total number of hops in that protection path (i.e., the wavelength "can be used at no additional cost").

Claim 1 has been amended to clarify that each element AB_j of the set $\{AB_j\}$ corresponds to the total available bandwidth on a link j in a candidate LD path for link i . Since the greedy and shortest path approaches taught by Network Protection have nothing to do with the total available bandwidths on links in LD paths, Network Protection cannot be said to teach the features of claim 1 that are missing from Seid and Harada.

For all these reasons, the Applicant submits that claim 1 is allowable over the cited references. For similar reasons, the Applicant submits that claim 11 is allowable over the cited references.

Since claims 2-10 and 22 depend directly or indirectly from claim 1, and claims 12-21 depend directly or indirectly from claim 11, it is further submitted that those claims are also allowable over the cited references.

New Claims 21 and 22

According to claims 21 and 22, the total available bandwidth on a link is explicitly defined as a measure of total currently unused bandwidth on the link. The Applicant submits that claims 21 and 22 explicitly clarify the differences between the invention of claims 1 and 11 and the teachings in Network Protection and the other cited references. As such, the Applicant submits that this provides additional reasons for the allowability of claims 21 and 22 over the cited references.

Conclusion

For the reasons set forth above, the Applicant respectfully submits that the rejections of claims 1-20 under Section 103(a) have been overcome. Furthermore, new claims 21-22 patentably define over the cited references.

In view of the above amendments and remarks, the Applicant believes that the now-pending claims are in condition for allowance. Therefore, the Applicant believes that the entire application is now in condition for allowance, and early and favorable action is respectfully solicited.

Fees

During the pendency of this application, the Commissioner for Patents is hereby authorized to charge payment of any filing fees for presentation of extra claims under 37 CFR 1.16 and any patent application processing fees under 37 CFR 1.17 or credit any overpayment to Mendelsohn & Associates, P.C. Deposit Account No. 50-0782.

The Commissioner for Patents is hereby authorized to treat any concurrent or future reply, requiring a petition for extension of time under 37 CFR 1.136 for its timely submission, as incorporating a petition for extension of time for the appropriate length of time if not submitted with the reply.

Respectfully submitted,

Date: 08/12/2008
Customer No. 46850
Mendelsohn & Associates, P.C.
1500 John F. Kennedy Blvd., Suite 405
Philadelphia, Pennsylvania 19102

/Steve Mendelsohn/
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Registration No. 35,951
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(215) 557-6657 (phone)
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Re: Attorney Docket No. Dziong 12-21-38In re application of: Zbigniew M. Dziong et al.

Serial No.: 10/817,760
 Filed: 04/02/04
 Matter No.: 990.0496

Group Art Unit: 4152
 Examiner: Trevillian Highter
 Phone No.: 571-270-3806

For: Calculation of Link-Detour Paths in Mesh Networks**AMENDMENT TRANSMITTAL**

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

Sir:

Transmitted herewith is an Amendment in the above-identified application.

[] No additional fee for claims is required.

	Claims After Amendment	Highest No. Previously Paid For	Present Extra	Additional Fee
Total	22	minus 20 =	2 x 50 =	\$100
Independent	2	minus 3 =	0 x 210 =	\$0
Multiple Dependent Claim(s), if applicable			0 x 370 =	\$0
			TOTAL FEE	\$100

[] It is hereby petitioned for an extension of time in accordance with 37 C.F.R. §1.136(a). The appropriate fee required by 37 C.F.R. §1.17 is calculated as shown below.

Response filed within:

[] first - \$ 120.00

[] second - \$ 460.00

[] third - \$1,050.00

[] fourth - \$1,640.00

[] fifth - \$2,230.00

month after time period set

[X] Electronic credit card payment is being made in the amount of \$100.00.[] Please charge **Mendelsohn & Associates, P.C. Deposit Account No. 50-0782** the amount of \$_____.[X] The Commissioner is hereby authorized to charge any underpayment of the following fees associated with this communication or credit any overpayment to **Deposit Account No. 50-0782**.

[X] Any filing fees under 37 C.F.R. §1.16 for the presentation of extra claims.

[X] Any patent application processing fees under 37 C.F.R. §1.17.

Date: 08/12/2008
 Customer No. 46850
 Mendelsohn & Associates, P.C.
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/Steve Mendelsohn/
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 Attorneys for Applicants

Electronic Patent Application Fee Transmittal				
Application Number:		10817760		
Filing Date:		02-Apr-2004		
Title of Invention:		Calculation of link-detour paths in mesh networks		
First Named Inventor/Applicant Name:		Zbigniew M. Dziong		
Filer:		Steve Mendelsohn/Gerry Marrero		
Attorney Docket Number:		Dziong 12-21-38		
Filed as Large Entity				
Utility Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Claims in excess of 20	1202	2	50	100
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Total in USD (\$)				100

Electronic Acknowledgement Receipt	
EFS ID:	3766089
Application Number:	10817760
International Application Number:	
Confirmation Number:	2094
Title of Invention:	Calculation of link-detour paths in mesh networks
First Named Inventor/Applicant Name:	Zbigniew M. Dziong
Customer Number:	46850
Filer:	Steve Mendelsohn/Gerry Marrero
Filer Authorized By:	Steve Mendelsohn
Attorney Docket Number:	Dziong 12-21-38
Receipt Date:	12-AUG-2008
Filing Date:	02-APR-2004
Time Stamp:	14:40:38
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$ 100
RAM confirmation Number	89
Deposit Account	500782
Authorized User	MENDELSONH,STEVE
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)	

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes) /Message Digest	Multi Part /.zip	Pages (if appl.)
1		Dziong_12_21_38_amend_o a2_v2.pdf	52283 75fe07d13f6fa812dc5cb9e0c68f2d7eb1e3315f	yes	9
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Amendment - After Non-Final Rejection		1	1	
	Claims		2	6	
	Applicant Arguments/Remarks Made in an Amendment		7	9	
Warnings:					
Information:					
2	Fee Worksheet (PTO-06)	Dziong_12_21_38_Amendment_Transmittal.pdf	15895 6fc9b2acc077188b6afeec10fd7cb4267b39ac6e	no	1
Warnings:					
Information:					
3	Fee Worksheet (PTO-06)	fee-info.pdf	8153 3e54905383a8cecd5db6eb08ea2eea8021908ef0b	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			76331		
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.					

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

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875					Application or Docket Number 10/817,760		Filing Date 04/02/2004		☐ 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), (l), or (m))	N/A	N/A	N/A		N/A					
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A		N/A					
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X \$ =		X \$ =					
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$ =		X \$ =					
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$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										
(Column 1)			(Column 2)		(Column 3)		SMALL ENTITY		OR OTHER THAN SMALL ENTITY	
AMENDMENT	08/12/2008	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)		
	Total (37 CFR 1.16(i))	* 22	Minus	** 20	= 2	X \$ =	OR X \$50=	100		
	Independent (37 CFR 1.16(h))	* 2	Minus	*** 3	= 0	X \$ =	OR X \$210=	0		
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))									
	TOTAL ADD'L FEE					TOTAL ADD'L FEE 100				
AMENDMENT	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)			
	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$ =	OR X \$ =			
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =	OR X \$ =			
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))									
	TOTAL ADD'L FEE					TOTAL ADD'L FEE				
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.										

Legal Instrument Examiner:
/EFREM WARREN/

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

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

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Re: Attorney Docket No. Dziong 12-21-38

In re application of: Zbigniew M. Dziong, Muhammad A. Qureshi and Yung-Terng Wang

Serial No.: 10/817,760

Filed: 04/02/2004

Matter No.: 990.0496

Group No.: 2151

Examiner: Trevillian H. Highter

Phone No.: 571-270-3806

For: Calculation of Link-Detour Paths In Mesh Networks

INFORMATION DISCLOSURE STATEMENT

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

Dear Sir:

In accordance with 37 CFR § 1.56, this is an Information Disclosure Statement (IDS) for the above-captioned U.S. patent application. An IDS Form PTO-1449 listing references is enclosed herewith and forms a part hereof. Submission of references is not an admission that those references are in fact prior art.

Certification Under 37 CFR § 1.704(d)

- ☐ Each item of information contained in this statement was cited in a communication from a foreign patent office in a counterpart application and this communication was not received by any individual designated in § 1.56(c) more than thirty days prior to the filing of this statement.

Certification Under 37 CFR § 1.97(e)

- ☒ Each item of information contained in this statement was either (1) cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this statement or (2) not known to any individual designated in § 1.56(c) more than three months prior to the filing of this statement.

Fee Under 37 CFR § 1.97(c)

- ☐ The fee for submission of this IDS under § 1.97(c) is \$180.00 as set forth in § 1.17(p).

Petition Under 37 CFR § 1.97(d)

- ☐ This is a petition requesting consideration of an IDS under § 1.97(d). The petition fee for submission of this IDS under § 1.97(d) is \$180.00 as set forth in § 1.17(p).

Provision of Copies of References

- ☐ A copy of the non-patent literature is enclosed herewith and forms a part hereof.
- ☐ A translation of each of Reference(s) is enclosed herewith and forms a part hereof.
- ☐ A copy of the International Search Report from a corresponding PCT application is enclosed herewith.

- ☐ A copy of the European Search Report from a corresponding EPO application is enclosed herewith.
- ☐ A copy of the final U.S. office action for U.S. patent application no. _____ filed on _____ as attorney docket no. (Case name or our ref.).
- ☐ The above-captioned U.S. patent application is a
- ☐ continuation
 - ☐ divisional
 - ☐ continuation-in-part

application of U.S. application serial number _____, filed on _____ as Attorney Docket No. _____. Each of the listed references was previously cited by or submitted to the Office in the prior application. The above-captioned U.S. patent application relies upon the prior application for an earlier filing date under 35 U.S.C. 120. Pursuant to § 1.98(d), copies of the listed references are not being provided with this IDS.

Authorization To Charge Deposit Account

[X] Authorization is given to charge Mendelsohn & Associates, P.C. Deposit Account No. 50-0782 any deficiency or credit any overpayment for any fee under § 1.97(c) or § 1.97(d).

It is respectfully requested that the Examiner initial and return a copy of the enclosed PTO-1449 form as confirmation that each of the documents has been considered.

Respectfully submitted,

Date: 07-29-2008
Customer No. 46850
Mendelsohn & Associates, P.C.
1500 John F. Kennedy Blvd., Suite 405
Philadelphia, Pennsylvania 19102

/Steve Mendelsohn/
Steve Mendelsohn
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Attorney for Applicant
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Enclosures

FORM PTO-1449 (Rev. 2-32)	U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTY. DOCKET NO. Dziong 12-21-38	SERIAL NO. 10/817,760
INFORMATION DISCLOSURE STATEMENT BY APPLICANT		APPLICANT Zbigniew M. Dziong et al.	
(Use several sheets if necessary)		FILING DATE 04/02/2004	GROUP 2151

U.S. PATENT DOCUMENTS							
EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
	KA	US 2008/0095045 A1	04/2008	Owens et al.	370	220	
	KB	US 7,197,008 B1	03/2007	Shabtay et al.	370	218	
	KC	US 6,807,653 B2	10/2004	Saito	716	2	
	KD	US 6,711,125 B1	03/2004	Walrand et al.	370	223	
	KE	US 2003/0112760 A1	06/2003	Puppa et al.	370	241.1	
	KF	5,933,422	08/1999	Kusano et al.	370	331	

FOREIGN PATENT DOCUMENTS							
		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES NO

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)			

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

Electronic Acknowledgement Receipt	
EFS ID:	3685683
Application Number:	10817760
International Application Number:	
Confirmation Number:	2094
Title of Invention:	Calculation of link-detour paths in mesh networks
First Named Inventor/Applicant Name:	Zbigniew M. Dziong
Customer Number:	46850
Filer:	Steve Mendelsohn/Leighann Madeksiak
Filer Authorized By:	Steve Mendelsohn
Attorney Docket Number:	Dziong 12-21-38
Receipt Date:	29-JUL-2008
Filing Date:	02-APR-2004
Time Stamp:	10:50:18
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment		no			
File Listing:					
Document Number	Document Description	File Name	File Size(Bytes) /Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement Letter	IDS_8.pdf	21442	no	2
			f110d95394f8f39abf53310c38577012654724be		
Warnings:					
Information:					

2	Information Disclosure Statement (IDS) Filed	PTO_1449_KA_KF.pdf	23794 309df7fb1a33c64af53008559f5f23e696380cb9	no	1
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
Total Files Size (in bytes):				45236	
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/817,760	04/02/2004	Zbigniew M. Dziong	Dziong 12-21-38	2094
46850	7590	06/19/2008		
MENDELSON & ASSOCIATES, P.C. 1500 JOHN F. KENNEDY BLVD., SUITE 405 PHILADELPHIA, PA 19102			EXAMINER HIGHTER, TREVILLIAN H	
			ART UNIT	PAPER NUMBER
			2151	
			MAIL DATE	DELIVERY MODE
			06/19/2008	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. 10/817,760		Applicant(s) DZIONG ET AL.	
	Examiner TREVILLIAN HIGHTER		Art Unit 2151	

-- 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 02 April 2004.

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) 1-20 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) 1-20 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 02 April 2004 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 1/3/2008, 4/8/2008.

4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

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

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

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

1. Claims 1 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seid (Patent No. 5,754,543), in view of Harada et al. (Patent No. 5,956,339), and further in view of Using Local Information for WDM Network Protection, hereinafter (Network Protection).

2. With respect to claim 1, Seid discloses selecting a first primary path (column 1, lines 35-36), from the N candidate primary paths (column 1, lines 35-36, when selecting a “best path”, it is apparent that the best path is selected from candidate paths), as a function of N sets $\{LC_i\}$ of link costs (column 1, lines 35-38) wherein each set $\{LC_i\}$ corresponds to one of the N candidate primary paths (column 1, lines 35-38, when selecting a “best path”, it is apparent that the best path is selected from candidate paths), and each element LC_i of each set corresponds to a link cost of a link i in the corresponding candidate primary path (column 1, lines 35-38);

Seid does not disclose developing N candidate primary paths, between a source node and a destination node for a demand, as a function of N sets $\{AB_i\}$ of available bandwidths, wherein each set $\{AB_i\}$ corresponds to one of the N candidate primary paths, and each element AB_i of each set corresponds to the available bandwidth on a link i of the corresponding candidate primary path; computing a link detour (LD) path for each link i in the first primary path as a function of a set $\{ABP_i\}$ of available LD bandwidths, wherein each element ABP_i of the set $\{ABP_i\}$ is equal to the minimum value from the set $\{AB_j\}$ of available bandwidths, wherein each element AB_j of the set $\{AB_j\}$ corresponds to a link j in a candidate LD path for link i.

Harada, however, discloses developing N candidate primary paths, between a source node and a destination node for a demand (abstract, lines 1-3), as a function of N sets $\{AB_i\}$ of available bandwidths (abstract, lines 1-7, available candidate routes are interpreted to be associated with available channel capacities of the links between the sending and destination node on each candidate route; channel capacities are related

to bandwidth; bandwidth is associated with channel capacity because the channel capacity, the limit to the data rate of a communication link and data rate is related to bandwidth), wherein each set $\{AB_i\}$ corresponds to one of the N candidate primary paths (abstract, lines 3-7), and each element AB_i of each set corresponds to the available bandwidth on a link i of the corresponding candidate primary path (abstract, lines 3-7);

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Seid with the teachings of Harada in order to make effective use of a plurality of routes available in the network.

Seid and Harada do not disclose computing a link detour (LD) path for each link i in the first primary path as a function of a set $\{ABP_i\}$ of available LD bandwidths, wherein each element ABP_i of the set $\{ABP_i\}$ is equal to the minimum value from the set $\{AB_j\}$ of available bandwidths, wherein each element AB_j of the set $\{AB_j\}$ corresponds to a link j in a candidate LD path for link i .

Network Protection, however, discloses computing a link detour (LD) path for each link i in the first primary path (Protection Schemes, paragraph 2, lines 13-16) as a function of a set $\{ABP_i\}$ of available LD bandwidths (Path Assignment Approaches, paragraph 1, lines 12-19, in order for a protection path to be selected, computation of the protection path must first take place in order to make selection decision; "protection paths uses wavelengths already assigned for protection" is interpreted as protection paths which uses bandwidth already assigned for protection (i.e. available bandwidth), bandwidth is interpreted as the width of the frequency band to transmit data; waves

represent frequency) wherein each element AB_{Pi} of the set $\{AB_{Pi}\}$ is equal to the minimum value from the set $\{AB_j\}$ of available bandwidths (Path Assignment Approaches, paragraph 1, lines 12-19, the shortest path problem includes finding a shortest path from a source vertex to all other vertices in the graph, therefore, the shortest path is interpreted as finding a path from a source node to all other nodes (i.e. each node) such that the sum of the weights is minimized), wherein each element AB_j of the set $\{AB_j\}$ corresponds to a link j in a candidate LD path for link i (Path Assignment Approaches, paragraph 1, lines 12-19, selection of protection paths makes it clear that candidate protection paths are considered; shortest path problem includes finding a shortest path from a source vertex to all other vertices in the graph. Shortest path is interpreted as finding a path from a source node to all other nodes (i.e. each node) such that the sum of the weights is minimized).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Seid and Harada with the teachings of Network Protection, in order to efficiently switch between a primary path and secondary path based upon detection of a network failure.

3. With respect to claim 11, Seid discloses select a first primary path (column 1, lines 35-36), from the N candidate primary paths (column 1, lines 35-36, when selecting a "best path", it is apparent that the best path is selected from candidate paths), as a function of N sets $\{LC_i\}$ of link costs (column 1, lines 35-38) wherein each set $\{LC_i\}$ corresponds to one of the N candidate primary paths (column 1, lines 35-38, when

selecting a “best path”, it is apparent that the best path is selected from candidate paths), and each element LC_i of each set corresponds to a link cost of a link i in the corresponding candidate primary path (column 1, lines 35-38);

Seid does not disclose develop N candidate primary paths, between a source node and a destination node for a demand, as a function of N sets $\{AB_i\}$ of available bandwidths, wherein each set $\{AB_i\}$ corresponds to one of the N candidate primary paths, and each element AB_i of each set corresponds to the available bandwidth on a link i of the corresponding candidate primary path; compute a link detour (LD) path for each link i in the first primary path as a function of a set $\{ABP_i\}$ of available LD bandwidths, wherein each element ABP_i of the set $\{ABP_i\}$ is equal to the minimum value from the set $\{AB_j\}$ of available bandwidths, wherein each element AB_j of the set $\{AB_j\}$ corresponds to a link j in a candidate LD path for link i .

Harada, however, discloses develop N candidate primary paths, between a source node and a destination node for a demand (abstract, lines 1-3), as a function of N sets $\{AB_i\}$ of available bandwidths (abstract, lines 1-7, available candidate routes are interpreted to be associated with available channel capacities of the links between the sending and destination node on each candidate route; channel capacities are related to bandwidth; bandwidth is associated with channel capacity because the channel capacity, the limit to the data rate of a communication link and data rate is related to bandwidth), wherein each set $\{AB_i\}$ corresponds to one of the N candidate primary paths (abstract, lines 3-7), and each element AB_i of each set corresponds to the available bandwidth on a link i of the corresponding candidate primary path (abstract,

lines 3-7);

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Seid with the teachings of Harada in order to make effective use of a plurality of routes available in the network.

Seid and Harada do not disclose compute a link detour (LD) path for each link i in the first primary path as a function of a set $\{ABP_i\}$ of available LD bandwidths, wherein each element ABP_i of the set $\{ABP_i\}$ is equal to the minimum value from the set $\{AB_j\}$ of available bandwidths, wherein each element AB_j of the set $\{AB_j\}$ corresponds to a link j in a candidate LD path for link i .

Network Protection, however, discloses compute a link detour (LD) path for each link i in the first primary path (Protection Schemes, paragraph 2, lines 13-16) as a function of a set $\{ABP_i\}$ of available LD bandwidths (Path Assignment Approaches, paragraph 1, lines 12-19, in order for a protection path to be selected, computation of the protection path must first take place in order to make selection decision; "protection paths uses wavelengths already assigned for protection" is interpreted as protection paths which uses bandwidth already assigned for protection (i.e. available bandwidth), bandwidth is interpreted as the width of the frequency band to transmit data; waves represent frequency.) wherein each element ABP_i of the set $\{ABP_i\}$ is equal to the minimum value from the set $\{AB_j\}$ of available bandwidths (Path Assignment Approaches, paragraph 1, lines 12-19, the shortest path problem includes finding a shortest path from a source vertex to all other vertices in the graph, therefore, the shortest path is interpreted as finding a path from a source node to all other nodes (i.e. each node) such that the sum

of the weights is minimized), wherein each element AB_j of the set $\{AB_j\}$ corresponds to a link j in a candidate LD path for link i (Path Assignment Approaches, paragraph 1, lines 12-19, selection of protection paths makes it clear that candidate protection paths are considered; shortest path problem includes finding a shortest path from a source vertex to all other vertices in the graph. Shortest path is interpreted as finding a path from a source node to all other nodes (i.e. each node) such that the sum of the weights is minimized).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Seid and Harada with the teachings of Network Protection, in order to efficiently switch between a primary path and secondary path based upon detection of a network failure.

4. Claims 2, 3, 6, 12, 13 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seid, in view of Harada, in view of Network Protection, and further in view of Hassel et al. (Patent No. US 6,606,303 B1).

5. With respect to claims 2 and 12, Seid, Harada, and Network Protection do not disclose each link j in each of a plurality of candidate LD paths for link i of the first primary path has a link cost associated with it; and computing the LD path for each link i in the first primary path comprises selecting the LD path for link i as a function of link cost.

Hassel, however, discloses each link j in each of a plurality of candidate LD paths for link i of the first primary path has a link cost associated with it (column 4, lines 18-19); and computing the LD path for each link i in the first primary path comprises selecting the LD path for link i as a function of link cost (column 4, lines 22).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Seid, Harada, and Network Protection with the teachings of Hassel, in order to tailor link cost and path cost functions according to the requirements of the network regarding resource utilization , routing performance, and other parameters.

6. With respect to claims 3 and 13, the claim is rejected for the same reason as claims 2 and 12 above. In addition Hassel discloses computing a sum of the link costs associated with each link j (column 4, lines 18-21) in two or more candidate LD paths for link i of the first primary path (column 4, lines 22, when a selection is made, it is apparent that a selection is made from candidate paths) to determine an LD path link cost sum (column 4, lines 20-21); and choosing the LD path for the link i of the first primary path to be the candidate LD path with the smallest LD path link cost sum (column 4, line 22).

7. With respect to claims 6 and 16, Seid discloses computing a sum of the link costs LC_i of all links i (column 1, lines 35-41) in each of the N candidate primary path (column 1, lines 35-36, when selecting a “best path”, it is apparent that the best path is selected

from candidate paths) to determine a link cost sum corresponding to each candidate primary path (column 1, lines 35-41).

Seid, Harada, and Network Protection do not disclose choosing the first primary path to be the candidate primary path with the smallest link cost.

Hassel, however, discloses choosing the first primary path to be the candidate primary path with the smallest link cost (column 4, lines 20-22, when selecting a “path” is interpreted as selecting the first primary path to be the candidate path).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Seid, Harada, and Network Protection with the teachings of Hassel, in order to tailor link cost and path cost functions according to the requirements of the network regarding resource utilization , routing performance, and other parameters.

8. Claims 4, 5, 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seid, in view of Harada, in view of Network Protection, in view of Hassel, and further in view of Kodialam et al. (US. Pub. No. 2002/0067693).

9. With respect to claims 4 and 14, Seid, Harada, Network Protection, and Hassel do not disclose each link cost is inversely related to the available bandwidth on the link.

Kodialam, however, discloses each link cost is inversely related to the available bandwidth on the link ([0069], lines 4-13).

Therefore, it would have been obvious to one of ordinary skill in the art at the

time of the invention to modify the teachings of Seid, Harada, Network Protection, and Hassel with the teachings of Kodialam, in order to efficiently share the available backup path bandwidth in the network.

10. With respect to claims 5 and 15, the claim is rejected for the same reason as claims 4 and 14 above. In addition, Kodialam discloses each link cost is inversely related to the available shared bandwidth on the link ([0069], lines 4-13).

11. Claims 7 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seid, in view of Harada, in view of Network Protection, and further in view of Iwata (Patent No. 5,933,425).

12. With respect to claims 7 and 17, Seid, Harada, and Network Protection does not disclose developing the N candidate primary paths and selecting the first primary path for the demand are performed at the source node .

Iwata, however, discloses developing the N candidate primary paths (column 3, lines 46-51, optimum paths are interpreted to include candidate primary paths) and selecting the first primary path for the demand are performed at the source node (column 3, lines 24-27, Fig. 1).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Seid, Harada, and Network Protection with the teachings of Iwata, in order to make effective use of a plurality of routes available in the network

13. Claims 8 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seid, in view of Harada, in view of Network Protection, and further in view of Kodialam.

14. With respect to claims 8 and 18, Seid, Harada, and Network Protection does not disclose computing the link detour (LD) path for a given link *i* in the first primary path is performed at a controlling node for link *i*, wherein the controlling node for link *i* is a terminating node for link *i* that is immediately upstream of link *i* with respect to the demand.

In addition, Kodialam discloses computing the link detour (LD) path for a given link *i* in the first primary path ([0029], lines 4-6) is performed at a controlling node for link *i* ([0028], lines 6-9), wherein the controlling node for link *i* is a terminating node for link *i* that is immediately upstream of link *i* with respect to the demand ([0028], lines 6-9; [0020], lines 1-3; [0029], lines 6-8).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Seid, Harada, and Network Protection with the teachings of Kodialam, in order to efficiently share the available backup path bandwidth in the network.

14. Claims 9 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seid, in view of Harada, in view of Network Protection, in view of Iwata, and further in view of Luo et al. (Patent No. US 6,477,582 B1).

15. With respect to claims 9 and 19, Seid discloses calculating the link cost LC_i for each link i of each candidate primary path as a function of CPP_i and CAB_i (column 2, lines 16-20, path cost as function of administrative weight and cost of available bandwidth are interpreted as non-additive cost factors; column 38-47; column 1, lines 40-41).

Seid, Harada, and Network Protection do not disclose calculating a LD path cost CPP_i for each link i of each candidate primary path, wherein CPP_i is a function of at least the administrative weight of each link within the link detour path for link i .

Iwata, however, discloses calculating a LD path cost CPP_i for each link i of each candidate primary path, wherein CPP_i is a function of at least the administrative weight of each link within the link detour path for link i (column 3, lines 40-43, total cost of path is interpreted to include LD path cost).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Seid, Harada, and Network Protection with the teachings of Iwata, in order to conservatively select links in a path from a source node to a destination node in a communication network.

Seid, Harada, Network Protection, and Iwata do not disclose calculating a cost of available bandwidth CAB_i for each link i of each candidate primary path, wherein CAB_i is inversely related to the available bandwidth on link i .

Luo, however, discloses calculating a cost of available bandwidth CAB_i for each link i of each candidate primary path (column 14, lines 12-18, cost is interpreted as whatever available bandwidth must be required in order to perform path selection, required bandwidth is interpreted

as the cost of available bandwidth, the required bandwidth must be calculated in order for its value to be compared to available bandwidth), wherein CABi is inversely related to the available bandwidth on link I (column 14, lines 12-18, cost is interpreted as whatever available bandwidth must be required in order to perform path selection, required bandwidth is interpreted as the cost of available bandwidth, the required bandwidth must be calculated in order for its value to be compared to available bandwidth).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Seid, Harada, Network Protection, and Iwata with the teachings of Luo, in order to conservatively select links in a path from a source node to a destination node in a communication network.

16. Claims 10 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seid, in view of Harada, in view of Network Protection, in view of Iwata, in view of Luo, and further in view of Kodialam.

17. With respect to claims 10 and 20, Seid, Harada, Network Protection, and Iwata do not disclose (CPPi) distributed to the rest of the network by a controlling node for link i, wherein the controlling node for link i is a terminating node for link i that is immediately upstream to link i with respect to the demand.

Kodialam, however, discloses (CPPi) distributed to the rest of the network by a controlling node for link i, wherein the controlling node for link i is a terminating node for link i that is immediately upstream to link i with respect to the demand [0020], lines 1-3; ([0029], lines

24-27, node immediately upstream from destination node transfer traffic to a backup link, therefore, distributing CPPi to the network by a controlling node is apparent).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Seid, Harada, and Network Protection with the teachings of Kodialam, in order to efficiently share the available backup path bandwidth in the network.

Response to Arguments

1. Applicant's arguments, with regards to claims 1-20, filed 2 April 2004 have been fully considered.

2. On page 3 of the Applicant's Response, applicants argues that the rejection of claims 1-20 are improper because Doshi (239) and the claimed invention were, at the time the claimed invention was made, owned by the same person or subject to an obligation of assignment to the same person. As such, Doshi (239) is not proper art reference.

The Examiner considers the Applicant's arguments and further examines and reconsiders the application in view of these remarks.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TREVILLIAN HIGHTER whose telephone number is (571)270-3806. The examiner can normally be reached on Monday-Friday 8:00-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Follansbee can be reached on (571)272-3984. 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.

THH 4-6-2008
Art Unit 2151
/John Follansbee/

Supervisory Patent Examiner, Art Unit 2151

Notice of References Cited	Application/Control No. 10/817,760		Applicant(s)/Patent Under Reexamination DZIONG ET AL.	
	Examiner TREVILLIAN HIGHTER		Art Unit 2151	Page 1 of 1

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*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-5,754,543	05-1998	Seid, Howard A.	370/351
*	B	US-5,956,339	09-1999	Harada et al.	370/400
*	C	US-6,606,303 B1	08-2003	Hassel et al.	370/238
*	D	US-2002/0067693 A1	06-2002	Kodialam et al.	370/216
*	E	US-6,477,582 B1	11-2002	Luo et al.	709/241
*	F	US-5,933,425	08-1999	Iwata, Atsushi	370/351
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

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

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	Hungjen Wang, Eytan Modiano, Muriel Medard, Using Local Information for WDM Network Protection, 2002, pages 1-4, http://www.mit.edu/~modiano/papers/C46.pdf
	V	
	W	
	X	

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

EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	1	("7039009").PN.	US-PGPUB; USPAT; USOCR; EPO; IBM_TDB	OR	OFF	2007/11/19 07:26
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S3	1	("20040190445").PN.	US-PGPUB; USPAT; USOCR; EPO; IBM_TDB	OR	OFF	2007/11/19 08:05
S4	1	("6760302").PN.	US-PGPUB; USPAT; USOCR; EPO; IBM_TDB	OR	OFF	2007/11/19 08:07
S5	1	("6697334").PN.	US-PGPUB; USPAT; USOCR; EPO; IBM_TDB	OR	OFF	2007/11/19 08:08
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S9	1	("20020067693").PN.	US-PGPUB; USPAT; USOCR; EPO; IBM_TDB	OR	OFF	2007/11/19 08:20
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S12	1	("6130875").PN.	US-PGPUB; USPAT; USOCR; EPO; IBM_TDB	OR	OFF	2007/11/19 09:44
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S32	2256	primary adj path	US-PGPUB; USPAT; EPO; IBM_TDB	OR	ON	2007/11/19 10:11

S33	499669	demand	US-PGPUB; USPAT; EPO; IBM_TDB	OR	ON	2007/11/19 10:11
S34	263568	bandwidth	US-PGPUB; USPAT; EPO; IBM_TDB	OR	ON	2007/11/19 10:11
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S36	28	S32 SAME S33 SAME S34	US-PGPUB; USPAT; EPO; IBM_TDB	OR	ON	2007/11/19 10:12
S37	1083	link adj cost	US-PGPUB; USPAT; EPO; IBM_TDB	OR	ON	2007/11/19 10:53
S38	3	S36 SAME S37	US-PGPUB; USPAT; EPO; IBM_TDB	OR	ON	2007/11/19 10:53
S39	1641	370/351.CCLS.	US-PGPUB; USPAT; EPO; IBM_TDB	OR	ON	2007/11/19 10:58
S40	0	S36 SAME S9	US-PGPUB; USPAT; EPO; IBM_TDB	OR	ON	2007/11/19 10:58
S41	21	S32 SAME S37	US-PGPUB; USPAT; EPO; IBM_TDB	OR	ON	2007/11/19 11:02
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S45	1	("20050220026").PN.	US-PGPUB; USPAT; USOCR; EPO; IBM_TDB	OR	OFF	2007/11/19 11:19
S46	527	administrat\$3 adj weight	US-PGPUB; USPAT; EPO; IBM_TDB	OR	OFF	2007/11/19 11:23
S47	596	shared adj bandwidth	US-PGPUB; USPAT; EPO; IBM_TDB	OR	OFF	2007/11/19 11:23
S48	1359	demand adj bandwidth	US-PGPUB; USPAT; EPO; IBM_TDB	OR	OFF	2007/11/19 11:23
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S50	28	S32 SAME S33 SAME S34	US-PGPUB; USPAT; EPO; IBM_TDB	OR	ON	2007/11/19 11:47
S51	3	S32 S33 S34 S37 S42	US-PGPUB; USPAT; EPO; IBM_TDB	AND	ON	2007/11/19 11:48
S52	434	BACKUP ADJ PATH	US-PGPUB; USPAT; EPO; IBM_TDB	OR	OFF	2007/11/19 11:50
S53	4	S32 S33 S34 S42	US-PGPUB; USPAT; EPO; IBM_TDB	AND	ON	2007/11/19 11:51
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S55	1	("20060013149").PN.	US-PGPUB; USPAT; USOCR; EPO; IBM_TDB	OR	OFF	2007/11/19 11:54
S56	64	S32 AND S37	US-PGPUB; USPAT; EPO; IBM_TDB	OR	ON	2007/11/19 11:58
S57	2378369	connection	US-PGPUB; USPAT; EPO; IBM_TDB	OR	ON	2007/11/19 13:18
S58	890359	capacity	US-PGPUB; USPAT; EPO; IBM_TDB	OR	ON	2007/11/19 13:21
S59	3	S32 SAME (S33 OR S57) SAME (S34 OR S58) SAME S37	US-PGPUB; USPAT; EPO; IBM_TDB	OR	ON	2007/11/19 13:23
S60	606	RECOVERY ADJ PATH	US-PGPUB; USPAT; EPO; IBM_TDB	OR	ON	2007/11/19 13:24
S61	3	S59 SAME S60	US-PGPUB; USPAT; EPO; IBM_TDB	OR	ON	2007/11/19 13:24
S62	61	S32(S33 OR S57)(S34 OR S58)S37	US-PGPUB; USPAT; EPO; IBM_TDB	AND	ON	2007/11/19 13:26
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S64	675	S63 same S32	US-PGPUB; USPAT; EPO; IBM_TDB	AND	ON	2007/11/19 13:52
S65	692885	detour or alternate	US-PGPUB; USPAT; EPO; IBM_TDB	AND	ON	2007/11/19 13:53
S66	119	S64 same S65	US-PGPUB; USPAT; EPO; IBM_TDB	AND	ON	2007/11/19 13:53

S67	9	S64 same S65 same demand	US-PGPUB; USPAT; EPO; IBM_TDB	AND	ON	2007/11/19 13:55
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S76	0	"efficient capacity sharing in path restoration schemes for mesh optical networks"	US-PGPUB; USPAT; EPO; IBM_TDB	OR	OFF	2007/11/26 15:11
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S81	0	S79 same S80	US-PGPUB; USPAT; EPO; IBM_TDB	OR	OFF	2007/11/27 07:41
S82	0	S79 same S80	US-PGPUB; USPAT; EPO; IBM_TDB	OR	OFF	2007/11/27 07:41

S83	2260	primary adj path	US-PGPUB; USPAT; EPO; IBM_TDB	OR	ON	2007/11/27 07:42
S84	0	S79 same S83	US-PGPUB; USPAT; EPO; IBM_TDB	OR	OFF	2007/11/27 07:42
S85	1	("6850705").PN.	US-PGPUB; USPAT; USOCR; EPO; IBM_TDB	OR	OFF	2008/04/28 08:53
S86	78298	link\$1 same ((protection or recovery or cost\$1) or (available near3 bandwidth))	US-PGPUB; USPAT; USOCR; EPO; DERWENT; IBM_TDB	OR	OFF	2008/04/28 12:12
S87	28441	link\$1 with ((protection or recovery or cost\$1) or (available near3 bandwidth))	US-PGPUB; USPAT; USOCR; EPO; DERWENT; IBM_TDB	OR	OFF	2008/04/28 12:13
S88	77	link with detour with path	US-PGPUB; USPAT; USOCR; EPO; DERWENT; IBM_TDB	OR	ON	2008/04/28 12:13
S89	46	S87 AND S88	US-PGPUB; USPAT; USOCR; EPO; DERWENT; IBM_TDB	OR	ON	2008/04/28 12:13
S90	4295	(bandwidth or band adj width or capacity) with (reserv\$3 or stor\$3 or table or assign\$2) with link\$1	US-PGPUB; USPAT; USOCR; EPO; DERWENT; IBM_TDB	OR	OFF	2008/04/29 10:59
S91	63353	"709".clas.	US-PGPUB; USPAT; USOCR; EPO; DERWENT; IBM_TDB	OR	OFF	2008/04/29 11:00
S92	700	S90 AND S91	US-PGPUB; USPAT; USOCR; EPO; DERWENT; IBM_TDB	OR	OFF	2008/04/29 11:00
S93	4305	link and ((protection or recovery) with cost\$1)	US-PGPUB; USPAT; USOCR; EPO; DERWENT; IBM_TDB	OR	OFF	2008/04/29 11:01

S94	250	S91 AND S93	US-PGPUB; USPAT; USOCR; EPO; DERWENT; IBM_TDB	OR	OFF	2008/04/29 11:02
S95	28	S92 AND S94	US-PGPUB; USPAT; USOCR; EPO; DERWENT; IBM_TDB	OR	OFF	2008/04/29 11:02
S96	81606	(multiple or candidate or many) with primary or (recovery or detour) with path\$1	US-PGPUB; USPAT; USOCR; EPO; DERWENT; IBM_TDB	OR	OFF	2008/04/29 11:37
S97	379	S90 AND S96	US-PGPUB; USPAT; USOCR; EPO; DERWENT; IBM_TDB	OR	OFF	2008/04/29 11:38
S98	81	S96 AND S92	US-PGPUB; USPAT; USOCR; EPO; DERWENT; IBM_TDB	OR	OFF	2008/04/29 11:38
S99	107	((primary or working or recovery or "link-detour") WITH path\$1) SAME (reserv\$3 or stor\$3 or table or assign\$2) WITH (bandwidth or band adj width or capacity) WITH (node\$1 or point\$1 or router\$1 or switch\$2)	US-PGPUB; USPAT; USOCR; EPO; DERWENT; IBM_TDB	OR	OFF	2008/04/29 13:43
S100	63353	"709".clas.	US-PGPUB; USPAT; USOCR; EPO; DERWENT; IBM_TDB	OR	OFF	2008/04/29 13:45
S101	13	S100 AND S99	US-PGPUB; USPAT; USOCR; EPO; DERWENT; IBM_TDB	OR	OFF	2008/04/29 13:45
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S103	5	(select or choose or pick) with ((candidate or primary or working) with path\$1) same (link adj cost\$1)	US-PGPUB; USPAT; USOCR; EPO; DERWENT; IBM_TDB	OR	OFF	2008/04/29 14:14

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S108	140	((available WITH (bandwidth OR capacity)) OR (link ADJ cost\$1)) WITH (each or individual) WITH link	US-PGPUB; USPAT; USOCR; EPO; DERWENT; IBM_TDB	OR	OFF	2008/04/30 10:29
S109	177	((available WITH (bandwidth OR capacity)) OR (link ADJ cost\$1)) WITH (each or individual) WITH link	US-PGPUB; USPAT; USOCR; EPO; DERWENT; IBM_TDB	OR	ON	2008/04/30 10:30
S110	105741	(multiple or candidate or many) WITH ((primary OR working) OR (alternate or back\$1up or recovery or detour) with path\$1)	US-PGPUB; USPAT; USOCR; EPO; DERWENT; IBM_TDB	OR	ON	2008/04/30 10:30
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S113	166	S112 AND S110	US-PGPUB; USPAT; USOCR; EPO; DERWENT; IBM_TDB	OR	OFF	2008/04/30 10:42

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S116	2	("5933425").PN.	US-PGPUB; USPAT; USOCR; EPO; DERWENT; IBM_TDB	OR	OFF	2008/04/30 13:57
S117	5	("6606303").PN.	US-PGPUB; USPAT; USOCR; EPO; DERWENT; IBM_TDB	OR	OFF	2008/04/30 15:39
S118	2	("6850705").PN.	US-PGPUB; USPAT; USOCR; EPO; DERWENT; IBM_TDB	OR	OFF	2008/04/30 16:32
S119	2	("0660303").PN.	US-PGPUB; USPAT; USOCR; EPO; DERWENT; IBM_TDB	OR	OFF	2008/05/01 11:40
S120	5	("6606303").PN.	US-PGPUB; USPAT; USOCR; EPO; DERWENT; IBM_TDB	OR	OFF	2008/05/01 11:41
S121	2	("20020067693").PN.	US-PGPUB; USPAT; USOCR; EPO; DERWENT; IBM_TDB	OR	OFF	2008/05/01 12:09

5/ 5/ 2008 10:09:26 PM

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<i>Search Notes</i> 	Application/Control No. 10817760	Applicant(s)/Patent Under Reexamination DZIONG ET AL.
	Examiner Trevillian H Highter	Art Unit 2151

SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
709/238 with keywords	11/27/2007	TH
370/351 with keywords	11/27/2007	TH
Double Patenting Search (Inventor)	11/27/2007	TH
East tool was used, history included	11/27/2007	TH
709/238 with keywords	5/5/2008	TH
709 class search with keywords	5/5/2008	TH
East tool was used, history included	5/5/2008	TH

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

<i>Index of Claims</i> 	Application/Control No. 10817760	Applicant(s)/Patent Under Reexamination DZIONG ET AL.
	Examiner Trevillian H Highter	Art Unit 2151

✓	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	11/27/2007											
	1	✓											
	2	✓											
	3	✓											
	4	✓											
	5	✓											
	6	✓											
	7	✓											
	8	✓											
	9	✓											
	10	✓											
	11	✓											
	12	✓											
	13	✓											
	14	✓											
	15	✓											
	16	✓											
	17	✓											
	18	✓											
	19	✓											
	20	✓											

FORM PTO-1449 (Rev. 2-32)	U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTY. DOCKET NO. Dziong 12-21-38	SERIAL NO. 10/817,760
INFORMATION DISCLOSURE STATEMENT BY APPLICANT		APPLICANT Zbigniew M. Dziong, et al.	
(Use several sheets if necessary)		FILING DATE 04/02/2004	GROUP 4152

U.S. PATENT DOCUMENTS							
EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
/T.H./	IA	US 7,248,561 B2	07/2007	Ishibashi et al.	370	228	
/T.H./	IB	US 7,180,852 B1	02/2007	Doverspike et al.	370	217	
/T.H./	IC	US 6,982,951 B2	01/2006	Doverspike et al.	370	217	
/T.H./	ID	US 2005/0232144 A1	10/2005	Doverspike et al.	370	216	
/T.H./	IE	US 2005/0201276 A1	09/2005	Sinha	370	225	
/T.H./	IF	US 6,904,462 B1	06/2005	Sinha	709	226	
/T.H./	IG	US 2004/0008619 A1	01/2004	Doshi et al.	370	217	
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/T.H./	II	6,075,766	06/2000	Croslin	370	225	
/T.H./	IJ	5,881,048	03/1999	Croslin	370	228	

FOREIGN PATENT DOCUMENTS							
		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES NO

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)							

EXAMINER /Trevillian Highter/	DATE CONSIDERED 05/05/2008
--------------------------------------	-----------------------------------

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

990.0496

(Form PTO-1449)

FORM PTO-1449 (Rev. 2-32)	U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTY. DOCKET NO. Dziong 12-21-38	SERIAL NO. 10/817,760
INFORMATION DISCLOSURE STATEMENT BY APPLICANT		APPLICANT Zbigniew M. Dziong, et al.	
(Use several sheets if necessary)		FILING DATE 04/02/2004	GROUP 4152

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/T.H./	JA	US 7,308,198 B1	12/2007	Chudak et al.	398	58	
/T.H./	JB	US 7,280,755 B2	10/2007	Kang et al.	398	7	
/T.H./	JC	US 7,272,116 B1	09/2007	Houchen	370	258	
/T.H./	JD	US 7,209,975 B1	04/2007	Zang et al.	709	238	
/T.H./	JE	US 7,164,652 B2	01/2007	Puppa et al.	370	225	
/T.H./	JF	US 7,110,356 B2	09/2006	Illikkal et al.	370	222	
/T.H./	JG	US 6,795,394 B1	09/2004	Swinkels et al.	370	222	
/T.H./	JH	US 2004/0174882 A1	09/2004	Willis	370	395.5	
/T.H./	JI	US 6,725,401 B1	04/2004	Lindhorst-Ko	714	47	
/T.H./	JJ	US 6,549,513 B1	04/2003	Chao et al.	370	227	
/T.H./	JK	US 6,538,987 B1	03/2003	Cedrone et al.	370	216	
/T.H./	JL	US 2003/0048749 A1	03/2003	Stamatelakis et al.	370	225	
/T.H./	JM	US 2002/0118636 A1	08/2002	Phelps et al.	370	222	

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		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES NO

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)		
	JN	"Operation & Maintenance mechanism for MPLS networks" ITU-T, Y.1711, 2002, pages 1-22.

EXAMINER	/Trevillian Highter/	DATE CONSIDERED	05/05/2008
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EXAMINER	DATE CONSIDERED
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EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered.
Include copy of this form with next communication to applicant.

Electronic Acknowledgement Receipt	
EFS ID:	3112408
Application Number:	10817760
International Application Number:	
Confirmation Number:	2094
Title of Invention:	Calculation of link-detour paths in mesh networks
First Named Inventor/Applicant Name:	Zbigniew M. Dziong
Customer Number:	46850
Filer:	Steve Mendelsohn/Leighann Madeksiak
Filer Authorized By:	Steve Mendelsohn
Attorney Docket Number:	Dziong 12-21-38
Receipt Date:	08-APR-2008
Filing Date:	02-APR-2004
Time Stamp:	14:37:50
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes) /Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement Letter	IDS_7.pdf	21439	no	2
			d162fb1512ed15fe2b4d2454463fc473a bec8197		

Warnings:

Information:

2	Information Disclosure Statement (IDS) Filed	PTO_1449_JA_JN.pdf	25863 c4d7cd1a31fee3ee41120397152d9d3460e679c1	no	1
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Information:					
This is not an USPTO supplied IDS fillable form					
3	NPL Documents	Reference_JN.pdf	1584496 c47448199a01a6dbbf6b471dca73a64f0e4d2d4	no	30
Warnings:					
Information:					
Total Files Size (in bytes):			1631798		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Re: Attorney Docket No. Dziong 12-21-38

In re application of: Zbigniew M. Dziong, Muhammad A. Qureshi and Yung-Terng Wang

Serial No.: 10/817,760
Filed: 04/02/04
Matter No.: 990.0496

Group No.: 4152
Examiner: Trevillian H. Highter
Phone No.: 571-270-3806

For: Calculation of Link-Detour Paths In Mesh Networks

INFORMATION DISCLOSURE STATEMENT

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

Dear Sir:

In accordance with 37 CFR § 1.56, this is an Information Disclosure Statement (IDS) for the above-captioned U.S. patent application. An IDS Form PTO-1449 listing references is enclosed herewith and forms a part hereof. Submission of references is not an admission that those references are in fact prior art.

Certification Under 37 CFR § 1.704(d)

- ☐ Each item of information contained in this statement was cited in a communication from a foreign patent office in a counterpart application and this communication was not received by any individual designated in § 1.56(c) more than thirty days prior to the filing of this statement.

Certification Under 37 CFR § 1.97(e)

- ☒ Each item of information contained in this statement was either (1) cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this statement or (2) not known to any individual designated in § 1.56(c) more than three months prior to the filing of this statement.

Fee Under 37 CFR § 1.97(c)

- ☐ The fee for submission of this IDS under § 1.97(c) is \$180.00 as set forth in § 1.17(p).

Petition Under 37 CFR § 1.97(d)

- ☐ This is a petition requesting consideration of an IDS under § 1.97(d). The petition fee for submission of this IDS under § 1.97(d) is \$180.00 as set forth in § 1.17(p).

Provision of Copies of References

- ☒ A copy of the non-patent literature is enclosed herewith and forms a part hereof.
- ☐ A translation of each of Reference(s) is enclosed herewith and forms a part hereof.
- ☐ A copy of the International Search Report from a corresponding PCT application is enclosed herewith.

- ☐ A copy of the European Search Report from a corresponding EPO application is enclosed herewith.
- ☐ A copy of the final U.S. office action for U.S. patent application no. _____ filed on _____ as attorney docket no. (Case name or our ref.).
- ☐ The above-captioned U.S. patent application is a
- ☐ continuation
 - ☐ divisional
 - ☐ continuation-in-part

application of U.S. application serial number _____, filed on _____ as Attorney Docket No. _____. Each of the listed references was previously cited by or submitted to the Office in the prior application. The above-captioned U.S. patent application relies upon the prior application for an earlier filing date under 35 U.S.C. 120. Pursuant to § 1.98(d), copies of the listed references are not being provided with this IDS.

Authorization To Charge Deposit Account

☒ Authorization is given to charge Mendelsohn & Associates, P.C. Deposit Account No. 50-0782 any deficiency or credit any overpayment for any fee under § 1.97(c) or § 1.97(d).

It is respectfully requested that the Examiner initial and return a copy of the enclosed PTO-1449 form as confirmation that each of the documents has been considered.

Respectfully submitted,

Date: 04-08-08
Customer No. 46850
Mendelsohn & Associates, P.C.
1500 John F. Kennedy Blvd., Suite 405
Philadelphia, Pennsylvania 19102

/Steve Mendelsohn/
Steve Mendelsohn
Registration No. 35,951
Attorney for Applicant
(215) 557-6657

Enclosures

CUSTOMER NO. 46850

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Re: Attorney Docket No. Dziong 12-21-38

In re application of: Zbigniew M. Dziong et al.

Serial No.: 10/817,760

Group Art Unit: 4152

Filed: 04/02/04

Examiner: Trevillian Highter

Matter No.: 990.0496

Phone No.: 571-270-3806

For: Calculation of Link-Detour Paths in Mesh Networks

AMENDMENT UNDER 37 CFR 1.111

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

Dear Sir:

This Amendment is filed in response to the non-final office action of 12/05/07.

SPECIFICATION

- o Amend paragraph beginning at page 1, line 13, as follows:

This application is one of a set of U.S. patent applications consisting of application no. ~~10/xxx,xxx~~ 10/817,748 filed as attorney docket no. Dziong 11-20-37; application no. ~~10/xxx,xxx~~ 10/817,760 filed as attorney docket no. Dziong 12-21-38; and application no. ~~10/xxx,xxx~~ 10/817,745 filed as attorney docket no. Dziong 13-22-39, all of which were filed on ~~the same date~~ 04/02/04 and the teachings of all of which are incorporated herein by reference.

REMARKS/ARGUMENTS

Claims 1-20 are pending in the application. The Applicant hereby requests further examination and reconsideration of the application in view of these remarks.

Specification

In paragraph 2 of the office action, the Examiner objected to the specification. In response, the Applicant has updated the cross-references, as suggested by the Examiner.

Claim Rejections

In paragraph 4 of the office action, the Examiner rejected claims 1-20 under 35 U.S.C. 103(a) as being unpatentable over Doshi (239) in view of Doshi (Paper), in further view of Kodialam.

The rejections of claims 1-20 under 35 U.S.C. 103(a) as being unpatentable over Doshi (239) in view of Doshi (Paper) in further view of Kodialam are improper because Doshi (239) and the claimed invention were, at the time the claimed invention was made, owned by the same person or subject to an obligation of assignment to the same person. As such, Doshi (239) is not a proper prior-art reference.

In view of the above remarks, the Applicant believes that the now-pending claims are in condition for allowance. Therefore, the Applicant believes that the entire application is now in condition for allowance, and early and favorable action is respectfully solicited.

Fees

During the pendency of this application, the Commissioner for Patents is hereby authorized to charge payment of any filing fees for presentation of extra claims under 37 CFR 1.16 and any patent application processing fees under 37 CFR 1.17 or credit any overpayment to Mendelsohn & Associates, P.C. Deposit Account No. 50-0782.

The Commissioner for Patents is hereby authorized to treat any concurrent or future reply, requiring a petition for extension of time under 37 CFR 1.136 for its timely submission, as incorporating a petition for extension of time for the appropriate length of time if not submitted with the reply.

Respectfully submitted,

Date: February 13, 2008
Customer No. 46850
Mendelsohn & Associates, P.C.
1500 John F. Kennedy Blvd., Suite 405
Philadelphia, Pennsylvania 19102

/Steve Mendelsohn/
Steve Mendelsohn
Registration No. 35,951
Attorney for Applicant
(215) 557-6657 (phone)
(215) 557-8477 (fax)

Electronic Acknowledgement Receipt	
EFS ID:	2854512
Application Number:	10817760
International Application Number:	
Confirmation Number:	2094
Title of Invention:	Calculation of link-detour paths in mesh networks
First Named Inventor/Applicant Name:	Zbigniew M. Dziong
Customer Number:	46850
Filer:	Steve Mendelsohn/Gerry Marrero
Filer Authorized By:	Steve Mendelsohn
Attorney Docket Number:	Dziong 12-21-38
Receipt Date:	13-FEB-2008
Filing Date:	02-APR-2004
Time Stamp:	15:30:36
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment		no			
File Listing:					
Document Number	Document Description	File Name	File Size(Bytes) /Message Digest	Multi Part /.zip	Pages (if appl.)
1		990_0496_Dziong_12_21_38_amend_oa1.pdf	23215	yes	3
			e1873b5a7410e1b37b3c8db446ec33dfbccac320		

	Multipart Description/PDF files in .zip description		
	Document Description	Start	End
	Amendment - After Non-Final Rejection	1	1
	Specification	2	2
	Applicant Arguments/Remarks Made in an Amendment	3	3
Warnings:			
Information:			
Total Files Size (in bytes):		23215	
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.			

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Re: Attorney Docket No. Dziong 12-21-38

In re application of: Zbigniew M. Dziong, Muhammad A. Qureshi and Yung-Terng Wang

Serial No.: 10/817,760
Filed: 04/02/04
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Group No.: 4152
Examiner: Trevillian H. Highter
Phone No.: 571-270-3806

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P.O. Box 1450
Alexandria, VA 22313-1450

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Respectfully submitted,

Date: 01-03-08
Customer No. 46850
Mendelsohn & Associates, P.C.
1500 John F. Kennedy Blvd., Suite 405
Philadelphia, Pennsylvania 19102

/Steve Mendelsohn/
Steve Mendelsohn
Registration No. 35,951
Attorney for Applicant
(215) 557-6657

Enclosures

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT		APPLICANT Zbigniew M. Dziong, et al.	
(Use several sheets if necessary)		FILING DATE 04/02/2004	GROUP 4152

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	IJ	5,881,048	03/1999	Croslin	370	228	

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		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES NO

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)							

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

Electronic Acknowledgement Receipt	
EFS ID:	2648433
Application Number:	10817760
International Application Number:	
Confirmation Number:	2094
Title of Invention:	Calculation of link-detour paths in mesh networks
First Named Inventor/Applicant Name:	Zbigniew M. Dziong
Customer Number:	46850
Filer:	Steve Mendelsohn/Leighann Madeksiak
Filer Authorized By:	Steve Mendelsohn
Attorney Docket Number:	Dziong 12-21-38
Receipt Date:	03-JAN-2008
Filing Date:	02-APR-2004
Time Stamp:	11:48:08
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes) /Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement Letter	IDS_6.pdf	21349	no	2
			ee566353d764e90c6b55ead4f59e54c0d8b66d97		

Warnings:

Information:

2	Information Disclosure Statement (IDS) Filed	PTO_1449_IA_IJ.pdf	23635 50a8c7161a5ea31b586f39f4896dbd2c bd7166b0	no	1
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
Total Files Size (in bytes):			44984		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/817,760	04/02/2004	Zbigniew M. Dziong	Dziong 12-21-38	2094
46850 7590 12/05/2007 MENDELSON & ASSOCIATES, P.C. 1500 JOHN F. KENNEDY BLVD., SUITE 405 PHILADELPHIA, PA 19102			EXAMINER HIGHTER, TREVILLIAN H	
			ART UNIT 4152	PAPER NUMBER
			MAIL DATE 12/05/2007	DELIVERY MODE PAPER

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

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

Office Action Summary	Application No. 10/817,760		Applicant(s) DZIONG ET AL.	
	Examiner Trevillian H. Highter		Art Unit 4152	

-- 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 2 April 2004.

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) 1-20 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) 1-20 is/are rejected.

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

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

Application Papers

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

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

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

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

Priority under 35 U.S.C. § 119

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

a) ☐ All b) ☐ Some * c) ☐ None of:

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

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

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

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

Attachment(s)

1) ☐ 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 See Continuation Sheet.

4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :9/24/2007, 5/16/2007, 5/16/2007, 7/31/2006, 11/21/2005, 4/2/2004.

DETAILED ACTION

1. Claims 1-20 are pending in this application.

Specification

2. The disclosure is objected to because of the following informalities: cross-references are not updated. Appropriate correction is required.

Claim Rejections - 35 USC § 103

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

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

4. **Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Doshi et.al. (US Pub. No. 2004/0205239 A1), hereinafter Doshi (239), in view of Doshi et. al. (Optical Network Design and Restoration), hereinafter Doshi (Paper), in further view of Kodialam et. al. (US. Pub. No. 2002/0067693), hereinafter Kodialam. Doshi (239) and Kodialam are cited in the Information Disclosure Statement filed by applicant on 9/24/2007. Doshi (Paper) is cited in the Information Disclosure Statement filed by applicant on 4/2/2004.**

5. With respect to claim 1, Doshi (239) discloses selecting a first primary path (abstract, line 7), from the N candidate primary paths (abstract, lines 7-8), as a function of N sets $\{LC_i\}$ of link costs (abstract, lines 5-9, a path is a set of one or more links, therefore, when path cost is calculated, link cost is inherent. Cost is generated for a path; when a cost is generated for a restoration path, generating a cost for a primary path is inherent) wherein each set $\{LC_i\}$ corresponds to one of the N candidate primary paths (abstract, lines 5-9, a path is a set of one or more links, therefore, when path cost is calculated, link cost is inherent. Cost is generated for a path; when a cost is generated for a restoration path, generating a cost for a primary path is inherent), and each element LC_i of each set corresponds to a link cost of a link i in the corresponding candidate primary path (abstract, lines 5-6, if sum of link costs is generated, link cost of a link is inherent);

Doshi (239) does not disclose developing N candidate primary paths, between a source node and a destination node for a demand, as a function of N sets $\{AB_i\}$ of available bandwidths, wherein each set $\{AB_i\}$ corresponds to one of the N candidate primary paths, and each element AB_i of each set corresponds to the available bandwidth on a link i of the corresponding candidate primary path; computing a link detour (LD) path for each link i in the first primary path as a function of a set $\{ABP_i\}$ of available LD bandwidths, wherein each element ABP_i of the set $\{ABP_i\}$ is equal to the minimum value from the set $\{AB_j\}$ of available bandwidths, wherein each element AB_j of the set $\{AB_j\}$ corresponds to a link j in a candidate LD path for link i.

Doshi (Paper), however, discloses developing N candidate primary paths (page 60, column 2, lines 32-33), between a source node and a destination node for a demand (page 60, column 2, lines 32-33, a path consist of a source and destination node), as a function of N sets $\{AB_i\}$ of available bandwidths (page 60, column 2, lines 36-41, algorithms that compute paths involve discovery of bandwidths), wherein each set $\{AB_i\}$ corresponds to one of the N candidate primary paths (page 60, column 2, lines 36-41, algorithms that compute paths involve discovery of bandwidths), and each element AB_i of each set corresponds to the available bandwidth on a link i of the corresponding candidate primary path (page 60, column 2, lines 36-41, algorithms that compute paths involve discovery of bandwidths, therefore, the bandwidth on each link is inherent because a path consist of links);

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Doshi (239) by developing candidate primary paths with selecting a first primary path from the candidate primary paths as taught by Doshi (Paper), in order to minimize network capacity and cost.

Doshi (239) and Doshi (Paper) do not disclose computing a link detour (LD) path for each link i in the first primary path as a function of a set $\{ABP_i\}$ of available LD bandwidths, wherein each element ABP_i of the set $\{ABP_i\}$ is equal to the minimum value from the set $\{AB_j\}$ of available bandwidths, wherein each element AB_j of the set $\{AB_j\}$ corresponds to a linkj in a candidate LD path for link i.

Kodialam, however, discloses computing a link detour (LD) path for each link i in the first primary path ([0029], lines 2-6, when determining a backup path for every link of

a failed node and last link in an active path, computing a link detour path for each link in the primary path is inherent) as a function of a set $\{ABP_i\}$ of available LD bandwidths ([0034], lines 1-11), wherein each element ABP_i of the set $\{ABP_i\}$ is equal to the minimum value from the set $\{AB_j\}$ of available bandwidths ([0034], lines 11-16), wherein each element AB_j of the set $\{AB_j\}$ corresponds to a link j in a candidate LD path for link i ([0034], line 1-14).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Doshi (239) and Doshi (Paper), by developing candidate primary paths and selecting a first primary path from the candidate primary paths with computing a link detour path, in order to switch between a primary path and secondary path based upon detection of a network failure.

6. With respect to claim 11, Doshi (239) discloses selecting a first primary path (abstract, line 7), from the N candidate primary paths (abstract, lines 7-8), as a function of N sets $\{LC_i\}$ of link costs (abstract, lines 5-9, a path is a set of one or more links, therefore, when path cost is calculated, link cost is inherent. Cost is generated for a path; when a cost is generated for a restoration path, generating a cost for a primary path is inherent) wherein each set $\{LC_i\}$ corresponds to one of the N candidate primary paths (abstract, lines 5-9, a path is a set of one or more links, therefore, when path cost is calculated, link cost is inherent. Cost is generated for a path; when a cost is generated for a restoration path, generating a cost for a primary path is inherent), and each element LC_i of each set corresponds to a link cost of a link i in the

corresponding candidate primary path (abstract, lines 5-6, if sum of link costs is generated, link cost of a link is inherent);

Doshi (239) does not disclose developing N candidate primary paths, between a source node and a destination node for a demand, as a function of N sets $\{AB_i\}$ of available bandwidths, wherein each set $\{AB_i\}$ corresponds to one of the N candidate primary paths, and each element AB_i of each set corresponds to the available bandwidth on a link i of the corresponding candidate primary path; computing a link detour (LD) path for each link i in the first primary path as a function of a set $\{ABP_i\}$ of available LD bandwidths, wherein each element ABP_i of the set $\{ABP_i\}$ is equal to the minimum value from the set $\{AB_j\}$ of available bandwidths, wherein each element AB_j of the set $\{AB_j\}$ corresponds to a link j in a candidate LD path for link i.

Doshi (Paper), however, discloses developing N candidate primary paths (page 60, column 2, lines 32-33), between a source node and a destination node for a demand (page 60, column 2, lines 32-33, a path consist of a source and destination node), as a function of N sets $\{AB_i\}$ of available bandwidths (page 60, column 2, lines 36-41, algorithms that compute paths involve discovery of bandwidths), wherein each set $\{AB_i\}$ corresponds to one of the N candidate primary paths (page 60, column 2, lines 36-41, algorithms that compute paths involve discovery of bandwidths), and each element AB_i of each set corresponds to the available bandwidth on a link i of the corresponding candidate primary path (page 60, column 2, lines 36-41, algorithms that compute paths involve discovery of bandwidths, therefore, the bandwidth on each link is inherent because a path consist of links);

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Doshi (239) by developing candidate primary paths with selecting a first primary path from the candidate primary paths as taught by Doshi (Paper), in order to minimize network capacity and cost.

Doshi (239) and Doshi (Paper) do not disclose computing a link detour (LD) path for each link i in the first primary path as a function of a set $\{ABP_i\}$ of available LD bandwidths, wherein each element ABP_i of the set $\{ABP_i\}$ is equal to the minimum value from the set $\{AB_j\}$ of available bandwidths, wherein each element AB_j of the set $\{AB_j\}$ corresponds to a link j in a candidate LD path for link i .

Kodialam, however, discloses computing a link detour (LD) path for each link i in the first primary path ([0029], lines 2-6, when determining a backup path for every link of a failed node and last link in an active path, computing a link detour path for each link in the primary path is inherent) as a function of a set $\{ABP_i\}$ of available LD bandwidths ([0034], lines 1-11), wherein each element ABP_i of the set $\{ABP_i\}$ is equal to the minimum value from the set $\{AB_j\}$ of available bandwidths ([0034], lines 11-16), wherein each element AB_j of the set $\{AB_j\}$ corresponds to a link j in a candidate LD path for link i ([0034], line 1-14).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Doshi (239) and Doshi (Paper), by developing candidate primary paths and selecting a first primary path from the candidate primary paths with computing a link detour path, in order to switch between a primary path and secondary path based upon detection of a network failure.

7. With respect to claims 2 and 12, the claims are rejected for the same reasons as claims 1 and 11 above. In addition, Kodialam discloses computing the LD path for each link *i* in the first primary path ([0029], lines 2-6, when determining a backup path for every link of a failed node and last link in an active path, computing a link detour path for each link in the primary path is inherent).

8. With respect to claims 3 and 13, Doshi (239) discloses computing a sum of the link costs associated with each link *j* (abstract, lines 1-6) in two or more candidate LD paths for link *i* of the first primary path to determine an LD path link cost sum (abstract, lines 1-6); and choosing the LD path for the link *i* of the first primary path to be the candidate LD path (abstract, lines 7-9) with the smallest LD path link cost sum ([0011], lines 10-12)).

9. With respect to claims 4 and 14, Doshi (239) discloses each link cost is inversely related to the available bandwidth on the link (abstract, lines 9-13).

10. With respect to claims 5 and 15, Doshi (239) discloses each link cost is inversely related to the available shared bandwidth on the link (abstract, lines 13-14; [0132], lines 1-5).

11. With respect to claims 6 and 16, Doshi (239) discloses computing a sum of the link costs LC_i of all links i in each of the N candidate primary path (abstract, lines 1-5, when a cost is generated for a restoration path, generating a cost for a primary path is inherent) to determine a link cost sum corresponding to each candidate primary path (abstract, lines 1-5, if a cost is generated for a restoration path, generating a cost for each primary path is inherent); and choosing the first primary path to be the candidate primary path with the smallest link cost sum (Doshi, ...239) ([0011], lines 10-12).

12. With respect to claims 7 and 17, Doshi (239) discloses developing the N candidate primary paths ([0164], lines 1-2; [0165], lines 1-5) and selecting the first primary path for the demand are performed at the source node ([0193] lines 13-17, when the protection path is made at the source node, selecting a primary path at the source node is inherent).

13. With respect to claims 8 and 18, the claims are rejected for the same reasons as claim 1 above. In addition, Kodialam discloses computing the link detour (LD) path for a given link i in the first primary path ([0029], lines 4-6) is performed at a controlling node for link i , wherein the controlling node for link i is a terminating node for link i that is immediately upstream of link i with respect to the demand ([0020], lines 1-3; [0029], lines 6-8).

14. With respect to claims 9 and 19, Doshi (239) discloses calculating a LD path cost CPP_i ([0141], lines 36-38) for each link i of each candidate primary path ([0141], lines 21-22, 30-32), wherein CPP_i is a function of at least the administrative weight of each link within the link detour path for link i ([0141], lines 10-17; [0127], lines 1-2); calculating a cost of available bandwidth CAB_i for each link i of each candidate primary path ([0127], lines 1-3, link cost is based on the link's available capacity (available bandwidth), therefore, calculating available bandwidth cost for each link is inherent. Additionally, link cost is based on the sum of links in a path, therefore, calculating a cost for each link of a path is inherent), wherein CAB_i is inversely related to the available bandwidth on link i ([0127], lines 12-15, link cost is based on the link's available capacity (available bandwidth), therefore, calculating available bandwidth cost for each link is inherent. Additionally, link cost is inversely related to available bandwidth, therefore, cost of available bandwidth is inversely related to available bandwidth is inherent); and calculating the link cost LC_i for each link i of each candidate primary path as a function of CPP_i and CAB_i ([0127], lines 1-3, link cost is based on the link's available capacity (available bandwidth), therefore, calculating available bandwidth cost for each link is inherent).

15. With respect to claims 10 and 20, the claims are rejected for the same reasons as claim 1 above. In addition, Kodialam discloses (CPP_i) distributed to the rest of the network by a controlling node for link i , wherein the controlling node for link i is a terminating node for link i that is immediately upstream to link i with respect to the

demand [0020], lines 1-3; [0029], lines 24-27, node immediately upstream from destination node transfer traffic to a backup link, therefore, distributing CPPi to the network by a controlling node is inherent).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Trevillian H. Highter whose telephone number is (571) 270-3806. The examiner can normally be reached on Monday-Thursday 7:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nabil El-Hady can be reached on (571) 272-3963. 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.

Application/Control Number: 10/817,760
Art Unit: 4152

Page 12

TH 11/27/2007

/Nabil El-Hady/
Supervisory Patent Examiner, Art Unit 2151

Notice of References Cited	Application/Control No. 10/817,760	Applicant(s)/Patent Under Reexamination DZIONG ET AL.	
	Examiner Trevillian H. Hightner	Art Unit 4152	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
	A	US-			
	B	US-			
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

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

NON-PATENT DOCUMENTS

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

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

<i>Search Notes</i> 	Application/Control No. 10817760	Applicant(s)/Patent Under Reexamination DZIONG ET AL.
	Examiner Trevillian H Highter	Art Unit 4152

SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
709/238 with keywords	11/27/2007	TH
370/351 with keywords	11/27/2007	TH
Double Patenting Search (Inventor)	11/27/2007	TH
East tool was used, history included	11/27/2007	TH

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

<i>Index of Claims</i> 	Application/Control No. 10817760	Applicant(s)/Patent Under Reexamination DZIONG ET AL.
	Examiner Trevillian H Highter	Art Unit 4152

✓	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	11/27/2007											
	1	✓											
	2	✓											
	3	✓											
	4	✓											
	5	✓											
	6	✓											
	7	✓											
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	16	✓											
	17	✓											
	18	✓											
	19	✓											
	20	✓											

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Re: Attorney Docket No. Dziong 12-21-38

In re application of: Zbigniew M. Dziong, Muhammad A. Qureshi and Yung-Terng Wang

Serial No.: 10/817,760
Filed: 04/02/04
Matter No.: 990.0496

Group No.: 2661
Examiner: Not yet assigned

For: Calculation of Link-Detour Paths In Mesh Networks

INFORMATION DISCLOSURE STATEMENT

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

Dear Sir:

In accordance with 37 CFR § 1.56, this is an Information Disclosure Statement (IDS) for the above-captioned U.S. patent application. An IDS Form PTO-1449 listing references is enclosed herewith and forms a part hereof. Submission of references is not an admission that those references are in fact prior art.

Certification Under 37 CFR § 1.704(d)

- [] Each item of information contained in this statement was cited in a communication from a foreign patent office in a counterpart application and this communication was not received by any individual designated in § 1.56(c) more than thirty days prior to the filing of this statement.

Certification Under 37 CFR § 1.97(e)

- [X] Each item of information contained in this statement was either (1) cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this statement or (2) not known to any individual designated in § 1.56(c) more than three months prior to the filing of this statement.

Fee Under 37 CFR § 1.97(c)

☐ The fee for submission of this IDS under § 1.97(c) is \$180.00 as set forth in § 1.17(p).

Petition Under 37 CFR § 1.97(d)

☐ This is a petition requesting consideration of an IDS under § 1.97(d). The petition fee for submission of this IDS under § 1.97(d) is \$180.00 as set forth in § 1.17(p).

Provision of Copies of References

☒ A copy of DJ is enclosed herewith and forms a part hereof.

☐ A translation of each of Reference(s) is enclosed herewith and forms a part hereof.

☐ A copy of the International Search Report from a corresponding PCT application is enclosed herewith.

☐ A copy of the European Search Report from a corresponding EPO application is enclosed herewith.

☐ A copy of the final U.S. office action for U.S. patent application no. filed on as attorney docket no. (Case name or our ref.)

☐ The above-captioned U.S. patent application is a

- ☐ continuation
- ☐ divisional
- ☐ continuation-in-part

application of U.S. application serial number , filed on as Attorney Docket No. . Each of the listed references was previously cited by or submitted to the Office in the prior application. The above-captioned U.S. patent application relies upon the prior application for an earlier filing date under 35 U.S.C. 120. Pursuant to § 1.98(d), copies of the listed references are not being provided with this IDS.

Authorization To Charge Deposit Account

☒ Authorization is given to charge the deposit account of **Mendelsohn & Associates, P.C.**
Deposit Account No. 50-0782 for any fee under § 1.97(c) or § 1.97(d).

It is respectfully requested that the Examiner initial and return a copy of the enclosed PTO-1449 form as confirmation that each of the documents has been considered.

Respectfully submitted,

Date: 05-16-2007
Customer No. 46850
Mendelsohn & Associates, P.C.
1500 John F. Kennedy Blvd., Suite 405
Philadelphia, Pennsylvania 19102

/Steve Mendelsohn/
Steve Mendelsohn
Registration No. 35,951
Attorney for Applicant
(215) 557-6657

Enclosures

FORM PTO-1449
(Rev. 2-32) U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICEINFORMATION DISCLOSURE
STATEMENT BY APPLICANT

(Use several sheets if necessary)

ATTY. DOCKET NO.

SERIAL NO.

Dziong 12-21-38

10/817,760

APPLICANT

Zbigniew M. Dziong, Muhammad A. Qureshi and
Yung-Terng Wang

FILING DATE

GROUP

04/02/04

Not yet assigned

U.S. PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
/T.H./	HA	US 7,039,009 B2	05/2006	Chaudhuri et al.	370	225	
/T.H./	HB	US 2004/0233843 A1	11/2004	Barker	370	225	
/T.H./	HC	US 2004/0205239 A1	10/2004	Doshi et al.	709	241	
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/T.H./	HE	US 6,760,302 B1	07/2004	Ellinas et al.	370	228	
/T.H./	HF	US 6,697,334 B1	02/2004	Klincewicz et al.	370	238	
/T.H./	HG	US 2003/0179700 A1	09/2003	Saleh et al.	370	216	
/T.H./	HH	US 2003/0169692 A1	09/2003	Stern et al.	370	242	
/T.H./	HI	US 2002/0174207 A1	11/2002	Battou	709	223	
/T.H./	HJ	US 2002/0067693 A1	06/2002	Kodialam et al.	370	216	
/T.H./	HK	6,141,319	10/2000	Dighe et al.	370	218	
/T.H./	HL	6,130,875	10/2000	Doshi et al.	370	225	
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/T.H./	HN	5,856,981	01/1999	Voelker	371	20.1	
/T.H./	HO	5,854,903	12/1998	Morrison et al.	395	200.79	
/T.H./	HP	5,506,956	04/1996	Cohen	395	182.04	

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		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES NO

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

EXAMINER	/Trevillian Highter/	DATE CONSIDERED	12/03/2007
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EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

990.0496

(Form PTO-1449)



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BIB DATA SHEET

CONFIRMATION NO. 2094

SERIAL NUMBER 10/817,760	FILING or 371(c) DATE 04/02/2004 RULE	CLASS 370	GROUP ART UNIT 4152	ATTORNEY DOCKET NO. Dziong 12-21-38	
APPLICANTS Zbigniew M. Dziong, Montreal, CANADA; Muhammad A. Qureshi, Irvine, CA; Yung-Terng Wang, Marlboro, NJ; ** CONTINUING DATA ***** ** FOREIGN APPLICATIONS ***** ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** 06/21/2004					
Foreign Priority claimed ☐ Yes ☒ No 35 USC 119(a-d) conditions met ☐ Yes ☐ No Verified and /TREVILLIAN H Acknowledged HIGHTER/ Examiner's Signature	☐ Met after Allowance Initials	STATE OR COUNTRY CANADA	SHEETS DRAWINGS 12	TOTAL CLAIMS 20	INDEPENDENT CLAIMS 2
ADDRESS MENDELSON & ASSOCIATES, P.C. 1500 JOHN F. KENNEDY BLVD., SUITE 405 PHILADELPHIA, PA 19102 UNITED STATES					
TITLE Calculation of link-detour paths in mesh networks					
FILING FEE RECEIVED 900	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		

INFORMATION DISCLOSURE CITATION <i>(Use several sheets if necessary)</i>				ATTY DOCKET NO. Dziong 12-21-38		APPLICATION NO. 10/817,760	
				APPLICANT(S) Zbigniew M. Dziong et al.			
				FILING DATE 04/02/2004		GROUP ART UNIT 2661	
U.S. PATENT DOCUMENTS							
*EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
/T.H./	DA	US 7,188,280 B2	03-2007	Shinomiya et al.	714	43	
/T.H./	DB	US 7,099,286 B1	08-2006	Swallow	370	255	
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/T.H./	DD	US 6,856,592 B2	02-2005	Grover et al.	370	216	
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U.S. PATENT APPLICATION PUBLICATIONS							
*EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
/T.H./	DF	US 2007/0011284 A1	01-2007	Le Roux et al.	709	223	
/T.H./	DG	US 2006/0178918 A1	08-2006	Mikurak	705	7	
/T.H./	DH	US 2006/0013149 A1	01-2006	Jahn et al.	370	254	
/T.H./	DI	US 2005/0185652 A1	08-2005	Iwamoto	370	395.1	
FOREIGN PATENT DOCUMENTS							
		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES NO
OTHER DOCUMENTS <i>(Including Author, Title, Date, Pertinent Pages, Etc.)</i>							
/T.H./		DJ	"Cisco's Packet over SONET/SDH (POS) Technology Support; Mission Accomplished" Copyright 1997. Cisco Systems, Inc. pp. 1-8.				
EXAMINER /Trevillian Highter/				DATE CONSIDERED 11/27/2007			
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INFORMATION DISCLOSURE CITATION <i>(Use several sheets if necessary)</i>				ATTY DOCKET NO. Dziong 12-21-38		APPLICATION NO. 10/817,760		
				APPLICANT(S) Zbigniew M. Dziong et al.				
				FILING DATE 04/02/2004		GROUP ART UNIT 2661		
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/T.H./	EA	5,995,485	11-1999	Croslin	370	216		
/T.H./	EB	5,706,276	01-1998	Arslan et al.	370	216		
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/T.H./	EC	US 2004/0190461 A1	09-2004	Gullicksen et al.	370	216		
/T.H./	ED	US 2004/0165526 A1	08-2004	Yada et al.	370	216		
/T.H./	EE	US 2004/0057375 A1	03-2004	Shiragaki et al.	370	216		
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FOREIGN PATENT DOCUMENTS								
		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION	
							YES	NO
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EXAMINER				DATE CONSIDERED				
/Trevillian Highter/				11/27/2007				
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INFORMATION DISCLOSURE CITATION <i>(Use several sheets if necessary)</i>				ATTY DOCKET NO. Dziong 12-21-38		APPLICATION NO. 10/817,760		
				APPLICANT(S) Zbigniew M. Dziong et al.				
				FILING DATE 04/02/2004		GROUP ART UNIT 2661		
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/T.H./	FA	US 2004/0042402 A1	03-2004	Galand et al.	370	237		
/T.H./	FB	US 2004/0004938 A1	01-2004	Buddhikot et al.	370	238		
/T.H./	FC	US 2003/0147352 A1	08-2003	Ishibashi et al.	370	248		
/T.H./	FD	US 2003/0095500 A1	05-2003	Cao	370	216		
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		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION	
							YES	NO
OTHER DOCUMENTS <i>(Including Author, Title, Date, Pertinent Pages, Etc.)</i>								
EXAMINER /Trevillian Highter/				DATE CONSIDERED 11/27/2007				
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INFORMATION DISCLOSURE CITATION <i>(Use several sheets if necessary)</i>				ATTY DOCKET NO. Dziong 12-21-38		APPLICATION NO. 10/817,760		
				APPLICANT(S) Zbigniew M. Dziong et al.				
				FILING DATE 04/02/2004		GROUP ART UNIT 2661		
U.S. PATENT DOCUMENTS								
*EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE	
U.S. PATENT APPLICATION PUBLICATIONS								
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/T.H./	GA	US 2003/0021222 A1	01-2003	Boer et al.	370	216		
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/T.H./	GC	US 2002/0071392 A1	01-2002	Grover et al.	370	241		
/T.H./	GD	US 2001/0038471 A1	11-2001	Agrawal et al.	359	110		
FOREIGN PATENT DOCUMENTS								
		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION	
							YES	NO
OTHER DOCUMENTS <i>(Including Author, Title, Date, Pertinent Pages, Etc.)</i>								
EXAMINER /Trevillian Highter/				DATE CONSIDERED 11/27/2007				
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EAST Search History

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S52	434	BACKUP ADJ PATH	US-PGPUB; USPAT; EPO; IBM_TDB	OR	OFF	2007/11/19 11:50
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S58	890359	capacity	US-PGPUB; USPAT; EPO; IBM_TDB	OR	ON	2007/11/19 13:21
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S81	0	S79 same S80	US-PGPUB; USPAT; EPO; IBM_TDB	OR	OFF	2007/11/27 07:41
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S84	0	S79 same S83	US-PGPUB; USPAT; EPO; IBM_TDB	OR	OFF	2007/11/27 07:42

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Re: Attorney Docket No. Dziong 12-21-38

In re application of: Zbigniew M. Dziong, Muhammad A. Qureshi and Yung-Terng Wang

Serial No.: Not Yet Assigned
Filed: Not Yet Assigned
Matter No.: 990.0496

Group No.: Not Yet Assigned
Examiner: Not Yet Assigned

For: Calculation Of Link-Detour Paths In Mesh Networks

INFORMATION DISCLOSURE STATEMENT

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

Dear Sir:

In accordance with 37 CFR § 1.56, this is an Information Disclosure Statement (IDS) for the above-captioned U.S. patent application. An IDS Form PTO-1449 listing references is enclosed herewith and forms a part hereof.

Certification Under 37 CFR § 1.704(d)

- [] Each item of information contained in this statement was cited in a communication from a foreign patent office in a counterpart application and this communication was not received by any individual designated in § 1.56(c) more than thirty days prior to the filing of this statement.

Certification Under 37 CFR § 1.97(e)

- [] Each item of information contained in this statement was either (1) cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this statement or (2) not known to any individual designated in § 1.56(c) more than three months prior to the filing of this statement.

* * * * *

Certification Under 37 CFR 1.10

"Express Mail" Mailing Label No. EV140153223US

Date of Deposit April 2, 2004

I hereby certify that this paper or fee is being deposited with the United States Postal Service's "Express Mail Post Office To Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Mary E. Caniz
(Name of person mailing)

Mary E. Caniz
(Signature of person mailing)

Fee Under 37 CFR § 1.97(c)

☐ The fee for submission of this IDS under § 1.97(c) is \$180.00 as set forth in § 1.17(p).

Petition Under 37 CFR § 1.97(d)

☐ This is a petition requesting consideration of an IDS under § 1.97(d). The petition fee for submission of this IDS under § 1.97(d) is \$130.00 as set forth in § 1.17(i).

Provision of Copies of References

☒ A copy of each of the listed references is enclosed herewith and forms a part hereof.

☐ A translation of each of Reference(s) is enclosed herewith and forms a part hereof.

☐ A copy of the International Search Report from a corresponding PCT application is enclosed herewith.

☐ A copy of the European Search Report from a corresponding EPO application is enclosed herewith.

☐ The above-captioned U.S. patent application is a

- ☐ continuation
- ☐ divisional
- ☐ continuation-in-part

application of U.S. application serial number , filed on as Attorney Docket No. . Each of the listed references was previously cited by or submitted to the Office in the prior application. The above-captioned U.S. patent application relies upon the prior application for an earlier filing date under 35 U.S.C. 120. Pursuant to § 1.98(d), copies of the listed references are not being provided with this IDS.

It is respectfully requested that the Examiner initial and return a copy of the enclosed PTO-1449 form as confirmation that each of the documents has been considered.

Respectfully submitted,

Date: 4/2/04
Customer No. 22186
Mendelsohn & Associates, P.C.
1515 Market Street, Suite 715
Philadelphia, Pennsylvania 19102


Michael L. Craner
Registration No. 50,127
Attorney for Applicant
(215) 557-6656

Enclosures

FORM PTO-1449 U.S. DEPARTMENT OF COMMERCE
(Rev. 2-32) PATENT AND TRADEMARK OFFICE

INFORMATION DISCLOSURE
STATEMENT BY APPLICANT

(Use several sheets if necessary)

ATTY. DOCKET NO.

SERIAL NO.

Dziong 12-21-38
APPLICANT

Not yet assigned

Zbigniew M. Dziong, Muhammad A. Qureshi and
Yung-Terng Wang

FILING DATE

GROUP

Not yet assigned

Not yet assigned

U.S. PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE

FOREIGN PATENT DOCUMENTS

		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES NO

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

/T.H./	AA	"Optical Network Design and Restoration" by B. T. Doshi, et al., BLTJ, January-March 1999.
	AB	"Design of a Meta-mesh of Chain Subnetworks: Enhancing the Attractiveness of Mesh-Restorable WDM networking on Low Connectivity Graphs" by W. D. Grover and J. Doucette, IEEE JSAC, Vol. 20, No. 1, January 2002.

EXAMINER /Trevillian Highter/

DATE CONSIDERED

11/27/2007

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



IFW

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Re: Attorney Docket No. Dziong 12-21-38

In re application of: Zbigniew M. Dziong, Muhammad A. Qureshi and Yung-Terng Wang

Serial No.: 10/817,760

Group No.: 2661

Filed: 04/02/04

Examiner: Not yet assigned

Matter No.: 990.0496

For: Calculation of Link-Detour Paths In Mesh Networks

INFORMATION DISCLOSURE STATEMENT

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

Dear Sir:

In accordance with 37 CFR § 1.56, this is an Information Disclosure Statement (IDS) for the above-captioned U.S. patent application. An IDS Form PTO-1449 listing references is enclosed herewith and forms a part hereof. Submission of references is not an admission that those references are in fact prior art.

Certification Under 37 CFR § 1.704(d)

- [] Each item of information contained in this statement was cited in a communication from a foreign patent office in a counterpart application and this communication was not received by any individual designated in § 1.56(c) more than thirty days prior to the filing of this statement.

Certification Under 37 CFR § 1.97(e)

- [] Each item of information contained in this statement was either (1) cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this statement or (2) not known to any individual designated in § 1.56(c) more than three months prior to the filing of this statement.

* * * * *

Certification Under 37 CFR 1.8

Date of Deposit November 17, 2005

I hereby certify that this paper and any accompanying papers or fees are being deposited with the U.S. Postal Service with sufficient postage as first class mail under 37 CFR 1.8 on the date indicated above and addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Mary E. Caniz
(Name of person mailing)

Mary E. Caniz
(Signature of person mailing)

Fee Under 37 CFR § 1.97(c)

[] The fee for submission of this IDS under § 1.97(c) is \$180.00 as set forth in § 1.17(p).

Petition Under 37 CFR § 1.97(d)

[] This is a petition requesting consideration of an IDS under § 1.97(d). The petition fee for submission of this IDS under § 1.97(d) is \$180.00 as set forth in § 1.17(p).

Provision of Copies of References

[X] A copy of each of the listed references is enclosed herewith and forms a part hereof.

[] A translation of each of Reference(s) ___ is enclosed herewith and forms a part hereof.

[] A copy of the International Search Report from a corresponding PCT application is enclosed herewith.

[] A copy of the European Search Report from a corresponding EPO application is enclosed herewith.

[] A copy of the final U.S. office action for U.S. patent application no. _____ filed on _____ as attorney docket no. (Case name or our ref.).

[] The above-captioned U.S. patent application is a

- [] continuation
- [] divisional
- [] continuation-in-part

application of U.S. application serial number ____, filed on ____ as Attorney Docket No. ____.
Each of the listed references was previously cited by or submitted to the Office in the prior application. The above-captioned U.S. patent application relies upon the prior application for an earlier filing date under 35 U.S.C. 120. Pursuant to § 1.98(d), copies of the listed references are not being provided with this IDS.

Authorization To Charge Deposit Account

[X] Authorization is given to charge the deposit account of **Mendelsohn & Associates, P.C. Deposit Account No. 50-0782** for any fee under § 1.97(c) or § 1.97(d).

It is respectfully requested that the Examiner initial and return a copy of the enclosed PTO-1449 form as confirmation that each of the documents has been considered.

Respectfully submitted,

Date: 11/17/05
Customer No. 46850
Mendelsohn & Associates, P.C.
1500 John F. Kennedy Blvd., Suite 405
Philadelphia, Pennsylvania 19102


Steve Mendelsohn
Registration No. 35,951
Attorney for Applicant
(215) 557-6657

Enclosures

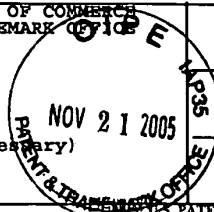
FORM PTO-1449 U.S. DEPARTMENT OF COMMERCE
(Rev. 2-32) PATENT AND TRADEMARK OFFICE

ATTY. DOCKET NO.

SERIAL NO.

INFORMATION DISCLOSURE
STATEMENT BY APPLICANT

(Use several sheets if necessary)



Dziong 12-21-38
APPLICANT

10/817,760

Zbigniew M. Dziong, Muhammad A. Qureshi and
Yung-Terng Wang

FILING DATE

GROUP

04/02/04

Not yet assigned

EXAMINER INITIAL	DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE

FOREIGN PATENT DOCUMENTS

DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES NO

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

/T.H./	BA	"RSVP-TE: Extensions to RSVP for LSP Tunnels" by D. Awduche, L. Berger, D. Gan, T. Li, V. Srinivasan, and G. Swallow; Cisco Systems, Inc. December 2001, pps. 1-47.
	BB	"SONET Bidirectional Line-Switched Ring Equipment Generic Criteria," Generic Requirements, GR-1230-CORE, Issue 4, December 1998, pps. 3-48 through 3-61.

EXAMINER	/Trevillian Highter/	DATE CONSIDERED	11/27/2007
----------	----------------------	-----------------	------------

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



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

PATENT

Re: Attorney Docket No. Dziong 12-21-38

In re application of: Zbigniew M. Dziong, Muhammad A. Qureshi and Yung-Terng Wang

Serial No.: 10/817,760

Filed: 04/02/04

Matter No.: 990.0496

Group No.: Not yet assigned

Examiner: Not yet assigned

For: Calculation of Link-Detour Paths In Mesh Networks

INFORMATION DISCLOSURE STATEMENT

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

Dear Sir:

In accordance with 37 CFR § 1.56, this is an Information Disclosure Statement (IDS) for the above-captioned U.S. patent application. An IDS Form PTO-1449 listing references is enclosed herewith and forms a part hereof. Submission of references is not an admission that those references are in fact prior art.

Certification Under 37 CFR § 1.704(d)

- [] Each item of information contained in this statement was cited in a communication from a foreign patent office in a counterpart application and this communication was not received by any individual designated in § 1.56(c) more than thirty days prior to the filing of this statement.

Certification Under 37 CFR § 1.97(e)

- [X] Each item of information contained in this statement was either (1) cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this statement or (2) not known to any individual designated in § 1.56(c) more than three months prior to the filing of this statement.

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*

*

*

*

Certification Under 37 CFR 1.8

Date of Deposit

July 26, 2006

I hereby certify that this paper and any accompanying papers or fees are being deposited with the U.S. Postal Service with sufficient postage as first class mail under 37 CFR 1.8 on the date indicated above and addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Leighann Madeksiak

(Name of person mailing)

Leighann Madeksiak
(Signature of person mailing)

Fee Under 37 CFR § 1.97(c)

- ☐ The fee for submission of this IDS under § 1.97(c) is \$180.00 as set forth in § 1.17(p).

Petition Under 37 CFR § 1.97(d)

- ☐ This is a petition requesting consideration of an IDS under § 1.97(d). The petition fee for submission of this IDS under § 1.97(d) is \$180.00 as set forth in § 1.17(p).

Provision of Copies of References

- ☒ A copy of each of the listed references is enclosed herewith and forms a part hereof.
- ☐ A translation of each of Reference(s) is enclosed herewith and forms a part hereof.
- ☐ A copy of the International Search Report from a corresponding PCT application is enclosed herewith.
- ☐ A copy of the European Search Report from a corresponding EPO application is enclosed herewith.
- ☐ A copy of the final U.S. office action for U.S. patent application no. filed on as attorney docket no. (Case name or our ref.).
- ☐ The above-captioned U.S. patent application is a
- ☐ continuation
 - ☐ divisional
 - ☐ continuation-in-part

application of U.S. application serial number , filed on as Attorney Docket No. . Each of the listed references was previously cited by or submitted to the Office in the prior application. The above-captioned U.S. patent application relies upon the prior application for an earlier filing date under 35 U.S.C. 120. Pursuant to § 1.98(d), copies of the listed references are not being provided with this IDS.

Authorization To Charge Deposit Account

- ☒ Authorization is given to charge the deposit account of **Mendelsohn & Associates, P.C. Deposit Account No. 50-0782** for any fee under § 1.97(c) or § 1.97(d).

It is respectfully requested that the Examiner initial and return a copy of the enclosed PTO-1449 form as confirmation that each of the documents has been considered.

Respectfully submitted,

Date: 07.26.06
Customer No. 46850
Mendelsohn & Associates, P.C.
1500 John F. Kennedy Blvd., Suite 405
Philadelphia, PA 19102


Edward J. Meisarosh
Reg. No. 57,463
(215) 599-3639
Attorneys for Applicants

Enclosures

FORM PTO-1449
(Rev. 2-32)

U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE

ATTY. DOCKET NO.

SERIAL NO.

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**

(Use several sheets if necessary)

~~Dzlong 12-21-38~~
~~APPLICANT~~

10/817,760

Ignatius M. Dziong, Muhammad A. Qureshi and Hung-Terng Wang	
FILING DATE	GROUP

GROUP

04/02/04
DOCUMENTS

Not yet assigned

[illegible]

FOREIGN PATENT DOCUMENTS

[illegible]

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)			

EXAMINER	/Trevillian Highter/	DATE CONSIDERED	11/27/2007
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EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

990.0496

(Form PTO-1449)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Re: Attorney Docket No. Dziong 12-21-38

In re application of: Zbigniew M. Dziong, Muhammad A. Qureshi and Yung-Terng Wang

Serial No.: 10/817,760
Filed: 04/02/04
Matter No.: 990.0496

Group No.: 2661
Examiner: Not yet assigned

For: Calculation of Link-Detour Paths In Mesh Networks

INFORMATION DISCLOSURE STATEMENT

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

Dear Sir:

In accordance with 37 CFR § 1.56, this is an Information Disclosure Statement (IDS) for the above-captioned U.S. patent application. An IDS Form PTO-1449 listing references is enclosed herewith and forms a part hereof. Submission of references is not an admission that those references are in fact prior art.

Certification Under 37 CFR § 1.704(d)

- ☐ Each item of information contained in this statement was cited in a communication from a foreign patent office in a counterpart application and this communication was not received by any individual designated in § 1.56(c) more than thirty days prior to the filing of this statement.

Certification Under 37 CFR § 1.97(e)

- ☒ Each item of information contained in this statement was either (1) cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this statement or (2) not known to any individual designated in § 1.56(c) more than three months prior to the filing of this statement.

Fee Under 37 CFR § 1.97(c)

[] The fee for submission of this IDS under § 1.97(c) is \$180.00 as set forth in § 1.17(p).

Petition Under 37 CFR § 1.97(d)

[] This is a petition requesting consideration of an IDS under § 1.97(d). The petition fee for submission of this IDS under § 1.97(d) is \$180.00 as set forth in § 1.17(p).

Provision of Copies of References

[] A copy of ____ is enclosed herewith and forms a part hereof.

[] A translation of each of Reference(s) ____ is enclosed herewith and forms a part hereof.

[] A copy of the International Search Report from a corresponding PCT application is enclosed herewith.

[] A copy of the European Search Report from a corresponding EPO application is enclosed herewith.

[] A copy of the final U.S. office action for U.S. patent application no. _____ filed on _____ as attorney docket no. (Case name or our ref.).

[] The above-captioned U.S. patent application is a

- [] continuation
- [] divisional
- [] continuation-in-part

application of U.S. application serial number _____, filed on _____ as Attorney Docket No. _____. Each of the listed references was previously cited by or submitted to the Office in the prior application. The above-captioned U.S. patent application relies upon the prior application for an earlier filing date under 35 U.S.C. 120. Pursuant to § 1.98(d), copies of the listed references are not being provided with this IDS.

Authorization To Charge Deposit Account

[X] Authorization is given to charge Mendelsohn & Associates, P.C. Deposit Account No. 50-0782 any deficiency or credit any overpayment for any fee under § 1.97(c) or § 1.97(d).

It is respectfully requested that the Examiner initial and return a copy of the enclosed PTO-1449 form as confirmation that each of the documents has been considered.

Respectfully submitted,

Date: 09-24-2007
Customer No. 46850
Mendelsohn & Associates, P.C.
1500 John F. Kennedy Blvd., Suite 405
Philadelphia, Pennsylvania 19102

/Steve Mendelsohn/
Steve Mendelsohn
Registration No. 35,951
Attorney for Applicant
(215) 557-6657

Enclosures

FORM PTO-1449
(Rev. 2-32)U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICEINFORMATION DISCLOSURE
STATEMENT BY APPLICANT

(Use several sheets if necessary)

ATTY. DOCKET NO.

SERIAL NO.

Dziong 12-21-38

10/817,760

APPLICANT

Zbigniew M. Dziong, Muhammad A. Qureshi and
Yung-Terng Wang

FILING DATE

GROUP

04/02/04

Not yet assigned

U.S. PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
	HA	US 7,039,009 B2	05/2006	Chaudhuri et al.	370	225	
	HB	US 2004/0233843 A1	11/2004	Barker	370	225	
	HC	US 2004/0205239 A1	10/2004	Doshi et al.	709	241	
	HD	US 2004/0190445 A1	09/2004	Dziong et al.	370	225	
	HE	US 6,760,302 B1	07/2004	Ellinas et al.	370	228	
	HF	US 6,697,334 B1	02/2004	Klincewicz et al.	370	238	
	HG	US 2003/0179700 A1	09/2003	Saleh et al.	370	216	
	HH	US 2003/0169692 A1	09/2003	Stern et al.	370	242	
	HI	US 2002/0174207 A1	11/2002	Battou	709	223	
	HJ	US 2002/0067693 A1	06/2002	Kodialam et al.	370	216	
	HK	6,141,319	10/2000	Dighe et al.	370	218	
	HL	6,130,875	10/2000	Doshi et al.	370	225	
	HM	6,104,701	08/2000	Avargues et al.	370	238	
	HN	5,856,981	01/1999	Voelker	371	20.1	
	HO	5,854,903	12/1998	Morrison et al.	395	200.79	
	HP	5,506,956	04/1996	Cohen	395	182.04	

FOREIGN PATENT DOCUMENTS

		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES NO

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

EXAMINER	DATE CONSIDERED
----------	-----------------

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

990.0496

(Form PTO-1449)

Electronic Acknowledgement Receipt	
EFS ID:	2220734
Application Number:	10817760
International Application Number:	
Confirmation Number:	2094
Title of Invention:	Calculation of link-detour paths in mesh networks
First Named Inventor/Applicant Name:	Zbigniew M. Dziong
Customer Number:	46850
Filer:	Steve Mendelsohn/Leighann Madeksiak
Filer Authorized By:	Steve Mendelsohn
Attorney Docket Number:	Dziong 12-21-38
Receipt Date:	24-SEP-2007
Filing Date:	02-APR-2004
Time Stamp:	13:13:06
Application Type:	Utility under 35 USC 111(a)

Payment information:

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

File Listing:

Document Number	Document Description	File Name	File Size(Bytes) /Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement Letter	IDS_5.pdf	21287	no	2
			17a842f7f0406fe19822dc2b55a0a5af100f14b3f		

Warnings:

Information:					
2	Information Disclosure Statement (IDS) Filed	PTO_1449_HA_HP.pdf	27461	no	1
			7466eed054e951093f652dee0997d0b6ad17916b		
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
Total Files Size (in bytes):			48748		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Re: Attorney Docket No. Dziong 12-21-38

In re application of: Zbigniew M. Dziong, Muhammad A. Qureshi and Yung-Terng Wang

Serial No.: 10/817,760
Filed: 04/02/04
Matter No.: 990.0496

Group No.: 2661
Examiner: Not yet assigned

For: Calculation of Link-Detour Paths In Mesh Networks

INFORMATION DISCLOSURE STATEMENT

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

Dear Sir:

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Fee Under 37 CFR § 1.97(c)

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Petition Under 37 CFR § 1.97(d)

☐ This is a petition requesting consideration of an IDS under § 1.97(d). The petition fee for submission of this IDS under § 1.97(d) is \$180.00 as set forth in § 1.17(p).

Provision of Copies of References

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☐ The above-captioned U.S. patent application is a

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application of U.S. application serial number _____, filed on _____ as Attorney Docket No. _____. Each of the listed references was previously cited by or submitted to the Office in the prior application. The above-captioned U.S. patent application relies upon the prior application for an earlier filing date under 35 U.S.C. 120. Pursuant to § 1.98(d), copies of the listed references are not being provided with this IDS.

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It is respectfully requested that the Examiner initial and return a copy of the enclosed PTO-1449 form as confirmation that each of the documents has been considered.

Respectfully submitted,

Date: 05-16-2007
Customer No. 46850
Mendelsohn & Associates, P.C.
1500 John F. Kennedy Blvd., Suite 405
Philadelphia, Pennsylvania 19102

/Steve Mendelsohn/
Steve Mendelsohn
Registration No. 35,951
Attorney for Applicant
(215) 557-6657

Enclosures

INFORMATION DISCLOSURE CITATION <i>(Use several sheets if necessary)</i>				ATTY DOCKET NO. Dziong 12-21-38		APPLICATION NO. 10/817,760	
				APPLICANT(S) Zbigniew M. Dziong et al.			
				FILING DATE 04/02/2004		GROUP ART UNIT 2661	
U.S. PATENT DOCUMENTS							
*EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
	DA	US 7,188,280 B2	03-2007	Shinomiya et al.	714	43	
	DB	US 7,099,286 B1	08-2006	Swallow	370	255	
	DC	US 6,863,363 B2	03-2005	Yabuta	347	19	
	DD	US 6,856,592 B2	02-2005	Grover et al.	370	216	
	DE	US 6,850,487 B2	02-2005	Mukherjee et al.	370	225	
U.S. PATENT APPLICATION PUBLICATIONS							
*EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
	DF	US 2007/0011284 A1	01-2007	Le Roux et al.	709	223	
	DG	US 2006/0178918 A1	08-2006	Mikurak	705	7	
	DH	US 2006/0013149 A1	01-2006	Jahn et al.	370	254	
	DI	US 2005/0185652 A1	08-2005	Iwamoto	370	395.1	
FOREIGN PATENT DOCUMENTS							
		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES NO
OTHER DOCUMENTS <i>(Including Author, Title, Date, Pertinent Pages, Etc.)</i>							
		DJ	"Cisco's Packet over SONET/SDH (POS) Technology Support; Mission Accomplished" Copyright 1997. Cisco Systems, Inc. pp. 1-8.				
EXAMINER				DATE CONSIDERED			
*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.							

INFORMATION DISCLOSURE CITATION <i>(Use several sheets if necessary)</i>				ATTY DOCKET NO. Dziong 12-21-38		APPLICATION NO. 10/817,760	
				APPLICANT(S) Zbigniew M. Dziong et al.			
				FILING DATE 04/02/2004		GROUP ART UNIT 2661	
U.S. PATENT DOCUMENTS							
*EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
	EA	5,995,485	11-1999	Croslin	370	216	
	EB	5,706,276	01-1998	Arslan et al.	370	216	
U.S. PATENT APPLICATION PUBLICATIONS							
*EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
	EC	US 2004/0190461 A1	09-2004	Gullicksen et al.	370	216	
	ED	US 2004/0165526 A1	08-2004	Yada et al.	370	216	
	EE	US 2004/0057375 A1	03-2004	Shiragaki et al.	370	216	
	EF	US 2004/0052207 A1	03-2004	Charny et al.	370	216	
FOREIGN PATENT DOCUMENTS							
		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES NO
OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)							
EXAMINER				DATE CONSIDERED			
*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.							

INFORMATION DISCLOSURE CITATION <i>(Use several sheets if necessary)</i>				ATTY DOCKET NO. Dziong 12-21-38		APPLICATION NO. 10/817,760	
				APPLICANT(S) Zbigniew M. Dziong et al.			
				FILING DATE 04/02/2004		GROUP ART UNIT 2661	
U.S. PATENT DOCUMENTS							
*EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
U.S. PATENT APPLICATION PUBLICATIONS							
*EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
	FA	US 2004/0042402 A1	03-2004	Galand et al.	370	237	
	FB	US 2004/0004938 A1	01-2004	Buddhikot et al.	370	238	
	FC	US 2003/0147352 A1	08-2003	Ishibashi et al.	370	248	
	FD	US 2003/0095500 A1	05-2003	Cao	370	216	
FOREIGN PATENT DOCUMENTS							
		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES NO
OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)							
EXAMINER				DATE CONSIDERED			
*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.							

INFORMATION DISCLOSURE CITATION <i>(Use several sheets if necessary)</i>				ATTY DOCKET NO. Dziong 12-21-38		APPLICATION NO. 10/817,760		
				APPLICANT(S) Zbigniew M. Dziong et al.				
				FILING DATE 04/02/2004		GROUP ART UNIT 2661		
U.S. PATENT DOCUMENTS								
*EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE	
U.S. PATENT APPLICATION PUBLICATIONS								
*EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE	
	GA	US 2003/0021222 A1	01-2003	Boer et al.	370	216		
	GB	US 2003/0018812 A1	01-2003	Lakshminarayana et al.	709	241		
	GC	US 2002/0071392 A1	01-2002	Grover et al.	370	241		
	GD	US 2001/0038471 A1	11-2001	Agrawal et al.	359	110		
FOREIGN PATENT DOCUMENTS								
		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION	
							YES	NO
OTHER DOCUMENTS <i>(Including Author, Title, Date, Pertinent Pages, Etc.)</i>								
EXAMINER				DATE CONSIDERED				
*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.								

Electronic Acknowledgement Receipt	
EFS ID:	1782074
Application Number:	10817760
International Application Number:	
Confirmation Number:	2094
Title of Invention:	Calculation of link-detour paths in mesh networks
First Named Inventor/Applicant Name:	Zbigniew M. Dziong
Customer Number:	46850
Filer:	Steve Mendelsohn/Amy Laudenslager
Filer Authorized By:	Steve Mendelsohn
Attorney Docket Number:	Dziong 12-21-38
Receipt Date:	16-MAY-2007
Filing Date:	02-APR-2004
Time Stamp:	17:20:33
Application Type:	Utility

Payment information:

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

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Filed	IDS_4.pdf	297552	no	2

Warnings:

Information:					
This is not an USPTO supplied IDS fillable form					
2	Information Disclosure Statement (IDS) Filed	PTO_1449_DA_GD.pdf	102119	no	4
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
3	NPL Documents	Article_DJ.pdf	1867579	no	8
Warnings:					
Information:					
Total Files Size (in bytes):			2267250		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

PATENT

Re: Attorney Docket No. Dziong 12-21-38

In re application of: Zbigniew M. Dziong, Muhammad A. Qureshi and Yung-Terng Wang

Serial No.: 10/817,760

Group No.: Not yet assigned

Filed: 04/02/04

Examiner: Not yet assigned

Matter No.: 990.0496

For: Calculation of Link-Detour Paths In Mesh Networks

INFORMATION DISCLOSURE STATEMENT

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

Dear Sir:

In accordance with 37 CFR § 1.56, this is an Information Disclosure Statement (IDS) for the above-captioned U.S. patent application. An IDS Form PTO-1449 listing references is enclosed herewith and forms a part hereof. Submission of references is not an admission that those references are in fact prior art.

Certification Under 37 CFR § 1.704(d)

- ☐ Each item of information contained in this statement was cited in a communication from a foreign patent office in a counterpart application and this communication was not received by any individual designated in § 1.56(c) more than thirty days prior to the filing of this statement.

Certification Under 37 CFR § 1.97(e)

- ☒ Each item of information contained in this statement was either (1) cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this statement or (2) not known to any individual designated in § 1.56(c) more than three months prior to the filing of this statement.

* * * * *

Certification Under 37 CFR 1.8

Date of Deposit

July 26, 2006

I hereby certify that this paper and any accompanying papers or fees are being deposited with the U.S. Postal Service with sufficient postage as first class mail under 37 CFR 1.8 on the date indicated above and addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Leighann Madeksiak

(Name of person mailing)

Leighann Madeksiak
(Signature of person mailing)

Fee Under 37 CFR § 1.97(c)

- ☐ The fee for submission of this IDS under § 1.97(c) is \$180.00 as set forth in § 1.17(p).

Petition Under 37 CFR § 1.97(d)

- ☐ This is a petition requesting consideration of an IDS under § 1.97(d). The petition fee for submission of this IDS under § 1.97(d) is \$180.00 as set forth in § 1.17(p).

Provision of Copies of References

- ☒ A copy of each of the listed references is enclosed herewith and forms a part hereof.
- ☐ A translation of each of Reference(s) is enclosed herewith and forms a part hereof.
- ☐ A copy of the International Search Report from a corresponding PCT application is enclosed herewith.
- ☐ A copy of the European Search Report from a corresponding EPO application is enclosed herewith.
- ☐ A copy of the final U.S. office action for U.S. patent application no. filed on as attorney docket no. (Case name or our ref.).
- ☐ The above-captioned U.S. patent application is a
- ☐ continuation
 - ☐ divisional
 - ☐ continuation-in-part

application of U.S. application serial number , filed on as Attorney Docket No. . Each of the listed references was previously cited by or submitted to the Office in the prior application. The above-captioned U.S. patent application relies upon the prior application for an earlier filing date under 35 U.S.C. 120. Pursuant to § 1.98(d), copies of the listed references are not being provided with this IDS.

Authorization To Charge Deposit Account

- ☒ Authorization is given to charge the deposit account of **Mendelsohn & Associates, P.C. Deposit Account No. 50-0782** for any fee under § 1.97(c) or § 1.97(d).

It is respectfully requested that the Examiner initial and return a copy of the enclosed PTO-1449 form as confirmation that each of the documents has been considered.

Respectfully submitted,

Date: 07.26.06
Customer No. 46850
Mendelsohn & Associates, P.C.
1500 John F. Kennedy Blvd., Suite 405
Philadelphia, PA 19102


Edward J. Meisarosh
Reg. No. 57,463
(215) 599-3639
Attorneys for Applicants

Enclosures

FORM PTO-1449
(Rev. 2-32)U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE

ATTY. DOCKET NO.

SERIAL NO.

INFORMATION DISCLOSURE
STATEMENT BY APPLICANT

(Use several sheets if necessary)

Dziong 12-21-38
APPLICANT

10/817,760

Dzigniew M. Dziong, Muhammad A. Qureshi and
Yung-Terng Wang

FILING DATE

GROUP

04/02/04

Not yet assigned

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
	CA	US 2002/0194339 A1	12/2002	Lin et al.	709	226	
	CB	US 2003/0037276 A1	02/2003	Mo et al.	714	4	
	CC	US 2003/0065811 A1	04/2003	Lin et al.	709	232	

FOREIGN PATENT DOCUMENTS

		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES NO	

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

EXAMINER

DATE CONSIDERED

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

990.0496

(Form PTO-1449)



FW

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Re: Attorney Docket No. Dziong 12-21-38

In re application of: Zbigniew M. Dziong, Muhammad A. Qureshi and Yung-Terng Wang

Serial No.: 10/817,760

Group No.: 2661

Filed: 04/02/04

Examiner: Not yet assigned

Matter No.: 990.0496

For: Calculation of Link-Detour Paths In Mesh Networks

INFORMATION DISCLOSURE STATEMENT

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

Dear Sir:

In accordance with 37 CFR § 1.56, this is an Information Disclosure Statement (IDS) for the above-captioned U.S. patent application. An IDS Form PTO-1449 listing references is enclosed herewith and forms a part hereof. Submission of references is not an admission that those references are in fact prior art.

Certification Under 37 CFR § 1.704(d)

- [] Each item of information contained in this statement was cited in a communication from a foreign patent office in a counterpart application and this communication was not received by any individual designated in § 1.56(c) more than thirty days prior to the filing of this statement.

Certification Under 37 CFR § 1.97(e)

- [] Each item of information contained in this statement was either (1) cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this statement or (2) not known to any individual designated in § 1.56(c) more than three months prior to the filing of this statement.

* * * * *

Certification Under 37 CFR 1.8

Date of Deposit November 17, 2005

I hereby certify that this paper and any accompanying papers or fees are being deposited with the U.S. Postal Service with sufficient postage as first class mail under 37 CFR 1.8 on the date indicated above and addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Mary E. Caniz
(Name of person mailing)

Mary E. Caniz
(Signature of person mailing)

Fee Under 37 CFR § 1.97(c)

[] The fee for submission of this IDS under § 1.97(c) is \$180.00 as set forth in § 1.17(p).

Petition Under 37 CFR § 1.97(d)

[] This is a petition requesting consideration of an IDS under § 1.97(d). The petition fee for submission of this IDS under § 1.97(d) is \$180.00 as set forth in § 1.17(p).

Provision of Copies of References

[X] A copy of each of the listed references is enclosed herewith and forms a part hereof.

[] A translation of each of Reference(s) ___ is enclosed herewith and forms a part hereof.

[] A copy of the International Search Report from a corresponding PCT application is enclosed herewith.

[] A copy of the European Search Report from a corresponding EPO application is enclosed herewith.

[] A copy of the final U.S. office action for U.S. patent application no. _____ filed on _____ as attorney docket no. (Case name or our ref.).

[] The above-captioned U.S. patent application is a

- [] continuation
- [] divisional
- [] continuation-in-part

application of U.S. application serial number ____, filed on ____ as Attorney Docket No. ____.
Each of the listed references was previously cited by or submitted to the Office in the prior application. The above-captioned U.S. patent application relies upon the prior application for an earlier filing date under 35 U.S.C. 120. Pursuant to § 1.98(d), copies of the listed references are not being provided with this IDS.

Authorization To Charge Deposit Account

[X] Authorization is given to charge the deposit account of **Mendelsohn & Associates, P.C. Deposit Account No. 50-0782** for any fee under § 1.97(c) or § 1.97(d).

It is respectfully requested that the Examiner initial and return a copy of the enclosed PTO-1449 form as confirmation that each of the documents has been considered.

Respectfully submitted,

Date: 11/17/05
Customer No. 46850
Mendelsohn & Associates, P.C.
1500 John F. Kennedy Blvd., Suite 405
Philadelphia, Pennsylvania 19102


Steve Mendelsohn
Registration No. 35,951
Attorney for Applicant
(215) 557-6657

Enclosures

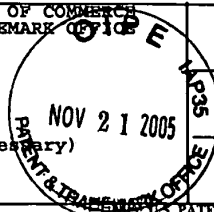
FORM PTO-1449 U.S. DEPARTMENT OF COMMERCE
(Rev. 2-32) PATENT AND TRADEMARK OFFICE

ATTY. DOCKET NO.

SERIAL NO.

INFORMATION DISCLOSURE
STATEMENT BY APPLICANT

(Use several sheets if necessary)



Dziong 12-21-38
APPLICANT

10/817,760

Zbigniew M. Dziong, Muhammad A. Qureshi and
Yung-Terng Wang

FILING DATE

GROUP

04/02/04

Not yet assigned

EXAMINER INITIAL	DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE

FOREIGN PATENT DOCUMENTS

DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES NO

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

BA	"RSVP-TE: Extensions to RSVP for LSP Tunnels" by D. Awduche, L. Berger, D. Gan, T. Li, V. Srinivasan, and G. Swallow; Cisco Systems, Inc. December 2001, pps. 1-47.
BB	"SONET Bidirectional Line-Switched Ring Equipment Generic Criteria," Generic Requirements, GR-1230-CORE, Issue 4, December 1998, pps. 3-48 through 3-61.

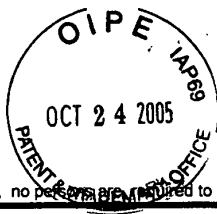
EXAMINER	DATE CONSIDERED
----------	-----------------

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

(Form PTO-1449)

990.0496

990.0496
Dziong 12-21-38



IFW

Doc Code:

PTO/SB/82 (04-05)

Approved for use through 11/30/2005. OMB 0651-0035

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

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

REVOCATION OF POWER OF ATTORNEY WITH NEW POWER OF ATTORNEY AND CHANGE OF CORRESPONDENCE	Application Number	10/817,760
	Filing Date	04/02/2004
	First Named Inventor	Zbigniew M. Dziong
	Art Unit	2661
	Examiner Name	not yet assigned
	Attorney Docket Number	Dziong 12-21-38

I hereby revoke all previous powers of attorney given in the above-identified application:

☐ A Power of Attorney is submitted herewith.

OR

☒ I hereby appoint the practitioners associated with the Customer Number:

46850

☒ Please change the correspondence address for the above-identified application to:

☒ The address associated with
Customer Number:

46850

OR

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

I am the:

☐ Applicant/Inventor.

☒ Assignee of record of the entire interest. See 37 CFR 3.71
Statement under 37CFR 3.73(b) is enclosed. (Form PTO/SB/96)

SIGNATURE of Applicant or Assignee of Record

Signature			
Name	Gregory Murgia, Esquire		
Date	10/4/05	Telephone	(732) 949-3578

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 _____ forms are submitted.

This collection of information is required by 37 CFR 1.36. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending on 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.



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

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

PATENT

Re: Attorney Docket No. Dziong 12-21-38

STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: Lucent Technologies Inc.

Application No./Patent No.: 10/817,760 Filed/Issued Date: 04/02/2004

Entitled: "Calculation of Link-Detour Paths In Mesh Network"

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

States that it is:

1. ☒ the assignee of the entire right, title, and interest; or
2. ☐ an assignee of less than the entire right, title, and interest.
The extent (by, percentage) of its ownership interest is _____ %

In the patent application/patent identified above by virtue of either:

- A. ☒ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel 015666, Frame 0415, or for which a copy thereof is attached.

OR

- B. ☐ A Chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as shown below:

1. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at Reel ___, Fame ___, or for which a copy thereof is attached.
2. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at Reel ___, Fame ___, or for which a copy thereof is attached.
3. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at Reel ___, Fame ___, or for which a copy thereof is attached.

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

☐ Copies of assignments or other document in the chain of title are attached.

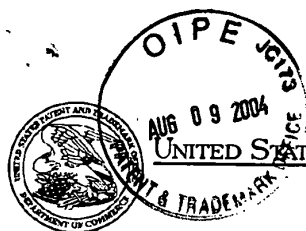
[Note: A separate copy (i.e., the original assignment document or a true copy of the original documents) must be submitted to Assignment Division in accordance with 37 CFR Part 3, if the assignment is to be recorded in the records of the USPTO. See MPEP 302.08]

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

Respectfully submitted,

Date: 10/4/05
Customer No. 46850


Gregory Murgia, Esquire
Registration No. 41,209
Attorney for Assignee



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	ATTORNEY DOCKET NUMBER
10/817,760	04/02/2004	Zbigniew M. Dziong	Dziong 12-21-38

Steve Mendelsohn
 Mendelsohn & Associates, P.C.
 Suite 715
 1515 Market Street
 Philadelphia, PA 19102

CONFIRMATION NO. 2094

FORMALITIES LETTER



OC000000013018455

Date Mailed: 06/22/2004

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

Filing Date Granted

Items Required To Avoid Abandonment:

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items and pay any fees required below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The statutory basic filing fee is missing.
Applicant must submit \$ 770 to complete the basic filing fee for a non-small entity. If appropriate, applicant may make a written assertion of entitlement to small entity status and pay the small entity filing fee (37 CFR 1.27).
- The oath or declaration is unsigned.
- To avoid abandonment, a late filing fee or oath or declaration surcharge as set forth in 37 CFR 1.16(e) of \$130 for a non-small entity, must be submitted with the missing items identified in this letter.

SUMMARY OF FEES DUE:

Total additional fee(s) required for this application is **\$900** for a Large Entity

- **\$770** Statutory basic filing fee.
- **\$130** Late oath or declaration Surcharge.

Replies should be mailed to: Mail Stop Missing Parts
 Commissioner for Patents
 P.O. Box 1450
 Alexandria VA 22313-1450

08/10/2004 RAO:DF01 00000014 10817760
 770.00 BP
 130.00 BP
 01 FC:1001
 02 FC:1051

A copy of this notice MUST be returned with the reply.



Customer Service Center

Initial Patent Examination Division (703) 308-1202

PART 2 - COPY TO BE RETURNED WITH RESPONSE



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Attorney Docket No.: Dziong 12-21-38

In re Application of: Zbigniew M. Dziong, Muhammad A. Qureshi and Yung-Terng Wang

Serial No: 10/817,760

Art Unit: 2661

Filed: 04/02/2004

Examiner: Not yet assigned

Matter No.: 990.0496

For: Calculation Of Link-Detour Paths In Mesh Networks

**RESPONSE TO NOTICE TO FILE MISSING
PARTS OF NONPROVISIONAL APPLICATION
FILING DATE GRANTED**

MAIL STOP MISSING PARTS

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

Dear Sir:

In response to the "Notice to File Missing Parts of Nonprovisional Application -- Filing Date Granted," mailed from the U.S. Patent and Trademark Office on 06/22/04, the following are submitted herewith and form a part of this response:

1. Check in the amount of \$940.00;
2. A copy of the Notice to File Missing Parts of Application;
3. Declaration and Power of Attorney (6 pages);

*

*

*

*

*

Certification Under 37 CFR 1.8

Date of Deposit August 4, 2004.

I hereby certify that this paper or fee is being deposited with the United States Postal Service with sufficient postage as first class mail under 37 CFR 1.8 on the date indicated above and is addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Mary E. Caniz

(Name of person mailing)

Mary E. Caniz
(Signature of person mailing)

4. Recordation Form Cover Sheet (1 page); and
5. Assignment (4 pages).

A check in the amount of \$940.00 as payment of the statutory basic filing fee (\$770.00), the surcharge (\$130.00), and the statutory assignment filing fee (\$40.00) is enclosed.

The Commissioner is hereby authorized to charge payment of any additional fees required under 37 CFR §§ 1.16 and 1.17 which are associated with this communication or credit any overpayment to **Mendelsohn & Associates, P.C. Deposit Account No. 50-0782**.

Respectfully submitted,

Date: 8/4/04
Customer No. 22186
Mendelsohn & Associates, P.C.
1515 Market Street, Suite 715
Philadelphia, Pennsylvania 19102

Steve Mendelsohn
Steve Mendelsohn
Registration No. 35,951
Attorney for Applicant
(215) 557-6657



Customer No.: 22186

Attorney No.: Dziong 12-21-38

IN THE UNITED STATES
PATENT AND TRADEMARK OFFICE

Declaration and Power of Attorney

As the below named inventor, I hereby declare that:

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

I believe I am the original, first, and sole inventor (if only one name is listed below) or an original, first, and joint inventor (if multiple names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled **Calculation Of Link-Detour Paths In Mesh Networks**, the specification of which is being filed under the above-identified Attorney Docket Number.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by an amendment, if any, specifically referred to in this oath or declaration.

I acknowledge the duty to disclose all information known to me which is material to patentability as defined in Title 37, Code of Federal Regulations, 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

None

I hereby claim the benefit under Title 35, United States Code, 119(e) of any United States provisional application(s) identified below:

None

I hereby claim the benefit under Title 35, United States Code, 120 of any United States application(s) listed below and, 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 Title 35, United States Code, 112, I acknowledge the duty to disclose all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

None

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

I hereby appoint the following attorney(s) with full power of substitution and revocation, to prosecute said application, to make alterations and amendments therein, to receive the patent, and to transact all business in the Patent and Trademark Office connected therewith:

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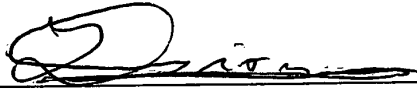
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3 Attorney Docket No.: Dziong 12-21-38

I hereby appoint the attorney(s) on ATTACHMENT A as associate attorney(s) in the aforementioned application, with full power solely to prosecute said application. to make alterations and amendments therein, to receive the patent, and to transact all business in the Patent and Trademark Office connected with the prosecution of said application. No other powers are granted to such associate attorney(s) and such associate attorney(s) are specifically denied any power of substitution or revocation.

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6 Attorney Docket No.: Dziong 12-21-38

ATTACHMENT A

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APPLICATION NUMBER	FILING OR 371 (c) DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NUMBER
10/817,760	04/02/2004	Zbigniew M. Dziong	Dziong 12-21-38

CONFIRMATION NO. 2094

FORMALITIES LETTER



OC000000013018455

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Date Mailed: 06/22/2004

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

Filing Date Granted

Items Required To Avoid Abandonment:

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items and pay any fees required below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The statutory basic filing fee is missing.
Applicant must submit \$ 770 to complete the basic filing fee for a non-small entity. If appropriate, applicant may make a written assertion of entitlement to small entity status and pay the small entity filing fee (37 CFR 1.27).
- The oath or declaration is unsigned.
- To avoid abandonment, a late filing fee or oath or declaration surcharge as set forth in 37 CFR 1.16(e) of \$130 for a non-small entity, must be submitted with the missing items identified in this letter.

SUMMARY OF FEES DUE:

Total additional fee(s) required for this application is **\$900** for a Large Entity

- **\$770** Statutory basic filing fee.
- **\$130** Late oath or declaration Surcharge.

Replies should be mailed to: Mail Stop Missing Parts
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PART 3 - OFFICE COPY



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IN THE UNITED STATES
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PATENT APPLICATION

APPLICANTS: Zbigniew M. Dziong
Muhammad A. Qureshi
Yung-Terng Wang

CASE NAME: Dziong 12-21-38

TITLE: Calculation Of Link-Detour Paths In Mesh Networks

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

SIR:

Enclosed are the following papers relating to the above-named application for patent:

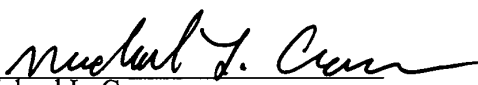
1. Transmittal Letter (1 page);
2. Unexecuted Declaration and Power of Attorney (pages);
3. Information Disclosure Statement w/PTO-1449 and 2 References; and
4. Patent Application with Formal Drawings (1 Cover Page; 31 Pages of Specification; 4 Pages of Claims; 1 Page of Abstract; 12 Sheet(s) of Drawings).

CLAIMS AS FILED				
	NO. FILED	NO. EXTRA	RATE	CALCULATIONS
Total Claims	20 - 20=	0	x \$18 =	\$
Independent Claims	2 - 3=	0	x \$86 =	\$
Multiple Dependent Claim(s), if applicable			\$290 =	\$
Basic Fee				\$770
			TOTAL FEE:	\$

Please address all correspondence to **Steve Mendelsohn, Mendelsohn & Associates, P.C., 1515 Market Street, Suite 715, Philadelphia, Pennsylvania 19102**. Telephone calls should be made to me at Area Code (215) 557-6657.

Respectfully submitted,

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IDS#125759 (990.0496)

Attorney Docket No. Dziong 12-21-38

APPLICATION FOR UNITED STATES LETTERS PATENT

FOR

CALCULATION OF LINK-DETOUR PATHS IN MESH NETWORKS

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Muhammad A. Qureshi
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Prepared by: Mendelsohn & Associates, P.C.
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* * * * *

Certification Under 37 CFR 1.10

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Date of Deposit April 2, 2004

I hereby certify that this document is being deposited with the United States Postal Service's "Express Mail Post Office To Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Mary E. Caniz
(Name of person mailing)

Mary E. Caniz
(Signature of person mailing)

CALCULATION OF LINK-DETOUR PATHS IN MESH NETWORKS

CROSS-REFERENCE TO RELATED APPLICATIONS

The subject matter of this application is related to U.S. patent application no.
5 10/639,728 filed on 08/12/2003 as attorney docket no. Dziong 8-25-16-32; application
no. 10/673,381 filed on 09/26/2003 as attorney docket no. Doshi 56-5-21-17-33;
application no. 10/673,383 filed on 09/26/2003 as attorney docket no.
Doshi 57-6-22-18-34; application no. 10/673,382 filed on 09/26/2003 as attorney docket
no. Doshi 55-7-23-15-35; application no. 10/673,056 filed on 09/26/03 as attorney docket
10 no. Alfakih 1-1-1-6-24; application no. 10/673,057 filed on 09/26/03 as attorney docket
no. Dziong 9-1; and application no. 10/673,055 filed on 09/26/03 as attorney docket no.
Doshi 58-10-27-19-36, the teachings of all of which are incorporated herein by reference.

This application is one of a set of U.S. patent applications consisting of application
no. 10/xxx,xxx filed as attorney docket no. Dziong 11-20-37; application no. 10/xxx,xxx
15 filed as attorney docket no. Dziong 12-21-38; and application no. 10/xxx,xxx filed as
attorney docket no. Dziong 13-22-39, all of which were filed on the same date and the
teachings of all of which are incorporated herein by reference.

BACKGROUND OF THE INVENTION

Field of the Invention

20 The present invention relates to communications networks, and, more specifically, to
mechanisms for calculating recovery paths in mesh communication networks.

Description of the Related Art

A mesh communication network includes a set of nodes interconnected by
communication links. A path in a mesh network is a set of one or more links connecting a
25 source node to a destination node possibly through one or more intermediate "transit" nodes.
Mesh networks that are able to recover automatically from the failure of at least one node or
link along paths in the network are considered to be "protected" networks. Recovery
mechanisms for such protected networks can be either path-based or link-based.

Path-based recovery is the process of recovering from a failure of one of the links or
30 nodes in a path from a source node to a destination node by rerouting traffic for the entire
path along a recovery path. In path-based recovery, the recovery path shares only the source
and destination nodes with the original path.

Link-based recovery, on the other hand, is the process of recovering from a single link/node failure by rerouting traffic around the failure using a link-detour path, without rerouting the entire path. A link-detour path is that portion of a link-based recovery path that corresponds to the failure. In many instances, the recovery path for link-based recovery from the failure of a single link is identical to the original path with the exception of the failed link, which is replaced by two or more new links connecting one or more new nodes.

Extensive work has been done on calculating primary paths and their recovery paths (also known as protection paths) for networks that employ path-based recovery (see, e.g., Doshi 58-10-27-19-36). Some work has also been done on calculating link-detour paths for links in primary paths for networks that employ link-based recovery.

SUMMARY OF THE INVENTION

Problems in the prior art are addressed in accordance with principles of the present invention by a protected communication network that utilizes a link-based recovery strategy that employs methods for calculating and distributing link-protection parameters and calculating both primary and link-detour (LD) paths based on these parameters. We have recognized that current solutions for link-based recovery fail to adequately consider the cost of link-detours when calculating primary paths for demands. To some extent, this is a result of a lack of information related to sharing and link state at elements of the network that perform these calculations. As a result, inefficiencies in the use of available network bandwidth and/or the expensive overbuilding of capacity can result in order to meet a desired level of service. In the protected communications network of the present invention, the availability of link-protection parameters at various locations within the network supports the computation of more-optimal primary and LD paths and a corresponding increase in sharing of network resources between disjoint failures.

In certain embodiments, the present invention is a method for selecting both a primary path for a demand and an LD path associated with each link in the selected primary path. This method involves (1) developing a plurality of candidate primary paths for a demand as a function of the available bandwidth on the links of the candidate primary paths, (2) selecting a primary path to carry the demand as a function of a sum of link costs associated with the links of each candidate primary path, and (3) calculating an LD path for each link of the selected primary path as a function of the available shared bandwidth on candidate LD paths. The link costs of the candidate primary path links can be a function of the link costs of LD paths for those primary path links.

In some cases, the link costs of the LD paths can be a function of an administrative weight for the LD path links. In addition or alternatively, the LD path link costs can be a function of the available shared bandwidth and a function of the demand bandwidth. These costs are distributed to portions of the network for use in path calculations. The controlling node for each link of the primary path for which these calculations are performed can be the node that also distributes LD path costs to the rest of the network.

A joint-optimization mechanism can be employed that considers jointly the cost of LD paths as well as the cost of links in candidate primary paths in the selection of a primary path for a demand. In these embodiments, information for the joint optimization can be distributed using link-state advertisements.

BRIEF DESCRIPTION OF THE DRAWINGS

Other aspects, features, and advantages of the present invention will become more fully apparent from the following detailed description, the appended claims, and the accompanying drawings in which:

FIG. 1 illustrates two interconnected ring topology networks.

FIG. 2 illustrates a network formed from nodes A, B, C, D, and E are connected in a topological ring.

FIG. 3 illustrates an exemplary process for achieving link-based protection at the demand level.

FIG. 4 depicts a process for calculating primary paths and link-detour paths according to one embodiment of the present invention.

FIG. 5 illustrates a simple network with both path-based and link-based recovery paths.

FIG. 6 illustrates an exemplary optical/SONET network and a corresponding bandwidth reservation table for one of its links.

FIG. 7 illustrates a generic LSA data flow for a link-based protection mechanism.

FIG. 8 illustrates loop issues in mesh networks.

FIG. 9 illustrates the link protection path-cost function in a SONET network assuming a static link-cost function.

FIG. 10 illustrates an exemplary loop-avoidance process applied to each link in the primary path of an end-to-end connection.

FIG. 11 illustrates another exemplary loop-avoidance process applied to each link in the primary path of an end-to-end connection.

FIG. 12 illustrates another exemplary loop-avoidance process that is applied to each link in the primary path of an end-to-end connection.

DETAILED DESCRIPTION

Reference herein to “one embodiment” or “an embodiment” means that a particular feature, structure, or characteristic described in connection with the embodiment can be included in at least one embodiment of the invention. The appearances of the phrase “in one embodiment” in various places in the specification are not necessarily all referring to the same embodiment, nor are separate or alternative embodiments mutually exclusive of other embodiments.

Introduction

Link-based recovery as implemented in the prior art suffers from a number of limitations including inefficient use of bandwidth, backhaul, and a failure to fully address bandwidth-sharing opportunities and recovery management at a granularity that is below the link/port (e.g., wavelength) level.

Recovery Granularity

In optical ring networks of the prior art, the granularity with which link-based protection is implemented is too coarse (e.g., link or line level). Link-based protection of the prior art is provided at a link or line (SONET) / wavelength (WDM) granularity as opposed to the present invention where link-detour paths are computed at a link/line/wavelength/demand granularity.

In the present invention, link-based recovery is managed at a demand granularity. Thus, in anticipation of a failure of a line/port, a separate link-detour path can be reserved for each demand in a line/port. Failure of a line/port or a complete link in the network can thus result in the rerouting of a multitude of affected individual demands along potentially independent recovery paths. In the case of a large demand that spans multiple lines, potentially in separate links (or shared risk links), the flexibility exists to reroute the entire demand in the event of a failure of one of the lines carrying the demand or reroute just the affected line. In general, the flexibility afforded by recovery down to, if desired, the granularity of a demand supports the computation of more-optimal link-detour paths.

Protection versus Restoration

Recovery mechanisms are often distinguished by the time at which the recovery path is computed and reserved relative to when it is activated. “Protection” typically refers to a recovery mechanism where the paths are computed and reserved in advance of a failure.

“Restoration” typically refers to a recovery mechanism where the paths are computed and reserved after a failure has occurred. Although typically slower, restoration can sometimes be more optimal than protection given that more-recent information can be used to route around failed links, nodes, or paths. The present invention can use either or both types of recovery mechanism though protection is preferred.

Sharing and Single-Event Failures

Another problem, associated with some current link-based recovery mechanisms is a failure to take advantage of recovery bandwidth-sharing opportunities. For example, consider topological rings **102** and **104** depicted in **FIG. 1**. Ring **102** (A-B-C-D-A) (with two units of capacity) and ring **104** (B-C-F-E-B) (with four units of capacity) have the link between nodes B and C (i.e., link B-C) in common. Note that, in this example, the capacity of a ring is limited to the capacity of the link in the ring with the lowest capacity. In accordance with the current SONET and SDH ring standards, ring **102** can use one unit of bandwidth for working traffic, while reserving one unit of bandwidth for protection. Similarly, ring **104** can use two units of bandwidth for working traffic, while reserving two units of bandwidth for protection. Since link B-C is common to both rings and thus carries three units of working traffic, it should reserve three units of protection bandwidth to protect against failures of other links in the two rings. This equates to providing sufficient recovery bandwidth on link B-C to accommodate a failure of at least one link (other than B-C) in each of ring 1 and ring 2 simultaneously.

However, modern-day networks have very high reliability and typically a very fast repair interval (i.e., the time it takes to recover from a single failure, restore service, fix the failure, and switch back to the original configuration – if that is part of the protocol, or at least reserve new recovery paths based on the modified configuration). In the present invention, this reliability is taken into account by assuming that, since the probability of experiencing a second failure during the recovery interval following an initial failure is insignificant, the probability of two or more co-existing failures can essentially be ignored.

Considering this, reserving separate capacity for each ring, ring **102** and ring **104** in our example, is wasteful of resources. In the above scenario, this equates to the assumption that the reserved bandwidth in the network need only accommodate a failure of a link of ring **102** or a link of ring **104**, but not both simultaneously. With this assumption, the bandwidth reserved on link B-C to cover a single failure on this two-ring network need only be two units (as opposed to three). In the event of a failure of any one of the other links of ring **102**,

one unit of the reserved bandwidth along link B-C can be used for recovery purposes. Similarly, in the event of a failure of any one of the other links of ring 104, both units of the reserved bandwidth along link B-C can be used for recovery purposes. Thus, the recovery bandwidth reserved on link B-C is shared between the two rings, yielding a more efficient use of network resources.

Finally, as another example of the flexibility afforded by link-based recovery at a demand granularity, in the case of a failure of link B-C, each demand on link B-C could be recovered along a different detour path, where in this example, the possible detours paths are B-A-D-C and B-E-F-C. Related information on path-based recovery bandwidth sharing among multiple disjoint failures in the context of wavelength connections in optical rings can be found in B.T. Doshi, S. Dravida, P. Harshavardhana, O. Hauser, Y. Wang, "Optical Network Design and Restoration" BLTJ, January – March 1999, incorporated herein by reference in its entirety. More information on BLSR and MS-Spring can be found in BLSR – GR – 1230 – CORE, SONET Bidirectional Line-Switched Ring Equipment Generic Criteria, and International Telecommunications Union (ITU) G.841 (SDH) "MS-Spring, types and characteristics of SDH network protection architecture," Feb. 99, each incorporated herein by reference in its entirety.

Preferred Embodiments

The following embodiments are included to illustrate the concepts of the present invention. Though these examples present preferred implementations in particular contexts, they should not be construed as limiting the scope or intent of the present invention.

Link-Based Recovery at the Demand Level

One embodiment of the present invention is a link-based recovery scheme for SONET/SDH networks where the link recovery and sharing are provided at the SONET/SDH tributary demand level. This is a finer granularity than either the SONET line or wavelength level. In one or more embodiments of the present invention, each tributary demand within a SONET line can be protected independently of the others. This means that tributary demands to the same SONET line may have different protection paths associated with them.

For example, referring again to the network of FIG. 1, assume there are two 5 Mbps demands on the network. One demand is carried along path A-B-C, the other is carried along path F-E-B-C. Thus, both demands have primary paths that include nodes B and C. Further suppose both demands are routed within the same line between nodes B and C. In

the prior art, in the event of a failure of that line on link B-C, all the traffic on the failed line would be redirected to one alternate path, for example, B-A-D-C or B-E-F-C in a link-based recovery scheme that was limited to line-level granularity. In the present invention, however, each demand carried on link B-C can have its own protection path. In the event of
5 a failure of link B-C, each demand can be routed along a different path if it is beneficial to do so. For example, the first demand can be routed along protection path B-A-D-C, and the second demand can be routed along path B-E-F-C. Alternatively, the first demand could be routed along B-E-F-C, and the second demand routed along B-A-D-C. Of course, within the present invention, the flexibility of routing both demands along the same recovery path is
10 retained as well.

Elimination of Backhauling

Another aspect of the present invention is that it avoids any unnecessary backhauling of traffic in the network. Backhauling occurs when traffic ends up unnecessarily traversing the same link twice, resulting in waste of recovery bandwidth. Backhauling can easily occur
15 if no special attention is given to the network topology/connectivity. For example, consider a network as illustrated in **FIG. 2** where nodes A, B, C, D, and E are connected in a ring topology, forming ring A-B-C-D-E-A. Assume that nodes C, D, and E have no other connected links or nodes in the network other than those illustrated. This means that there is just one shortest detour (C-B-A-E-D) between nodes C and D that can avoid traversing link
20 C-D.

Now consider a demand **202** from node A to node B whose primary path, for some reason, is A-E-D-C-B. Assume that the demand is recovered by link-based recovery mechanisms, where the detour for link D-C is the path D-E-A-B-C. In this case, if link D-C fails, traffic for demand **202** will flow along the primary path segment A-E-D (**204**),
25 followed by flow along the detour path D-E-A-B-C (**206**), followed by flow along the primary path segment C-B (**208**). In this case, traffic will flow along links A-E, E-D, and B-C twice. This backhauling can be avoided if the protection scheme detects the backhaul while computing the protection paths and avoids the backhaul by moving the protection switching functions. In the present example, backhauling can be avoided by moving the
30 protection switching function to nodes A and B. To accomplish this, the present invention can incorporate additional bookkeeping and signaling that allow the computation and selection of the appropriate switching nodes for protection.

Precomputation of Protection Cross-Connect Tables

To achieve fast protection comparable to that of SONET/SDH ring protection, embodiments of the present invention include computation of cross-connect tables per failure per node in advance of a failure. This comes at the cost of more data management but
5 avoids having to allocate cross-connects at the time of failure. Further, this allows triggering of protection signaling from both sides of a connection since the cross-connects at each node along the detour are already computed, reserved, and known in advance of the failure.

Bundling of Signaling Messages

Embodiments of the present invention also feature bundling of signaling messages.
10 In this scheme, failure indication for all the demands affected by a single line/port failure that will be recovered along the same detour path can be bundled in a single recovery message. This reduces the number of recovery messages that need to be processed in the network.

Exemplary Procedure

FIG. 3 depicts an exemplary process for achieving link-based protection at the
15 demand level. As shown, in step **302**, a working path for a new service is computed along with protection paths for each link in the working path. In order to admit a new service into the network, there should be sufficient capacity in the network to admit the new service along the working path and also guarantee the service's recovery from any single failure along its route.

20 In step **304**, to avoid backhaul, the recovery-switching nodes for recovery of each link in the working path are adjusted so that, for example, no links in the recovery path of a failed link are traversed more than once and no links in the recovery path for the failed link are part of the original primary path. Alternatively or additionally, backhaul is eliminated by a recovery-path calculation mechanism that eliminates redundant traversal of any one link and
25 reassignment of the recovery-switching function to nodes appropriate to the backhaul-free path. Once the recovery-switching nodes are adjusted, state information is updated to reflect the new detour node locations.

Next, in step **306**, sharing between disjoint link failures is achieved by determining, via bookkeeping information, the amount of protection bandwidth that would need to be
30 reserved on each link for recovering demands affected by any single other link failure in the network. Recovery of each other link may require a different amount of capacity. On each link that is part of a recovery path, the maximum of required recovery capacities required on that link is calculated. This maximum is then reserved on the link if sufficient capacity

exists on the link. For a distributed implementation, each node keeps track of this sharing information for each of its incident links. Signaling is used to update this sharing information with admittance of every new demand into the network. In the case of SONET/SDH networks, the reservation information is kept in terms of time slots associated with the demands, though other schemes are possible.

In step 308, each upstream node to a link keeps track of the demands on that link that use the same line/port and have the same link-detour path. Signaling messages for these connections are bundled whenever possible by the upstream node to save signaling bandwidth.

Finally, in step 310, link status and sharing information is passed to nodes in the network using an appropriate link state advertisement (LSA)-based routing protocol.

Calculation of Primary and Link-Detour Paths

Embodiments of the present invention may include a distributed method for calculating primary and link-detour paths in a mesh network. This method improves the number of connections admitted to a network and reduces the probability of crank-backs due to unavailable or overutilized link-detour paths. A crankback is the failure to establish either a primary or protection path based on the unavailability of resources that were anticipated to be available. A crankback can occur, for example, during the reservation of bandwidth along a calculated protection path for a link. A source node may assume that bandwidth for a new connection is available, and then start to signal to establish the primary path and link-detour paths for the connection. However, during the process of establishing those paths, it might be found that one of the links along the paths cannot support the required bandwidths. In this case, the paths need to be ripped up and the signaling “cranked back” to the originating source node, which needs to try an alternative path. Crankbacks can be very undesirable because of the delay associated with them. Improvement in the number of connections admitted to the network results from a link-detour path-calculation method that increases sharing of the recovery bandwidth and a primary-path calculation method that is a function of the link-detour costs.

Link-Protection Path Calculation

In embodiments of the present invention, link-detour path calculation involves maximizing sharing of link-detour bandwidth. The recovery-path calculation algorithm makes use of information including how much bandwidth can be shared at each link in the network. This information is obtained by advertising, across the network, the amount of

bandwidth reserved for recovery on each link and by bookkeeping, in each node, information about all recovery paths that would be activated when a protected link fails.

Primary-Path Calculation

5 The primary path is calculated by taking into account the link cost and constraints that take into account the costs and constraints of link-detour paths for each link in the primary path. The link-detour path cost and constraints for each link are distributed to each node by an advertising protocol.

FIG. 4 depicts a process for calculating primary paths and link-detour (LD) paths according to one embodiment of the present invention. In step **402**, each node in the network does bookkeeping for each of its incident links of the amount of protection bandwidth that is needed to recover service in the event of each potential link failure in the network. The amount of bandwidth actually reserved on each incident link is the maximum of the bandwidths required to recover from any of the failures.

15 In step **404**, each node in the network advertises to other nodes in the network the amount of protection bandwidth it currently has reserved on each of its incident links.

In step **406**, an LD path for each link in a set of candidate primary paths for a new demand is calculated in such a way that sharing in the network is maximized (e.g., by summing the cost of each link in each candidate LD path, where the cost is an inverse function of the degree to which the protection bandwidth for that link can be shared with other links in the network, and by choosing the path with the lowest cost).

Next, in step **408**, the primary path for a new demand is selected from the set of candidate primary paths by considering not only the cost of the links in each primary path but also the cost of the LD paths for each link in the primary path.

Link-Based vs. Path-Based Shared Protection

25 Path-based shared recovery has been utilized in mesh networks to improve the efficiency and recovery speed of communications networks. More information on path-based shared recovery can be found in Z. Dziong, S. Kasera, R. Nagarajan, "Efficient Capacity Sharing in Path Restoration Schemes for Mesh Optical Networks," NFOEC 2002 (herein "Dziong '02"), and in co-pending applications Lucent-1 – Lucent-6 referenced above. However, a generic link-based shared-recovery approach can provide effective resiliency mechanisms that are competitive with other solutions, such as ring-based protection, from both a bandwidth efficiency and a recovery time perspective.

While some of the algorithms utilized in a link-based scheme are related to path-based recovery algorithms, there are significant modifications and special considerations that are made in the case of link-based recovery.

FIG. 5 illustrates a simple network with both path-based and link-based recovery paths. For path-based recovery, two link- and node-disjoint paths between the source and destination nodes are shown. One is primary path A-B-C-D and the other is recovery path E-F-G-H-I. For link-based recovery, each link on the primary path has its own link-detour (LD) path that is defined by its source node (the link's upstream node), its destination node (the link's downstream node), and a set of transit nodes. For example, in the case of a failure of link A, demands that were carried on that link can be rerouted to LD path J-K. Alternatively, though much less efficiently, demands on link A could have been rerouted along LD path E-F-G-H-I-D-C-M-L. Other alternative routes could also be used, contingent on any hop limit imposed on the network. In the present invention, it is assumed that a failure can affect an entire link, part of a link (e.g., one or more lines/ports that are part of the link), or several links. The links or the lines/ports that are likely to be affected at the same time are grouped into a shared-risk link group (SRLG). In general, SRLGs can overlap each other.

Link-Based Shared Restoration

Different embodiments of the present invention employ a variety of link-based recovery mechanisms that trade off bandwidth efficiency with implementation complexity and cost. The framework is defined by the following assumptions:

- a) Recovery paths are calculated for each connection separately,
- b) Recovery is guaranteed for a single failure, and
- c) Recovery bandwidth is shared among different shared-risk link groups.

Note that, although optical or SONET network examples are used in various discussion herein, the present invention can be applied to networks based on different technologies and topologies, including wired / wireless, optical / electrical, and mesh topology.

General Link-Based Protection Framework

Link protection can be implemented in different ways. The choice is usually driven by the following objectives:

- a) Recovery speed comparable with rings,
- b) Recovery guaranteed for one SRLG failure at a time,
- c) Bandwidth efficiency better than that of rings, and

d) Scalability.

The objectives of recovery speed and guaranteed recovery for no more than one SRLG failure at a time imply that the recovery paths should be reserved in advance. Although the terms “restoration” and “protection” are often used interchangeably in the art, herein, advance reservation schemes are referred to as “protection” schemes, and schemes where alternative paths for services are calculated after a link’s failure are referred to herein as “restoration” schemes. Using this distinction between restoration and protection, the paths calculated for link protection herein will generally either be referred to as protection paths or recovery paths, although it should be understood throughout that the alternative of post-failure reservation within the scope and intent of the present invention.

In the present invention, link-recovery mechanisms can be implemented with different reservation granularities varying from reservation per link/fiber/line/port to reservation per demand/connection/service. All these choices are viable from a bandwidth efficiency viewpoint since, although the flexibility exists in the present invention to route each demand along a different LD path, demands can still be routed along common LD paths if so desired from a bandwidth flexibility perspective. Still, the choice of granularity has an impact on implementation complexity, bandwidth efficiency, and restoration speed. While each of the alternatives has some advantages and disadvantages, a preferred embodiment of the present invention involves reservation per demand that provides:

- i) Flexibility that supports different recovery services for each customer,
- ii) Bandwidth efficiency associated with the use of diverse link-detour paths for demands within the same link or even the same line/port, and the ability to reserve only the required amount of bandwidth for recovery, and
- iii) Avoidance of unnecessary connection disruptions if the connection is carried on a line/port that is not affected by the failure but would be switched anyway due to reservation granularity coarser than a single line/port.

To achieve bandwidth efficiency better than that of rings, recovery bandwidth sharing is considered between different single-event failures. In other words, the bandwidth reserved for recovery of a particular SRLG can be shared with bandwidth reserved for recovery of other disjoint SRLGs, since it is assumed that only one failure at a time will occur. **FIG. 6(a)** illustrates an exemplary optical/SONET network **602** and **FIG. 6(b)** shows bandwidth reservation table **604** for link A-B of **FIG. 6(a)**.

In network **602**, each solid line represents all of the demands that have the same link-detour path, which is represented by a corresponding broken line. For example, solid line **606** in SRLG 4 corresponds to one or more demands totaling 15 units of bandwidth between nodes A and D. Broken lines **608** between nodes A and B, nodes B and C, and nodes C and D correspond to the common link-detour path for those demands.

Bandwidth reservation table **604** describes the current state of the bandwidth of link A-B in terms of cross-connection (XC) units. In particular, "P-XC" represents the number of XC units in link A-B that currently support demands (i.e., 12 units in this example). "SRLG 3 failure" represents the number of XC units in link A-B that are reserved to protect demands on SRLG 3 (i.e., 48 units). Similarly, "SRLG 4 failure" and "SRLG 5 failure" represent the numbers of XC units in link A-B that are reserved to protect demands on SRLG 4 (i.e., 15 units) and SRLG 5 (i.e., 36 units), respectively. Note that link A-B is not part of the link-detour path for the other 24 XC units of demand on SRLG 4 (i.e., represented by solid line CE).

Table **604** is based on the assumption that protection bandwidth is shared for SRLG-disjoint failures. As such, RSRV-XC represents the actual amount of bandwidth that needs to be reserved on link A-B to protect against any one SRLG failure in network **602**. In the current example, this corresponds to the maximum of the protection bandwidths required by each of SRLGs 3, 4, and 5 protected by link A-B (i.e., 48 units). Thus, link A-B provides protection bandwidth that is shared between disjoint SRLGs 3, 4, and 5.

The example shows one-link-long connections and their protection paths that, in effect, illustrate link-based protection concepts. Because these primary paths are only a single link long, calculation of bandwidths reserved for protection in this case could be done using the same mechanism used for path protection as discussed in Dziong '02. In general, this will not be the case.

To calculate bandwidth reserved on each link for protection, the node controlling the link book-keeps information about the bandwidth needed to protect each SRLG. To support this, when the source node of a protection path sends a message along that path to make a reservation, it also includes information about the protected SRLG.

The calculation of primary and protection paths can be done in several ways that influence several performance characteristics such as scalability, bandwidth efficiency, and number of crank-backs. There are three main issues associated with this problem: path

calculation architecture, algorithms for calculation of protection paths, and algorithms for calculation of primary paths.

Centralized Calculation

Recovery-path calculation can be centralized or distributed. In a centralized solution, the path calculation is performed in a specialized server that keeps track of all connection states. When a new connection demand arrives at a source node, a request is sent to the server to calculate the primary path and associated protection path(s). Once the server calculates the paths, this information is sent back to the source node. The main advantage of this option is that the path calculation algorithms have exact information about link and connection states so that optimal paths can be calculated and crank-backs avoided. Nevertheless, these advantages have to be weighed against several drawbacks such as scalability limits, calculation delays, sensitivity to server failure, and design of an additional network element that needs very reliable communication with all other network elements.

Distributed Calculation

An alternative to centralized solution is a distributed implementation where paths are calculated in their respective source nodes. Such a solution has the advantage of being much more scalable and resilient to network element failures. While a distributed implementation avoids signaling to a centralized server, it requires an advertisement protocol that distributes information about link states across the network. Such link-state advertisement (LSA) protocols are usually already present in communications networks to support primary path calculations. However, some extensions may be required in order to advertise information about link bandwidth sharing capabilities, and, in the case of link recovery, link-recovery costs.

FIG. 7 illustrates a generic LSA data flow in such an environment for the link-based protection mechanism. This flow is more complex than the equivalent flow for path protection since it includes the addition of the link protection path parameters (702). More details on these and other parameters to be advertised are given in the next section where path calculation algorithms are described. As illustrated, the link protection process can be divided into two main parts. These are the connection setup process, which includes steps 704, 706, and 708, and the local LSA calculation process, which includes steps 710, and 712. The connection setup process starts with a request for a new demand in step 704. This is followed by primary path calculation for the new demand in step 706 using link and link-protection parameters 714, and 702, respectively. Then, in step 708, making use of link

parameters 714, at each node along the primary path, the protection path for the downstream link connected to that node is calculated. Upon the occurrence of an LSA update trigger (716) (e.g., a new primary path in the network, a new global LSA update, or the expiration of a periodic timer) each node performs LSA link-protection parameter calculations (for each of its incident nodes) and in step 712, each node updates the link-protection parameters in its local link-protection database. Finally upon the occurrence of a large change in services on the network or other periodic timer (718), the new LSA database is flooded to the network.

Protection and Primary Path Calculations

The calculation of primary and protection paths for path protection was discussed and presented in Dziong '02. For link-based protection, it is of interest to provide node- and link-disjoint paths that are bandwidth efficient. Two generic approaches are possible. The first approach assumes the same link weight for both the primary and protection paths. In this case, an algorithm can be implemented that provides a minimum-cost solution, but compromises bandwidth efficiency by not taking into account sharing opportunities. In the second approach, the algorithm takes into account link-sharing opportunities. This second approach raises two additional issues. First, the link-sharing abilities should be advertised in the distributed implementation. This results in an increased signaling load in the network. Second, the link cost can be different for primary and protection paths. This feature makes optimal solution time-consuming in real-time and therefore a heuristic is preferred as proposed in Dziong '02.

Recovery path calculations

In some areas, the issues associated with recovery path calculation for link-based recovery is analogous to recovery path calculations for path-based restoration that was described in Dziong '02. In particular, two generic approaches can be considered.

In the first, the recovery path is calculated using the same link-state database and link-cost function as the ones used for primary path calculations. Assuming that the primary path was already calculated, a shortest-path algorithm can be used for calculation of a minimum-cost link-detour path after excluding the protected link from the network topology.

In this case, the LD path calculation does not take into account the sharing capabilities of links, and therefore sharing is not optimized. Still, some degree of sharing can be achieved by proper bookkeeping of the reserved recovery paths at the nodes controlling the links. Another disadvantage of this approach is that link *i* considered for the protection path of a

protected link j should have available bandwidth AB_i at least as large as the protected connection bandwidth CB (i.e., $CB \leq AB_i$), since the sharing capability of the reserved bandwidth for protection is unknown.

As a consequence, in some cases, a request for a protection path for a link can be rejected due to lack of available bandwidth on a candidate protection link, while, in reality, it could have been established using available shared bandwidth reserved for protection on that link for a disjoint failure. Still, this option has the advantage of being simple and consistent with primary path calculation approaches.

Available shared bandwidth (ASB)

In the second approach, a link's detour path is calculated using link-state and link-cost functions that take into account link-sharing capabilities. In this approach, the reservation for a new LD path can use both a protection link's available bandwidth and the protection link's available shared bandwidth ASB_i . In this case, the link bandwidth constraint is given by:

$$CB \leq AB_i + ASB_i$$

To calculate available shared bandwidth on link i , two additional link parameters are needed. First, link i bandwidth reserved for all LD paths using this link BRP_i , should be known. Note that, in the case of a distributed implementation, this information should be advertised throughout the network so that each potential LD path source node has this information for all links in the network. The source node also should have information about the link i protection bandwidth PB_i^j already reserved (in support of other connections) for the failure of link j for which the protection path is calculated. In this case:

$$ASB_i = BRP_i - PB_i^j$$

Note that the value of PB_i^j is available locally at the protection path source node since this node has to keep track of all connections on link j anyway. The bandwidth PB_i^j is subtracted from the total reserved protection bandwidth on link i because it is not available for sharing with additional connections protected on link j since all the connections on link j are considered (for the present discussion) to fail in common with the link failure and thus simultaneously require protection in an additive manner. This feature is of importance when compared with path protection schemes where such information is not available in the

protection path source node and has to be advertised throughout the network based on local protection bandwidth bookkeeping (see Dziong '02).

This advantage of link protection vs. path protection is straightforward when an SRLG consists of one link. When the k -th SRLG consists of more than one link, the
5 available shared bandwidth is given by:

$$ASB_i = BRP_i - PB_i^k$$

where PB_i^k corresponds to protection bandwidth needed on link i in the case of a failure of all links belonging to SRLG k . If all links belonging to SRLG k originate in the protection path source node, the value of PB_i^k is still available at the source node. A problem arises
10 when the links from SRLG k originate in different nodes. In these cases, the protection path source node does not have sufficient information to calculate PB_i^k . One possible solution is analogous to the one proposed in Dziong '02 for path protection. Namely, the node controlling link i performs bookkeeping of PB_i^k for all SRLGs using link i for protection in order to calculate bandwidth reserved for protection bandwidth. Therefore, these values can
15 be advertised throughout the network so that the protection path source node has the information it needs to calculate the sharing capabilities for all links.

Link-cost function

Depending on the path calculation objective, the link-cost function can take into account several metrics including: administrative weight (which can be considered as a link
20 bandwidth unit cost), available bandwidth, and delay. In the following discussion, maximization of bandwidth utilization is the focus, where the metrics of importance are administrative weight, available bandwidth, and available shared bandwidth. When LD path calculation is based on available bandwidth only, the conservative approach is to assume that the LD path will need additional reservation of CB , since the available shared bandwidth is
25 unknown. In this case, the link-cost function should be the same as for the primary path calculations.

In general, one can consider a static link-cost function, such as administrative weight AW , or a dynamic link-cost function that depends on available bandwidth. A dynamic non-sharing link-cost function (the cost of available bandwidth CAB) can be based on the inverse
30 of available bandwidth as proposed in Dziong '02:

$$LC_{NS} = CAB = \frac{CB \cdot AW}{AB^a}$$

where a is a numerically chosen factor. The inverse of available bandwidth factor provides better load balancing in the network that in turn can improve bandwidth utilization and access fairness.

While the above formulations define the cost of the link available bandwidth, the question arises as to what should be the link-cost function for the link available shared bandwidth. First, it should be noted that there is no immediate cost for new protection path reservation using ASB_i in terms of bandwidth. Therefore, at that instant of reservation, the link cost could be assumed to be zero. Nevertheless, by using a Markov decision theory framework, one can find that there is a certain cost. This follows from the fact that the cost should be considered during the whole connection-holding time. So, even if, at the moment of connection arrival, sharing is possible, in the future, with some probability, the other connections can be terminated, and the new connection will be the sole occupant of the reserved bandwidth and hence incurs a cost for reserving additional restoration bandwidth. Also, consuming the available shared bandwidth increases the probability of use of available bandwidth by some future protection paths. While exact calculation of such a cost is complex, one can apply an approximation (the cost of shared bandwidth CSB) similar to that presented in Dziong '02:

$$LC_s = CSB = \frac{CB'}{1 + b \cdot ASB} \cdot \frac{AW}{AB^a}$$

where CB' is the portion of the connection bandwidth that can be accommodated using the available shared bandwidth of the link, and $b > 1$ is a numerically chosen coefficient that reduces the available shared bandwidth cost compared to the cost of available bandwidth.

Path calculation and loop avoidance

Assuming link-cost and link-state information is available, one LD path calculation approach involves removal of the protected link from the network topology before application of a shortest-path algorithm to the source-destination pair. Nevertheless, this approach has one potential drawback. Namely, in the case of a failure, the link protection path combined with the still active part of the primary path can form a loop that can be seen as an unnecessary waste of bandwidth. Such a situation can happen quite often especially in sparse networks where some nodes have only two adjoining links.

FIG. 8 illustrates some loop issues. For example, in both **FIGs. 8(a)** and **8(b)**, a failure of link **802** results in routing of traffic (indicated by broken lines) around the failed

link in a less than optimal fashion. Note that, in each case, an ideal detour path would involve protection switching for the link-detour path occurring at node 804.

In general, loop avoidance can be realized in several ways. In a distributed embodiment, it is assumed that the protected link's immediately upstream node is in control of calculation, reservation, and activation of the protection path for the link. In one embodiment, a link protection path is calculated without any considerations of loops. If a loop is subsequently detected, by comparing the LD path with the primary path, the algorithm defines the branching and merging nodes of the shortened-LD path as the nodes common to primary and link protection paths that are closest to the primary path source and destination nodes, respectively. Then, the reservation message, sent from the upstream node along the protection path, reserves bandwidth only on the links belonging to the shortened-LD path. When the link fails, the recovery message, sent from the upstream node along the shortened-LD path, activates connections between the primary and shortened-LD paths in the branching and merging nodes as well as connections in the transit nodes of the shortened-LD path.

Additional gain in bandwidth efficiency can be achieved by enhancing the LD path calculation. This can be obtained by first marking the primary links as no-constraint links with link cost equal zero. Then, after calculating the LD path and subtracting the primary links from the solution, the outcome defines the least-expensive, shortened-LD path.

Joint optimization of primary and protection paths

In non-joint optimization embodiments of the present invention, the primary path is calculated using a shortest-path algorithm that minimizes the path cost and meets the bandwidth constraints ($CB \leq AB_i$) for each link i in the primary path. Then, the protection paths can be optimized for a given primary path using one or more of the techniques described above.

In joint-optimization embodiment, a more optimal solution calculates and optimizes both the primary and protection paths at the same time. This approach was applied in Dziong '02 for path protection. In the case of link protection, the issue of joint optimization is much more complex due to the multitude of link detour paths. Moreover, in the case of distributed implementation, it is more straightforward to calculate the link detour paths in the controlling nodes for the primary path links and calculate the primary path in the connection

source node. Still, a joint optimization has the advantage of increasing bandwidth efficiency and reducing the number of crank-backs.

The following discussion describes a joint-optimization embodiment of the present invention where joint optimization is performed in a distributed fashion. In this embodiment, the primary path calculation takes into account some advertised attributes of the link-detour path, but the paths are still calculated in the respective upstream (i.e., controlling) nodes of each protected link.

Throughout this document, a controlling node for a link is defined as the node that is immediately upstream to a link relative to a given primary demand. A controlling node calculates and distributes a link-detour path cost CPP_i and keeps track of the available bandwidth for protection ABP_i on the link detour path for a link i along the primary path. (Note that a node in the network may have many incident links for which it serves as a controlling node). The aforementioned function of a controlling node can be done either by using information from the last link detour path calculation, by periodic calculations, or by a combination of the two. This information is then periodically advertised to all other nodes together with other link-state parameters as illustrated in FIG. 7. When the connection source node calculates the primary path, the link constraints and link cost are modified. In particular, each link considered for the primary path has to fulfill the bandwidth constraint for the primary connection:

$$CB \leq AB_i$$

and the bandwidth constraint for the link detour path:

$$CB \leq ABP_i.$$

The link cost for joint optimization then has two components, one associated with the primary path links and the other associated with the link detour paths:

$$LC_i = CAB_i + CPP_i.$$

Note that the cost of a link detour path can be a non-linear function of connection bandwidth. This follows from the fact that the available shared bandwidth can be smaller than the maximum connection bandwidth on some protection path links. This feature may require advertisement of several parameters that approximate the CPP_i function.

FIG. 9 illustrates the link protection path-cost function in a SONET network assuming a static link-cost function (e.g., $LC = f(\text{administrative weight } AW)$). In this case, the number of cost parameters corresponds to the number of connection bandwidth

requirements in the SONET hierarchy (e.g., each different bandwidth in the hierarchy, for example, STS-3, typically has a different administrative weight AW). Negative values (e.g., for STS48 and STS192) correspond to connection bandwidths that require more bandwidth than is available.

5 In **FIG. 9**, boxes **902**, **904**, and **906** represent the use of bandwidth on three links (A, B, and C) along a link detour path. Each of these boxes shows 5 STS-1 units of bandwidth **910**, **912**, **914**, respectively, reserved for protecting the 5 STS-1 bandwidth demand **908** associated with a primary path link i . Each of boxes **902**, **904**, and **906** also represent the use of each associated links bandwidth for primary, available, and recovery bandwidth
10 categories. For example, as represented by box **902**, link A has 8 STS-1s reserved for protection (**916**). Link B has 15 STS-1s reserved for protection (**918**) and link C has 10 STS-1s reserved (**920**).

 Note that the available bandwidth on the link detour path for protection of a new demand on link i is limited to the minimum available bandwidth of the three detour path
15 links, in this case equal to 18 STS-1s per link C.

 Given this situation, the graph of cost of the protection path CPP_i **922** associated with link i shows what CPP_i would for five different sizes of a new demand on link i . As illustrated, a demand of either STS-1 or STS-3 can be accommodated without requiring any additional bandwidth for recovery on the detour links A, B, and C. Therefore the CPP value
20 for those demands is shown as zero. For an STS-12 demand, 9 additional STS-1s are needed on link A for recovery since three STS-1s are already reserved and can be shared (assuming the reservation is for a disjoint link recovery). Similarly, 2 additional STS-1s are needed on link B where 15 units are already reserved (10 above the 5 STS-1 demand of link i), and 7 additional STS-1s are required on link C. These numbers are used with the respective
25 weights to calculate CPP_i value for a STS-12 demand. Since the shared bandwidth plus the available capacity of link B is insufficient (see box **904**) to accommodate an STS-48 demand, the CPP_i value associated with STS-48 is negative. Similarly, the CPP_i value is negative for an STS-192 demand. Note that CPP_i is a function of the demand, thus, in some embodiments, a set of CPP_i values can be advertised for each link I , where each element of
30 the set is associated with a different demand value or range of values.

 The above joint-optimization approach has the advantage of improving bandwidth utilization by joint optimization of the primary and protection paths in a distributed implementation. Also, the crank-backs are minimized since the connection source knows the

availability of link protection a priori. One potential drawback to this approach is increased link advertisement load that may limit the LSA-update frequency and that in turn may reduce the accuracy of the link-protection attributes.

Loop Avoidance in Link-Recovery Schemes for Mesh Networks

5 Embodiments of the present invention include a method to calculate (in a distributed fashion), reserve, and activate (in the event of a failure) shortened link-detour paths. Shortened link-detour paths avoid loops caused by overlapping of primary and link-detour paths and therefore can significantly increase network efficiency in terms of the number of accepted connections.

10 Loop avoidance includes three parts: (1) a modified link-detour path calculation, (2) signaling extensions in the link-detour path reservation process, and (3) signaling extensions in the recovery process.

 The link-detour path calculation is modified by the constraint that the calculated link-detour path and the primary path are link and node disjoint.

15 The following assumptions and definitions are provided to facilitate further discussion:

Branching node – a node, upstream of a link with respect to an end-to-end connection that traverses the link, which controls the rerouting of traffic around that link in the event of a failure of the link. Note that, prior to loop avoidance, the branching node for a link is the
20 upstream node of a link that terminates the link; while, after loop avoidance, the branching node could be a transit node that is further upstream in the end-to-end connection path.

Merging node – a node, downstream of a link with respect to an end-to-end connection that traverses the link, which receives the traffic of the connection that was rerouted around that link in the event of a failure of the link. Note that, prior to loop
25 avoidance, the merging node for a link is the downstream node of a link that terminates the link; while, after loop avoidance, the merging node could be a transit node that is further downstream in the end-to-end connection path.

Full-LD path – a link-detour path between an upstream node and a downstream node of a link.

30 *Shortened-LD path* – the portion of a full-LD path that connects the branching and merging nodes.

Signaling nodes – transit nodes that belong to the full-LD path but not to the shortened link-detour path.

Protected segment - A protected segment is the portion of a primary path that is between the branching and merging nodes. It is assumed that, in case of a bi-directional end-to-end connection along a path between two end nodes in a network, any of the two end nodes can receive the request for the connection, whereas, in the case of a unidirectional connection between two end nodes, only the node that is upstream to the connection can receive the connection request. For convenience, the node receiving the connection request is referred to as the connection's source node, and the other end node is referred to as the connection's destination node, irrespective of the type of connection. For example, a bi-directional connection that is set up between nodes A and D can be requested at either node A or node D. If this connection is requested at node A, then node A will be referred as the source node and node D will be referred as the destination node. In contrast, a unidirectional connection from node A to node D can only be requested at node A. Note that, in this document, only bi-directional connection requests are discussed, although similar principles apply to unidirectional requests.

The source node of an end-to-end connection is responsible for computing the primary path for the connection as well as verifying that, for each link along the primary path, there exists at least one link-detour path (LD path) that can accommodate the recovery bandwidth required for that link. The upstream node of each link in the primary path (and not necessarily the source node of the end-to-end connection) is responsible for computing the LD path for its link. For example, suppose that a link connecting node A and node B is along the primary path for an end-to-end connection. Further, suppose node A is the node that is connected upstream to a particular link in the primary path for the connection (that is, node A is closer to the source node than node B is). In this case, node A will compute the LD path. Note that, with minimal additional information, the upstream-terminating node of a link can compute a more-optimal LD path than the source node.

Embodiments of the present invention employ three major mechanisms to avoid loops in calculated paths. The three mechanisms are "source-node (centralized)," "segment-based," and the preferred embodiment "upstream-node (distributed)." Loop avoidance can significantly improve resource utilization within a network.

30 *Source-Node (Centralized) Loop Avoidance*

In this embodiment, when a new connection request arrives at a source node, a centralized routing engine calculates both a primary path for the connection and a loop-free link-detour path for each link of the primary path. The resulting LD path information is

passed to the transit nodes of the primary path during the primary path setup process. Note that the loop-free LD path for each link might include a branching node that is not the immediate upstream node of the link due to loop-avoidance optimizations performed by the centralized routing engine. In any event, each branching node sets up its link's LD-path (reserves bandwidth, etc.). When a link failure occurs, the node that is immediately upstream of the failed link sends a failure message to the corresponding branching node, which then activates the corresponding LD path.

Advantages of this approach include a possibly optimal choice of branching, merging nodes according to selected objectives, and no path computations in the transit nodes. Disadvantages include increased complexity of the routing engine and limited sharing optimization.

Segment-Based Loop Avoidance

In a segment-based approach, a source node for an end-to-end connection calculates the primary path for the connection and then identifies path segments within the primary path. Path segments are portions of the primary path that include transit nodes that are of connectivity no greater than two and that can therefore not serve as branching or merging nodes. The starting and ending nodes of each segment are thus identified as the branching and merging nodes, respectively, of LD paths for links within that segment. This information is passed to the transit nodes of the primary path during the primary path setup process. Then, each branching node calculates and sets up the LD path between itself and its merging node. When a failure occurs, the node that is immediately upstream of the failed link sends a failure message to the corresponding branching node, which then activates the corresponding LD path. Branching nodes again control the LD paths.

Advantages of this approach include the primary path calculation being unaffected. Disadvantages include, depending on traffic conditions, some probability of loops remaining in the network.

Upstream-Node Distributed Loop Avoidance (UNDLA)

Here, the primary path calculation and setup are unchanged. In this preferred embodiment, during the LD path bandwidth reservation phase, each transit node calculates the LD path for its downstream incident link on the primary path. If a loop exists in the resulting full-LD path, it is then shortened and the branching and merging nodes are selected. In this approach, the immediately upstream node of a link remains in control of the shortened-LD path, and the branching and merging nodes have no control functionality.

During the recovery path bandwidth reservation process, the other upstream nodes that are covered by the shortened-LD path can be provided with the failure ID corresponding to the primary connection under consideration. In this way, they know they do not need to perform LD path calculation corresponding to their incident downstream link along that primary path
5 for the connection.

Advantages of this approach include minimal changes to the existing LD path algorithms and protocols. Disadvantages include the possibility of overlapping of branching and merging nodes.

There are three main approaches to upstream-node distributed loop avoidance
10 (UNDLA): (1) basic, (2) enhanced, and (3) non-revertive. Note that, in general, the computation of link-detour paths is realized in the reservation control (upstream) node for a link and can be divided into two parts: (a) calculation of a path between the upstream and downstream nodes (i.e., the computation of the full link-detour path) and (b) loop elimination (computation of a shortened link-detour path). Loop elimination requires
15 knowledge of primary path topology in the link upstream node.

1. UNDLA Basic Solution

In the basic solution, each link-detour path is calculated independently of the others and independently of the primary path. As a result, these LD paths may partially overlap protected segments.

20 For this solution, **FIG. 10** illustrates an exemplary loop-avoidance process applied to each link in the primary path of the end-to-end connection. In step **1002**, the full-LD path for a link in the primary path is calculated (e.g., using a shortest-path algorithm to calculate a path between upstream and downstream terminating nodes for the link). If, in step **1004**, it is determined that no loops exist, then the terminating nodes that are upstream and downstream
25 of the link are designated the branching and merging nodes of the LD path, and the process exits in step **1006**.

However, if loops are detected in the full LD path, then, in step **1008**, the branching node is determined as that node that is common to both the primary path and the full LD path and that is closest to the connection source. Then, in step **1010**, the merging node is
30 determined as that node that is common to both the primary path and the full-LD path and that is closest to the connection destination. In step **1012**, the shortened-LD path is set equal to the portion of the full-LD path that is directly between the branching and merging nodes.

2. *UNDLA Enhanced Solution - Revertive*

In the enhanced solution, all links within a protected segment use the same LD path. For this solution, **FIG. 11** illustrates another exemplary loop-avoidance process that can be applied to each link in the primary path of the end-to-end connection. In step 1102, the full-LD path for a link in the primary path is calculated from a network topology where the primary path links are marked as “no-constraint” (e.g., assigned a link cost of zero). In step 1104, primary path links are subtracted from the full-LD path to determine the shortened-LD path and define the protected segment.

Note that, in this solution, the objective is to use the same LD path for all links in a protected segment. Each link in the protected segment belongs to at least one shared-risk link group (SRLG) that might include multiple links. It is thus important to make sure that none of the links used in the shortened-LD path are also in an SRLG for one or more of the links in the segment. Otherwise, a failure of a link in the protected segment will be associated with some significant probability of failure of a link along the shortened-LD path.

Assuming the initial shortened-LD path calculation was done in consideration of the SRLG associated with a specific link in the primary path, if any link in the resulting protected segment has an SRLG in common with the specific link, a new calculation is done that considers all SRLGs associated with links in the protected segment and excludes them from the topology for the new calculation. Thus, in step 1112, a test is performed to see if another link in the protected segment has an SRLG in common with the specified link. If the test fails, the process exits in step 1114.

However, if the test passes, then, in step 1106, the SRLGs of all links in the segment are determined, and, in step 1108, all links in the SRLGs are removed from the current shortened-LD path. Finally, in step 1110, an LD path for the link is recalculated using the previously determined branching and merging nodes, and this new path is used as the shortened-LD path. The process exits in step 1114. Note that, if the exclusion process makes the previously calculated branching and merging nodes invalid for the new shortened-LD path, the new topology can be used in the calculation of a new full-LD path as a first step and then the new shortened-LD path calculated from the new full-LD path. Ultimately, this new shortened-LD path is combined with any primary path links from the source node to the branching node and any primary path links from the merging node to the destination node to form a new recovery path for all the links in the protected segment.

Note that each demand in the protected segment can be assigned a different recovery path if so desired.

Advantages of this solution include achieving a shortened-LD path with minimum cost. Disadvantages include the fact that the full-LD path could be longer than the LD path that results from the basic solution; however, this should not be a problem if a constraint for a maximum number of nodes in the link-detour path is introduced.

3. *UNDLA Non-Revertive or Minimum-Cost Primary*

The following embodiment additionally provides for reducing the cost of the resultant primary path during loop elimination calculations. This solution is called “non-revertive” since, in this embodiment, once traffic is switched over to the shortened-LD path, the shortened-LD path becomes the new primary path for the connection, and recovery of the failed link does not result in traffic being “reverted” to the original primary path. **FIG. 12** illustrates another exemplary loop-avoidance process that can be applied to each link in the primary path of the end-to-end connection. In step **1202**, the link under consideration is removed from the topology and the primary links are marked as no-constraint links. Next, in step **1204**, a shortest path between the source and destination of the primary path is calculated (by any of the aforementioned or conventional methods).

Then, in steps **1206** and **1208**, the nodes in the path that are common to the primary path and the shortest path just calculated are identified and the common nodes that are closest to the link under consideration in the upstream direction and in the downstream direction become, respectively, the branching and merging nodes of the shortened-LD path for the link. Finally, in step **1210**, the shortened LD path is set equal to the portion of the shortened path that lies between the newly defined branching and merging nodes and in step **1212**, the process exits. If needed, the full-LD path can be defined as the concatenation of the shortened-LD path and the primary path between the branching and merging nodes minus the link under consideration to create a new primary path. The process exits in step **1212**.

Advantages of this approach include achieving a new primary path in case of failure at minimum cost. Disadvantages include the fact that the full link-detour path can be longer than in the other solutions.

30 *LD Path Reservation*

The reservation setup messages are slightly different in the basic, enhanced, and non-revertive loop avoidance embodiments. In the basic embodiment, a reservation setup message is sent from the reservation control node to the branching node, then along the

shortened-LD path to the merging node, and from there, to the downstream node. The message carries information that classifies nodes as branching, merging, or transit nodes.

In the enhanced loop avoidance embodiment, the reservation setup message is sent along the full-LD path. The message carries information that classifies nodes as branching, merging, signaling, or transit nodes. The message also carries associated failure IDs, if applicable. The failure IDs are used to avoid having more than one shortened-LD path associated with the set of links in the protected segment associated with the shortened-LD path.

In the non-revertive loop avoidance embodiment, the reservation message may need to carry additional information that is required in the shortened-LD path related nodes to take full control of the recovery path in the case of failure.

LD path reservation actions at each node

In the basic embodiment, branching, merging, and transit nodes reserve cross-connects in anticipation of a failure. In this scheme, each link in the protected segment makes an independent reservation. This limits, in general, using the same shortened-LD path for all links in the protected segment since each LD path can be different. As a consequence, there is a possibility of partly overlapping protection segments and that may cause problems in a scenario where a second failure occurs.

In the enhanced embodiment, signaling nodes (and the branching node if different from the reservation control node) will associate a failure ID with the primary connection for which the LD path is reserved. If this signaling node previously made an LD-path reservation, this reservation should be torn down. When the signaling node later becomes an upstream node that is to reserve an LD path for the same primary connection, it sends the reservation message with the associated failure IDs so the same link-detour path can be used for all links in the protected segment. Branching, merging, and transit nodes perform the same actions as in the basic solution except when they encounter a failure ID in the reservation message, the new failure ID is linked to the existing reservation and no new cross connects are added. Actions for nodes in the non-revertive embodiment are identical to the actions for corresponding nodes in the enhanced embodiment.

Advantages of this approach include that the same LD path is used for all links in the protected segment. Disadvantages include that the failure ID concept has to be incorporated into signaling and reserved cross-connect infrastructure.

Link first-failure recovery

For a first failure in the network, in the basic embodiment, the failure message is sent from the reservation control node to the branching node, then along the shortened-LD path to the merging node, and then to the downstream node.

5 In the enhanced embodiment, the failure message is sent from the reservation control node to the branching node, then along the shortened-LD path to the merging node, and then to the downstream node. At the branching and merging nodes, the node first checks to see if any of the associated failure IDs are already activated. If so, no action is taken other than confirmation that the recovery is in place. Otherwise, the reserved cross-connect is
10 activated.

In the non-revertive embodiment, the node actions are the same as in the enhanced embodiment, except that, additionally, once recovery is confirmed, the shortened-LD path nodes take over control of the new primary path, while the failed link upstream node tears down the old primary path between the branching and merging nodes.

15 *Second failure on the primary path*

In the basic embodiment, since each link-detour path is calculated independently for each link, the protection segments for each link can overlap each other (partially or fully) and there can be problems with second-failure recovery.

In a first scenario, two failures occur on two protection segments with common
20 branching and/or merging nodes. Independent of whether or not the second failure is within the protected segment of the first failure, the link recovery for the second link can fail. When the second failure occurs, the connection will still be protected by the link-detour path that was put into place following the first failure. However, if the first failure is repaired, and the connection path is allowed to revert to the original primary path, the reversion will
25 disconnect the end-to-end connection because of the second failure. Therefore, the repairs should be synchronized in such a way that the second failure is repaired first. Alternatively, path-based recovery can be used to recover more than one link failure.

In a second scenario, single event failures occur on two different protected segments simultaneously where the protected segments are partly overlapping and they have different
30 branching and merging nodes. In this scenario, the recovery of the second failure can disconnect the end-to-end connection. In this case, path-based restoration will be activated.

Note that, in the enhanced embodiments, there are no overlapping protection segments since, for each protection segment, there is one LD path. If a second failure is

within the protected segment of the first failure, its failure ID is associated with the active recovery path, and the recovery message will be confirmed without any cross-connect actions upon reception of the message at the branching, transit, and merging nodes, other than a confirmation of the recovery. In each node of the shortened-LD path, the second failure ID
5 will have already been marked as activated. Therefore, independent of which failure is repaired first, its rollover and reversion messages will only change the status of its failure ID from active to non-active, but the cross-connects will stay intact, since the other failure ID will still be active, and the connection will not be lost.

Recovery / Reversion

10 Once a failure is repaired, in the basic embodiment, messages are sent to branching and merging nodes to rollover (or revert) the connections back to the original primary path. Once this action is confirmed, a tear-down message is sent along the link-detour path. This message serves to restore the state from before the failure. If there was a second failure within the protected segment and it is not repaired by now, after rollover, the connection will
15 be broken, and path recovery will take over.

Advantages of this approach include simplicity. Disadvantages include that the primary path is broken if the second failure in the protected segment is not repaired before the first failure is repaired and protection reestablished.. This issue can be solved by coordination of the failure repairs.

20 In the enhanced embodiment, the signaling process is the same as in the basic solution except that, in each of the shortened link-detour path nodes, there are two possible actions that can occur after receiving the rollover or reversion messages. If the failure ID is the only active failure among all the associated failures on the common protected segment, then the process is the same as in the basic solution. Otherwise, the failure ID status is
25 changed to non-active, but no actions (e.g., cross-connect reassignments) are performed. Instead, the messages are confirmed as if the action was taken.

Advantages of this approach include that the primary path is protected even if the second failure in the protected segment is not repaired before the first failure is repaired. Disadvantages include that implementation of the failure ID associations is
30 required.

Although the present invention has been described in the context of optical networks, the invention can also be implemented in the context of other networks such as all electrical networks and hybrid optical/electrical networks.

While this invention has been described with reference to illustrative embodiments, this description should not be construed in a limiting sense. Various modifications of the described embodiments, as well as other embodiments of the invention, which are apparent to persons skilled in the art to which the invention pertains are deemed to lie within the principle and scope of the invention as expressed in the following claims.

Although the steps in the following method claims are recited in a particular sequence with corresponding labeling, unless the claim recitations otherwise imply a particular sequence for implementing some or all of those steps, those steps are not necessarily intended to be limited to being implemented in that particular sequence.

10

CLAIMS

We claim:

1. A link-based recovery method for a mesh network, the method comprising:
developing N candidate primary paths, between a source node and a destination node for a
5 demand, as a function of N sets $\{AB_i\}$ of available bandwidths, wherein each set $\{AB_i\}$
corresponds to one of the N candidate primary paths, and each element AB_i of each set
corresponds to the available bandwidth on a link i of the corresponding candidate primary path;
selecting a first primary path, from the N candidate primary paths, as a function of N sets
 $\{LC_i\}$ of link costs, wherein each set $\{LC_i\}$ corresponds to one of the N candidate primary
10 paths, and each element LC_i of each set corresponds to a link cost of a link i in the
corresponding candidate primary path; and
computing a link detour (LD) path for each link i in the first primary path as a function of a
set $\{ABP_i\}$ of available LD bandwidths, wherein each element ABP_i of the set $\{ABP_i\}$ is equal
to the minimum value from the set $\{AB_j\}$ of available bandwidths, wherein each element AB_j
15 of the set $\{AB_j\}$ corresponds to a link j in a candidate LD path for link i .

2. The invention of claim 1, wherein:
each link j in each of a plurality of candidate LD paths for link i of the first primary path has
a link cost associated with it; and
20 computing the LD path for each link i in the first primary path comprises selecting the LD
path for link i as a function of link cost.

3. The invention of claim 2, wherein computing an LD path comprises:
computing a sum of the link costs associated with each link j in two or more candidate LD
25 paths for link i of the first primary path to determine an LD path link cost sum; and
choosing the LD path for the link i of the first primary path to be the candidate LD path
with the smallest LD path link cost sum.

4. The invention of claim 2, wherein each link cost is inversely related to the available
30 bandwidth on the link.

5. The invention of claim 2, wherein each link cost is inversely related to the available
shared bandwidth on the link.

6. The invention of claim 1, wherein:

selecting the first primary path comprises:

5 computing a sum of the link costs LC_i of all links i in each of the N candidate
primary path to determine a link cost sum corresponding to each candidate primary path; and
 choosing the first primary path to be the candidate primary path with the smallest link
cost sum.

7. The invention of claim 1, wherein developing the N candidate primary paths and
10 selecting the first primary path for the demand are performed at the source node.

8. The invention of claim 1, wherein computing the link detour (LD) path for a given link i
in the first primary path is performed at a controlling node for link i , wherein the controlling
node for link i is a terminating node for link i that is immediately upstream of link i with respect
15 to the demand.

9. The invention of claim 1, comprising:

 calculating a LD path cost CPP_i for each link i of each candidate primary path, wherein
 CPP_i is a function of at least the administrative weight of each link within the link detour path
20 for link i ;

 calculating a cost of available bandwidth CAB_i for each link i of each candidate primary
path, wherein CAB_i is inversely related to the available bandwidth on link i ; and

 calculating the link cost LC_i for each link i of each candidate primary path as a function of
 CPP_i and CAB_i .
25

10. The invention of claim 9, wherein CPP_i is calculated and distributed to the rest of the
network by a controlling node for link i , wherein the controlling node for link i is a
terminating node for link i that is immediately upstream to link i with respect to the demand.

30 11. A protection manager for a mesh communications network, the manager comprising one
or more computing elements adapted to:

 develop N candidate primary paths, between a source node and a destination node for a
demand, as a function of N sets $\{AB_i\}$ of available bandwidths, wherein each set $\{AB_i\}$

corresponds to one of the N candidate primary paths, and each element AB_i of each set corresponds to the available bandwidth on a link i of the corresponding candidate primary path;

select a first primary path, from the N candidate primary paths, as a function of N sets $\{LC_i\}$ of link costs, wherein each set $\{LC_i\}$ corresponds to one of the N candidate primary
5 paths, and each element LC_i of each set corresponds to a link cost of a link i in the corresponding candidate primary path; and

compute a link detour (LD) path for each link i in the first primary path as function of a set $\{ABP_i\}$ of available LD bandwidths, wherein each element ABP_i of the set $\{ABP_i\}$ is equal to the minimum value from the set $\{AB_j\}$ of available bandwidths, wherein each element AB_j of
10 the set $\{AB_j\}$ corresponds to one link j in an LD path for link i .

12. The invention of claim 11, wherein:

each link j in each of a plurality of candidate LD paths for link i of the first primary path has a link cost associated with it; and

15 computing the LD path for each link i in the first primary path comprises selecting the LD path for link i as a function of link cost.

13. The invention of claim 12, wherein computing an LD path comprises:

computing a sum of the link costs associated with each link j in two or more candidate LD
20 paths for link i of the first primary path to determine an LD path link cost sum; and

choosing the LD path for the link i of the first primary path to be the candidate LD path with the smallest LD path link cost sum.

14. The invention of claim 12, wherein each link cost is inversely related to the available
25 bandwidth on the link.

15. The invention of claim 12, wherein each link cost is inversely related to the available shared bandwidth on the link.

30 16. The invention of claim 11, wherein:

selecting the first primary path comprises:

computing a sum of the link costs LC_i for all links i in the primary path to determine a link cost sum; and

choosing the first primary path to be the primary path with the smallest link cost sum.

17. The invention of claim 11, wherein developing the N candidate primary paths and selecting the first primary path for the demand are performed at the source node.

5

18. The invention of claim 11, wherein computing the link detour (LD) path for a given link i in the first primary path is performed at a controlling node for link i , wherein the controlling node for link i is a terminating node for link i that is immediately upstream of link i with respect to the demand.

10

19. The invention of claim 11, wherein the one or more computing elements are adapted to: calculate a LD path cost CPP_i for each link i of each candidate primary path, wherein CPP_i is a function of at least the administrative weight of each link within the link detour path for link i ;

15

calculate a cost of available bandwidth CAB_i for each link i of each candidate primary path, wherein CAB_i is inversely related to the available bandwidth on link i ; and

calculate the link cost LC_i for each link i of each candidate primary path as a function of CPP_i and CAB_i .

20

20. The invention of claim 19, wherein CPP_i is calculated and distributed to the rest of the network by a controlling node for link i , wherein the controlling node for link i is a terminating node for link i that is immediately upstream to link i with respect to the demand.

CALCULATION OF LINK-DETOUR PATHS IN MESH NETWORKS**ABSTRACT OF THE DISCLOSURE**

A protected communication network utilizes a link-based recovery strategy that includes methods for calculating and distributing link-protection parameters and calculating primary and link-detour paths based on these parameters. These link-protection parameters support the computation of more-optimal link-detour paths and a corresponding increase in sharing of network resources between disjoint failures. A joint-optimization mechanism can be employed that considers both the cost of link-detour paths as well as the cost of links in candidate primary paths in the selection of a primary path for a demand. Information for the joint optimization is preferably distributed using link-state advertisements.

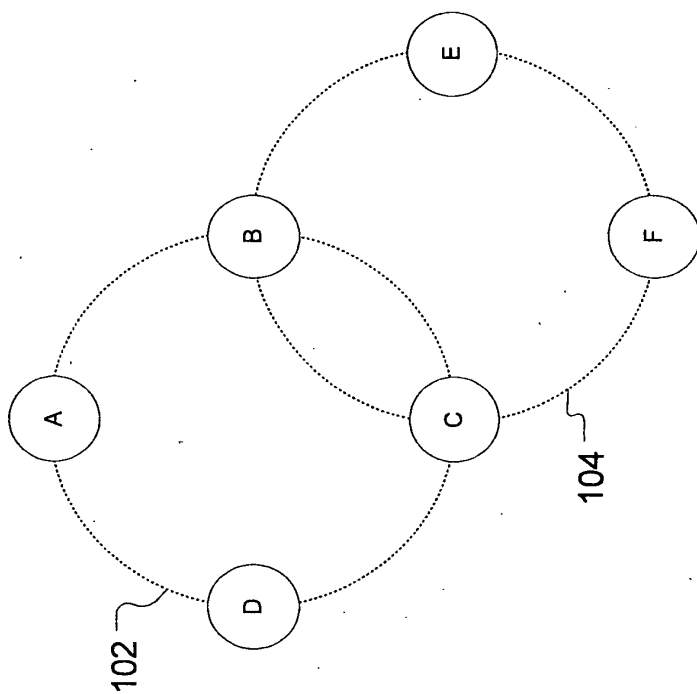


FIG. 1

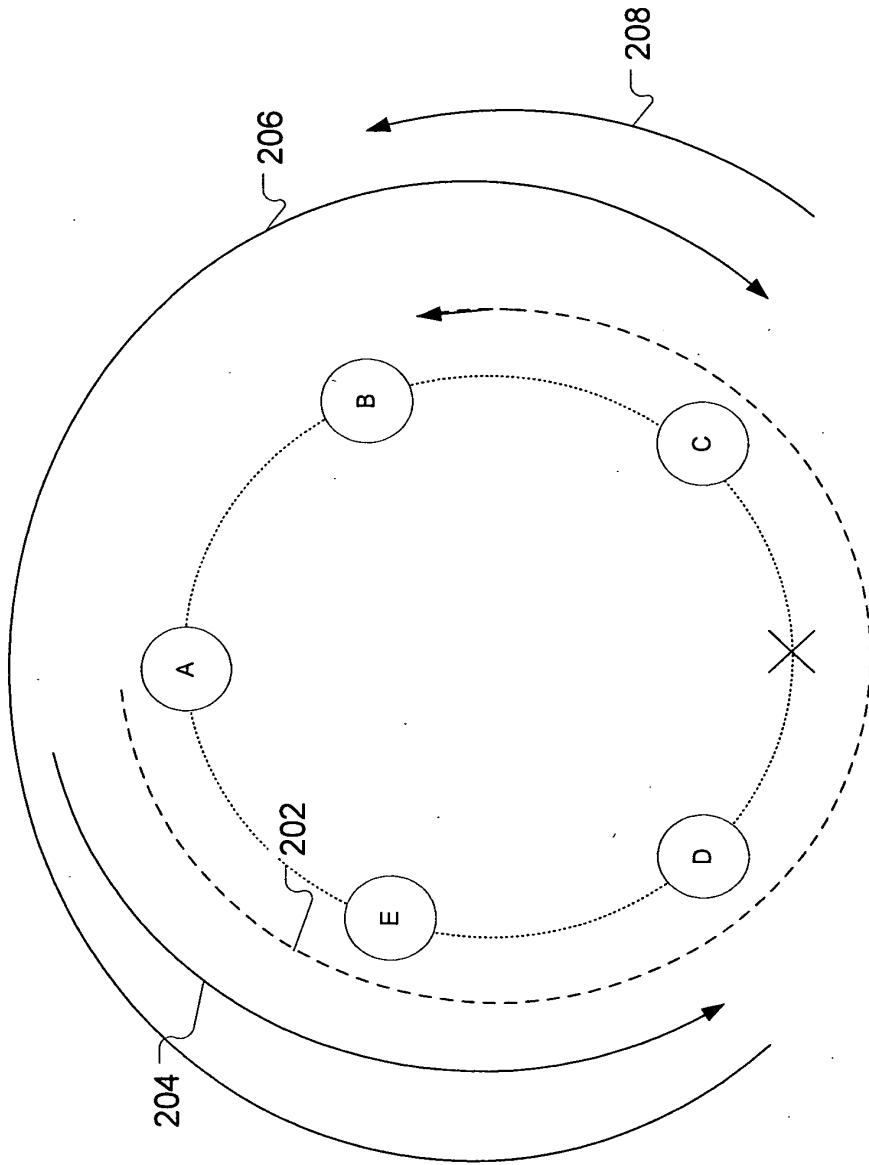


FIG. 2

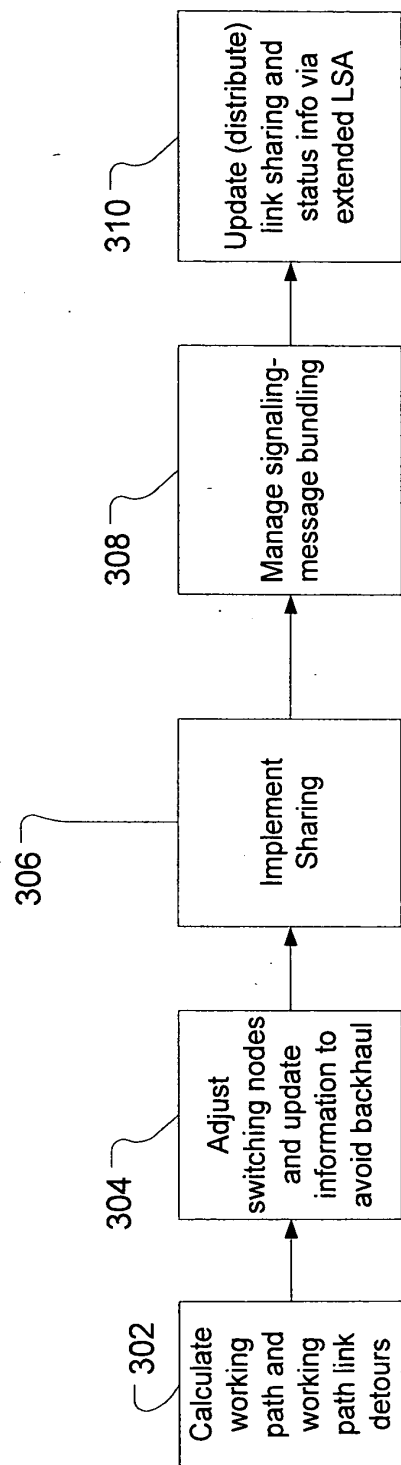


FIG. 3

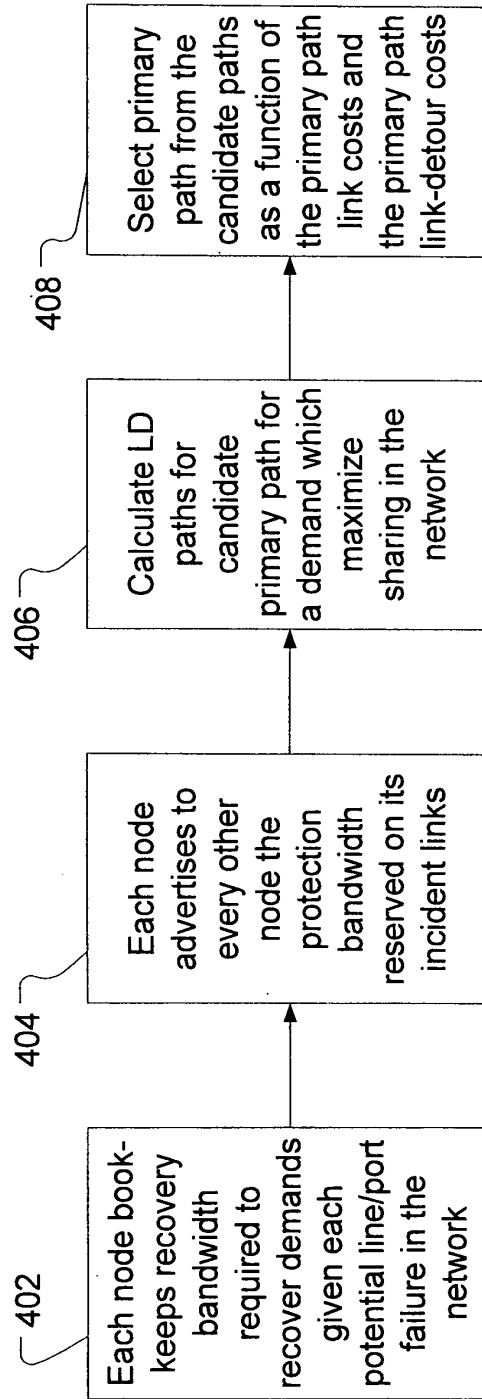


FIG. 4

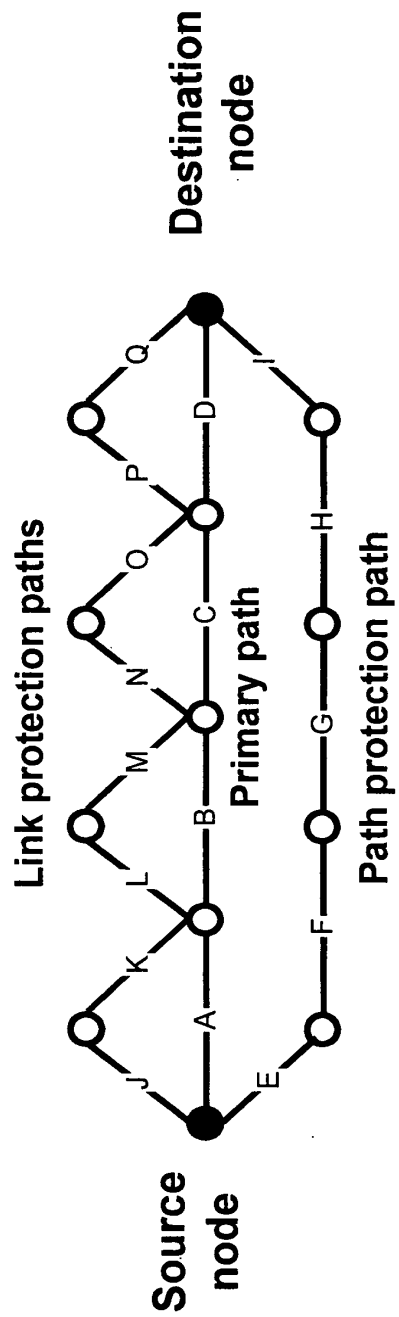
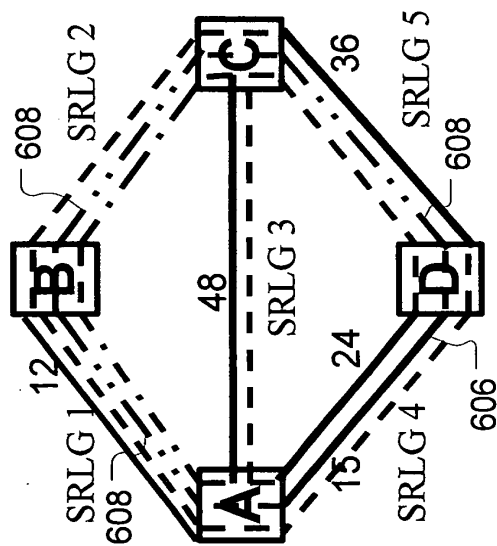


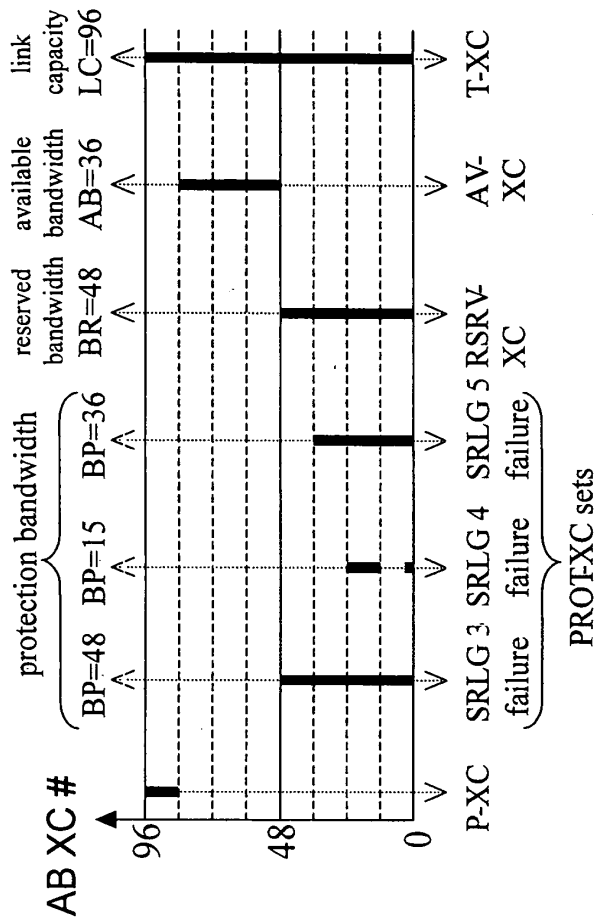
FIG. 5

602



(a)

604



(b)

FIG. 6

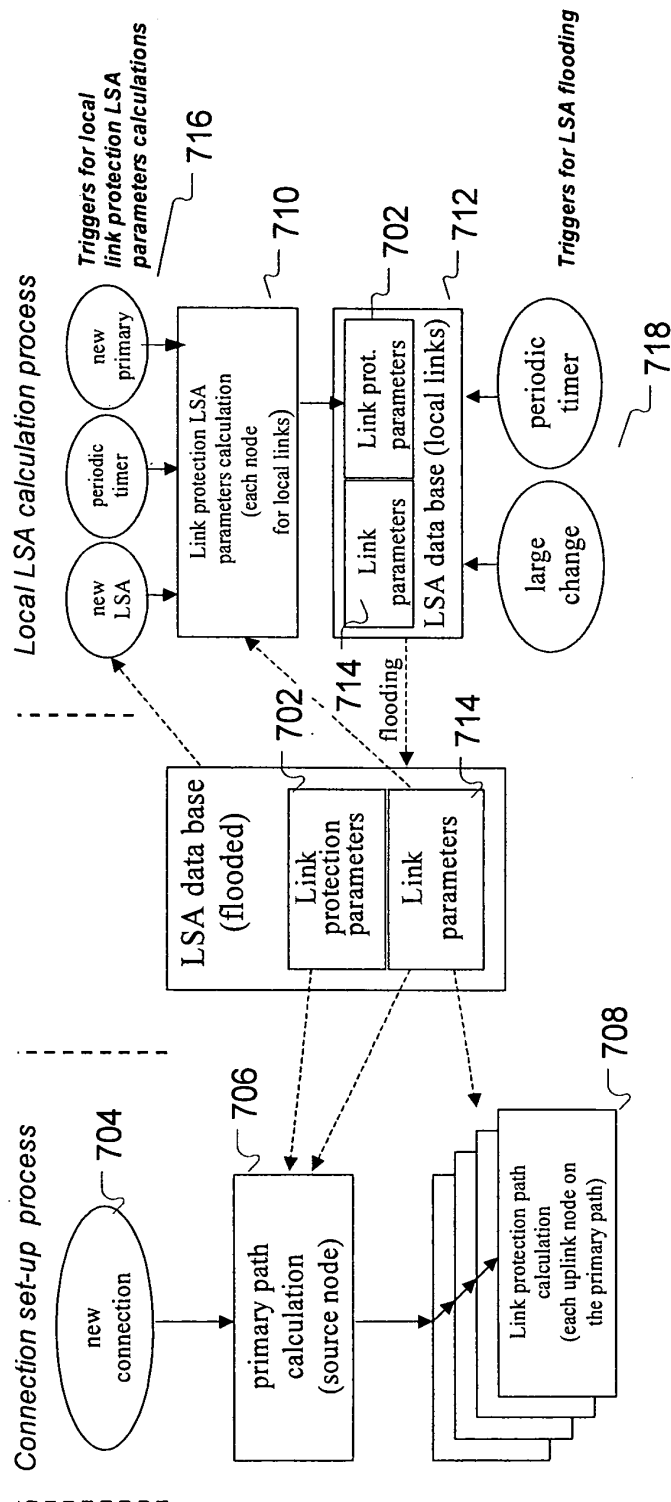


FIG. 7

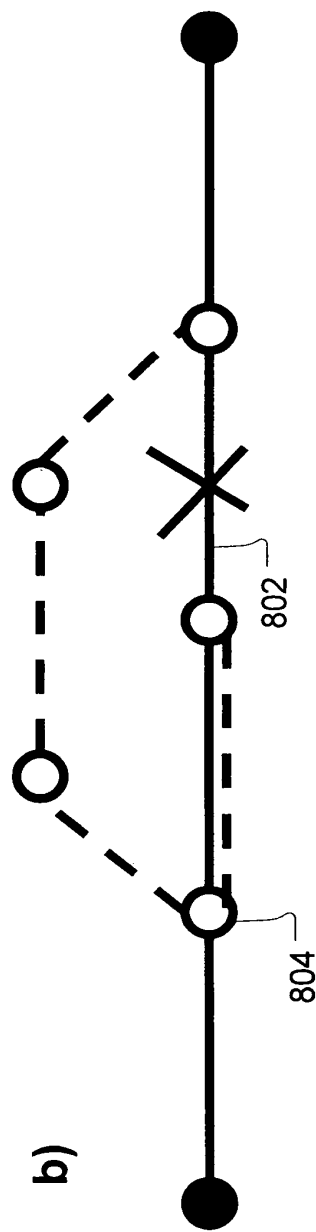
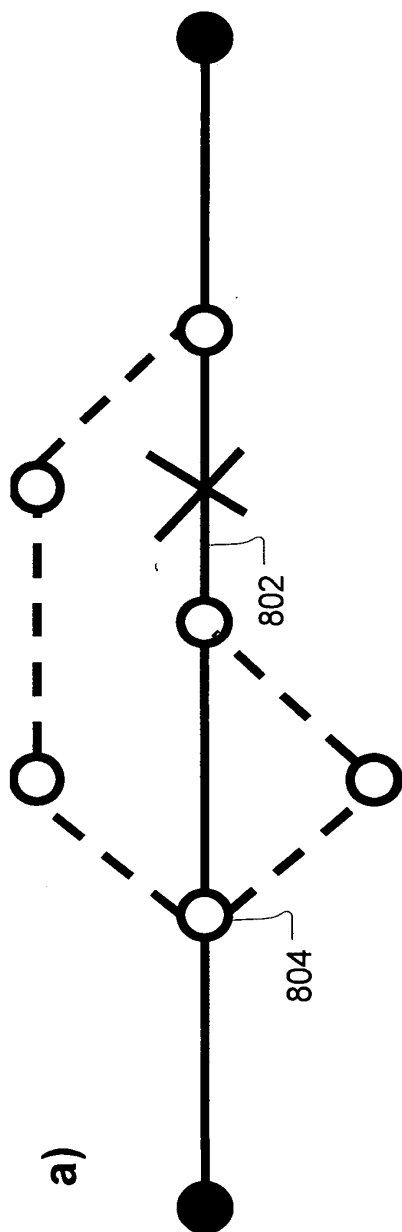


FIG. 8

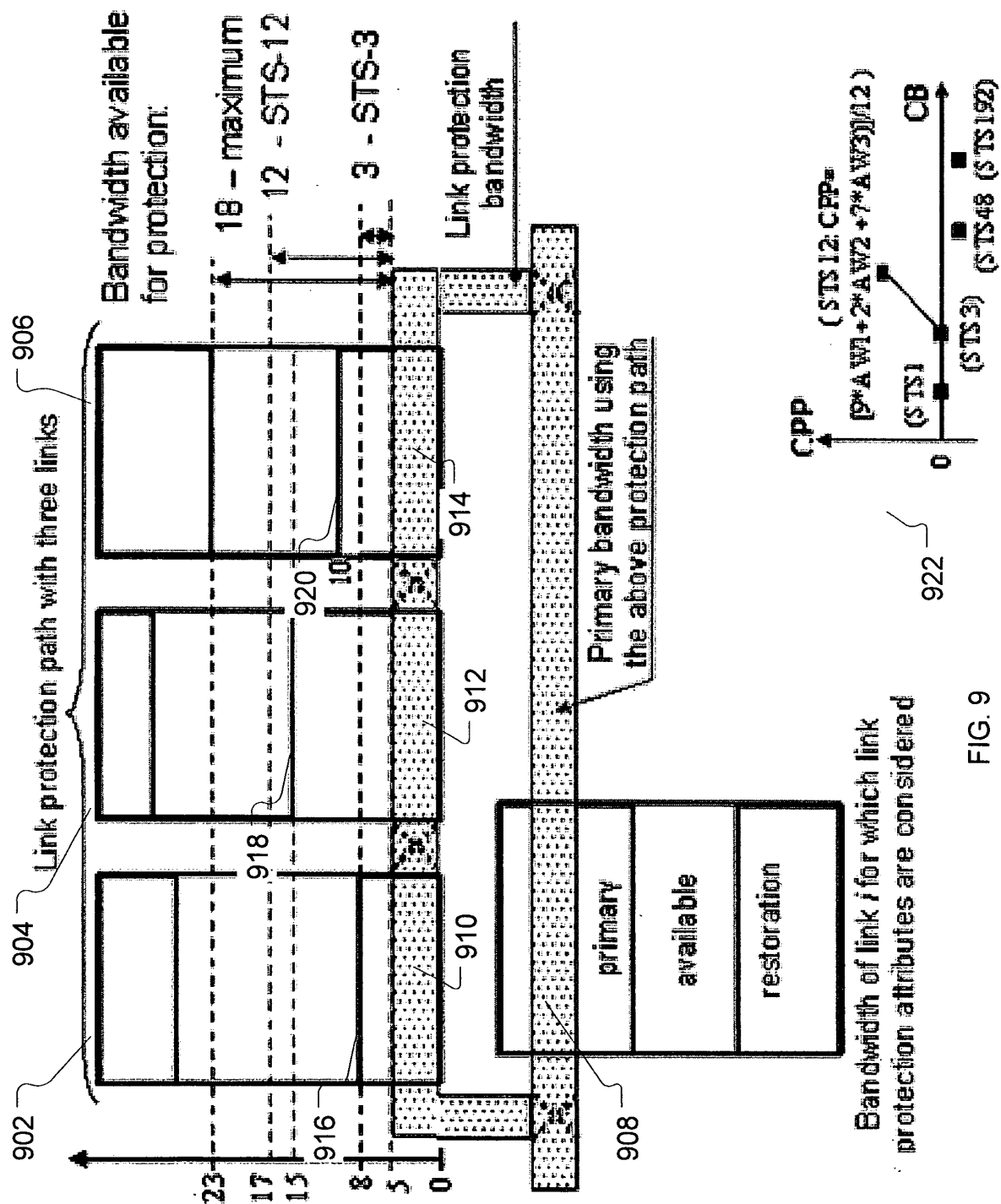


FIG. 9

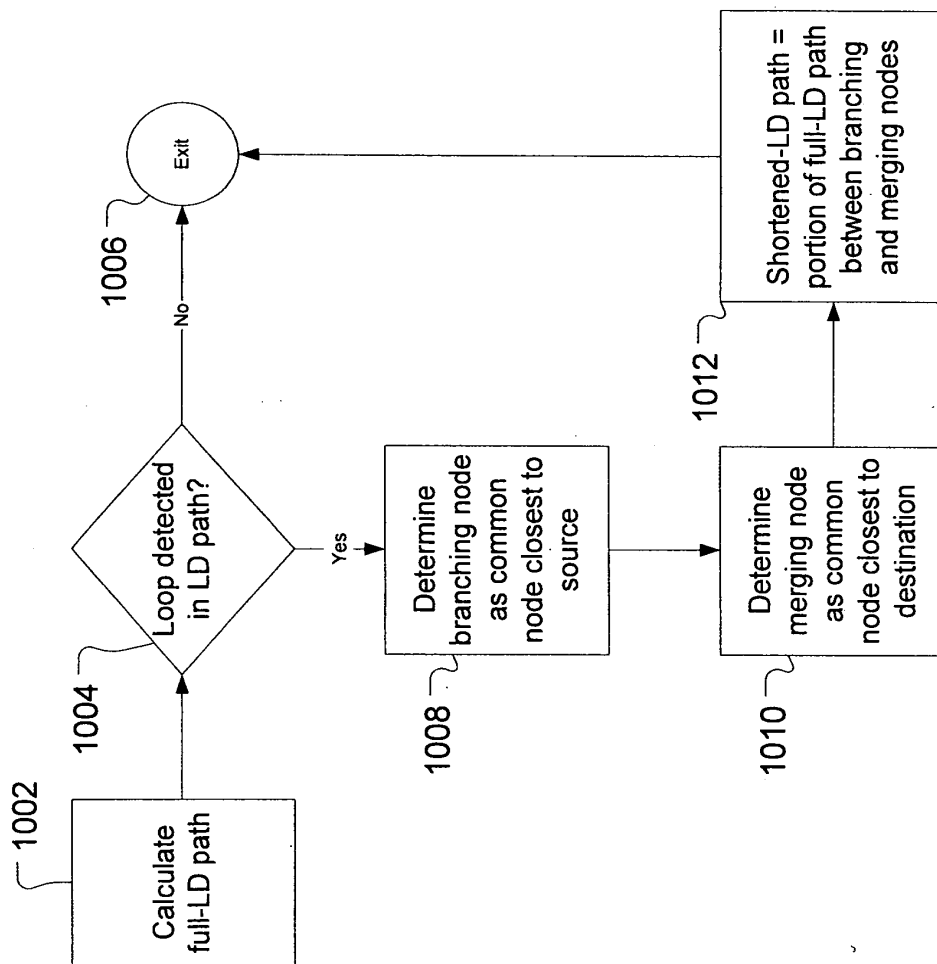


FIG. 10

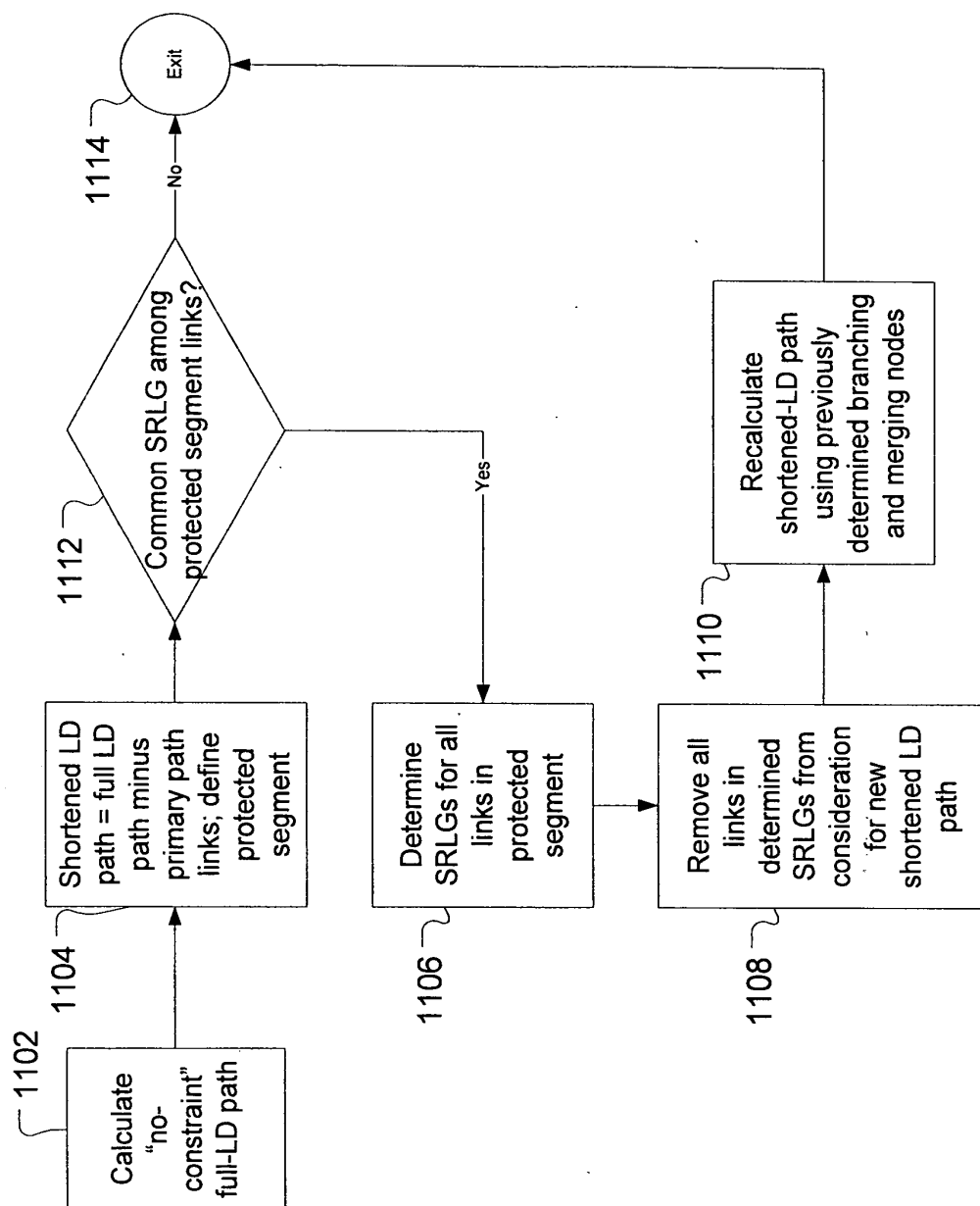


FIG. 11

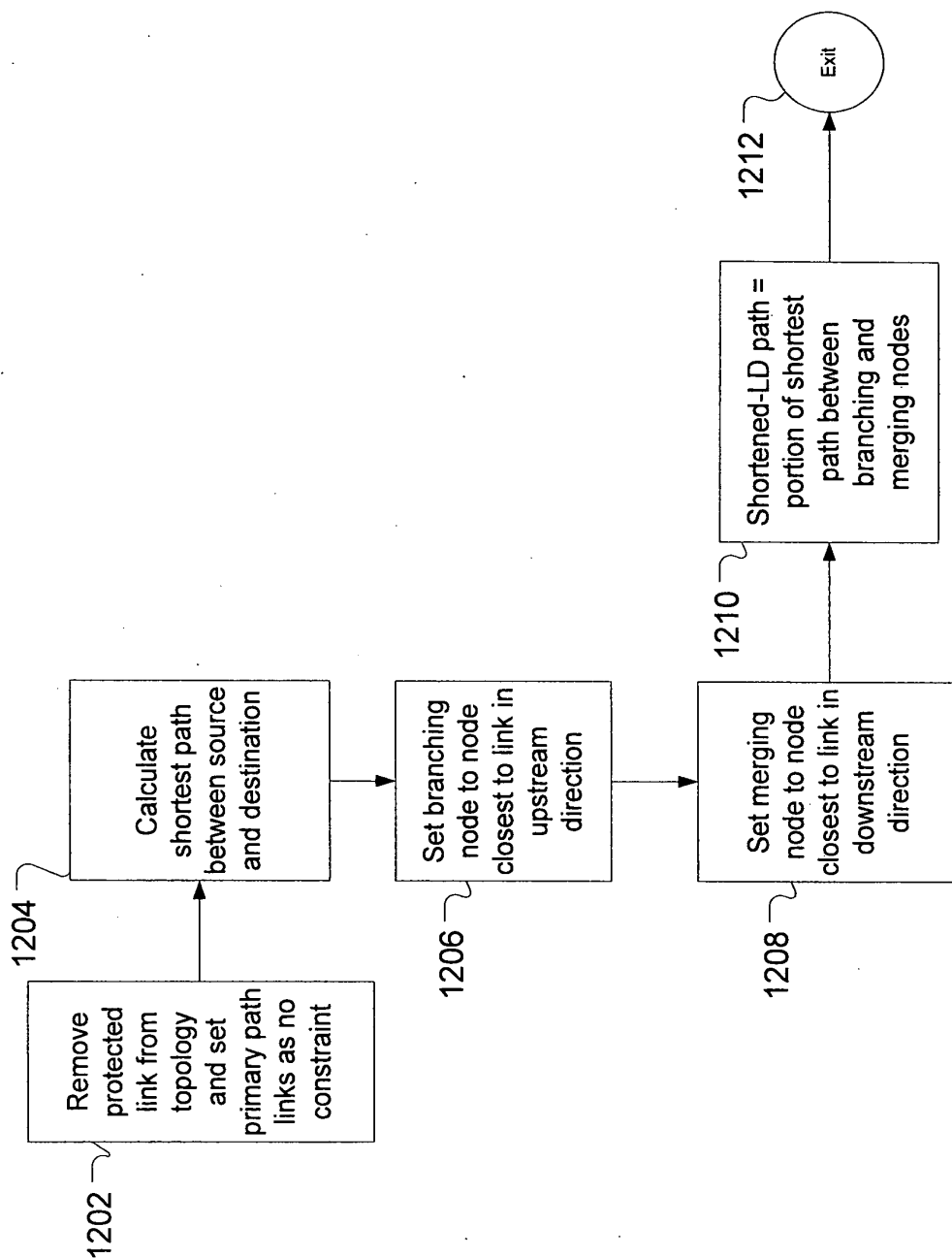


FIG. 12

Customer No.: 22186

Attorney No.: Dziong 12-21-38

IN THE UNITED STATES
PATENT AND TRADEMARK OFFICE

Declaration and Power of Attorney

As the below named inventor, I hereby declare that:

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

I believe I am the original, first, and sole inventor (if only one name is listed below) or an original, first, and joint inventor (if multiple names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled **Calculation Of Link-Detour Paths In Mesh Networks**, the specification of which is being filed under the above-identified Attorney Docket Number.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by an amendment, if any, specifically referred to in this oath or declaration.

I acknowledge the duty to disclose all information known to me which is material to patentability as defined in Title 37, Code of Federal Regulations, 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

None

I hereby claim the benefit under Title 35, United States Code, 119(e) of any United States provisional application(s) identified below:

None

I hereby claim the benefit under Title 35, United States Code, 120 of any United States application(s) listed below and, 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 Title 35, United States Code, 112, I acknowledge the duty to disclose all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

None

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

I hereby appoint the following attorney(s) with full power of substitution and revocation, to prosecute said application, to make alterations and amendments therein, to receive the patent, and to transact all business in the Patent and Trademark Office connected therewith:

Kenneth M. Brown	(Reg. No. 37590)
Donald P. Dinella	(Reg. No. 39961)
Martin I. Finston	(Reg. No. 31613)
Barry H. Freedman	(Reg. No. 26166)
Julio A. Garceran	(Reg. No. 37138)
Jimmy Goo	(Reg. No. 36528)
Stephen M. Gurey	(Reg. No. 27336)
David W. Herring, Jr.	(Reg. No. P-51069)
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Christopher N. Malvone	(Reg. No. 34866)
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Eugene J. Rosenthal	(Reg. No. 36658)
Steven R. Santema	(Reg. No. 40156)
David A. Sasso	(Reg. No. 43084)
Bruce S. Schneider	(Reg. No. 27949)
Ozer M. N. Teitelbaum	(Reg. No. 36698)
Jeffrey M. Weinick	(Reg. No. 36304)

Customer No.: 22186

3 Attorney Docket No.: Dziong 12-21-38

I hereby appoint the attorney(s) on ATTACHMENT A as associate attorney(s) in the aforementioned application, with full power solely to prosecute said application. to make alterations and amendments therein, to receive the patent, and to transact all business in the Patent and Trademark Office connected with the prosecution of said application. No other powers are granted to such associate attorney(s) and such associate attorney(s) are specifically denied any power of substitution or revocation.

Full name of sole inventor (or 1st joint inventor): Zbigniew M. Dziong

Inventor's
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4 Attorney Docket No.: Dziong 12-21-38

Full name of 2nd joint inventor: Muhammad A. Qureshi

Inventor's
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5 Attorney Docket No.: Dziong 12-21-38

Full name of 3rd joint inventor: Yung-Terng Wang

Inventor's
signature_____Date_____

Residence: Marlboro, Monmouth County, New Jersey

Citizenship: U.S.A.

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6 Attorney Docket No.: Dziong 12-21-38

ATTACHMENT A

Attorney Name(s):	<u>Steve Mendelsohn</u>	Reg. No.:	<u>35,951</u>
	<u>Ian M. Hughes</u>		<u>41,083</u>
	<u>Steven R. Petersen</u>		<u>31,287</u>
	<u>Yuri Gruzdkov</u>		<u>50,762</u>
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All written communications are to be addressed to:

**Steve Mendelsohn
Mendelsohn & Associates, P.C.
1515 Market Street, Suite 715
Philadelphia, PA 19102**

Customer No.: 22186

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Re: Attorney Docket No. Dziong 12-21-38

In re application of: Zbigniew M. Dziong, Muhammad A. Qureshi and Yung-Terng Wang

Serial No.: Not Yet Assigned
Filed: Not Yet Assigned
Matter No.: 990.0496

Group No.: Not Yet Assigned
Examiner: Not Yet Assigned

For: Calculation Of Link-Detour Paths In Mesh Networks

INFORMATION DISCLOSURE STATEMENT

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

Dear Sir:

In accordance with 37 CFR § 1.56, this is an Information Disclosure Statement (IDS) for the above-captioned U.S. patent application. An IDS Form PTO-1449 listing references is enclosed herewith and forms a part hereof.

Certification Under 37 CFR § 1.704(d)

- [] Each item of information contained in this statement was cited in a communication from a foreign patent office in a counterpart application and this communication was not received by any individual designated in § 1.56(c) more than thirty days prior to the filing of this statement.

Certification Under 37 CFR § 1.97(e)

- [] Each item of information contained in this statement was either (1) cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this statement or (2) not known to any individual designated in § 1.56(c) more than three months prior to the filing of this statement.

* * * * *

Certification Under 37 CFR 1.10

"Express Mail" Mailing Label No. EV140153223US

Date of Deposit April 2, 2004

I hereby certify that this paper or fee is being deposited with the United States Postal Service's "Express Mail Post Office To Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Mary E. Caniz
(Name of person mailing)

Mary E. Caniz
(Signature of person mailing)

Fee Under 37 CFR § 1.97(c)

☐ The fee for submission of this IDS under § 1.97(c) is \$180.00 as set forth in § 1.17(p).

Petition Under 37 CFR § 1.97(d)

☐ This is a petition requesting consideration of an IDS under § 1.97(d). The petition fee for submission of this IDS under § 1.97(d) is \$130.00 as set forth in § 1.17(i).

Provision of Copies of References

☒ A copy of each of the listed references is enclosed herewith and forms a part hereof.

☐ A translation of each of Reference(s) is enclosed herewith and forms a part hereof.

☐ A copy of the International Search Report from a corresponding PCT application is enclosed herewith.

☐ A copy of the European Search Report from a corresponding EPO application is enclosed herewith.

☐ The above-captioned U.S. patent application is a

- ☐ continuation
- ☐ divisional
- ☐ continuation-in-part

application of U.S. application serial number , filed on as Attorney Docket No. . Each of the listed references was previously cited by or submitted to the Office in the prior application. The above-captioned U.S. patent application relies upon the prior application for an earlier filing date under 35 U.S.C. 120. Pursuant to § 1.98(d), copies of the listed references are not being provided with this IDS.

It is respectfully requested that the Examiner initial and return a copy of the enclosed PTO-1449 form as confirmation that each of the documents has been considered.

Respectfully submitted,

Date: 4/2/04
Customer No. 22186
Mendelsohn & Associates, P.C.
1515 Market Street, Suite 715
Philadelphia, Pennsylvania 19102


Michael L. Craner
Registration No. 50,127
Attorney for Applicant
(215) 557-6656

Enclosures

FORM PTO-1449 U.S. DEPARTMENT OF COMMERCE
(Rev. 2-32) PATENT AND TRADEMARK OFFICE

INFORMATION DISCLOSURE
STATEMENT BY APPLICANT

(Use several sheets if necessary)

ATTY. DOCKET NO.

SERIAL NO.

Dziong 12-21-38
APPLICANT

Not yet assigned

Zbigniew M. Dziong, Muhammad A. Qureshi and
Yung-Terng Wang

FILING DATE

GROUP

Not yet assigned

Not yet assigned

U.S. PATENT DOCUMENTS

EXAMINER INITIAL	DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE

FOREIGN PATENT DOCUMENTS

DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES NO

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

AA	"Optical Network Design and Restoration" by B. T. Doshi, et al., BLTJ, January-March 1999.
AB	"Design of a Meta-mesh of Chain Subnetworks: Enhancing the Attractiveness of Mesh-Restorable WDM networking on Low Connectivity Graphs" by W. D. Grover and J. Doucette, IEEE JSAC, Vol. 20, No. 1, January 2002.

EXAMINER

DATE CONSIDERED

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

BEST AVAILABLE COPY

PATENT APPLICATION FEE DETERMINATION RECORD

Effective October 1, 2003

Application or Docket Number

10817760

CLAIMS AS FILED - PART I

	(Column 1)	(Column 2)
TOTAL CLAIMS	20	
FOR	NUMBER FILED	NUMBER EXTRA
TOTAL CHARGEABLE CLAIMS	20 minus 20 = *	1
INDEPENDENT CLAIMS	2 minus 3 = *	
MULTIPLE DEPENDENT CLAIM PRESENT		☐

* If the difference in column 1 is less than zero, enter "0" in column 2

SMALL ENTITY
TYPE ☐OR OTHER THAN
SMALL ENTITY

RATE	FEE
BASIC FEE	385.00
X\$ 9=	
X43=	
+145=	
TOTAL	

RATE	FEE
BASIC FEE	770.00
X\$18=	1
X86=	
+290=	
TOTAL	770

CLAIMS AS AMENDED - PART II

	(Column 1)	(Column 2)	(Column 3)
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
Total	*	Minus **	=
Independent	*	Minus ***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM			☐

SMALL ENTITY

OR OTHER THAN
SMALL ENTITY

RATE	ADDITIONAL FEE
X\$ 9=	
X43=	
+145=	
TOTAL ADDIT. FEE	

RATE	ADDITIONAL FEE
X\$18=	
X86=	
+290=	
TOTAL ADDIT. FEE	

	(Column 1)	(Column 2)	(Column 3)
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
Total	*	Minus **	=
Independent	*	Minus ***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM			☐

RATE	ADDITIONAL FEE
X\$ 9=	
X43=	
+145=	
TOTAL ADDIT. FEE	

RATE	ADDITIONAL FEE
X\$18=	
X86=	
+290=	
TOTAL ADDIT. FEE	

	(Column 1)	(Column 2)	(Column 3)
AMENDMENT C	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
Total	*	Minus **	=
Independent	*	Minus ***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM			☐

RATE	ADDITIONAL FEE
X\$ 9=	
X43=	
+145=	
TOTAL ADDIT. FEE	

RATE	ADDITIONAL FEE
X\$18=	
X86=	
+290=	
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.