AO 120 (Rev. 08/10)

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

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

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

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
2:24-cv-3951	5/10/2024	for the Central District of California, Los Angeles Division

PLAINTIFF	DEFENDANT
Sandpiper CDN, LLC	Google LLC

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	8,478,903	7/2/2013	Sandpiper CDN, LLC
2	8,595,778	11/26/2013	Sandpiper CDN, LLC
3	8,645,517	2/4/2014	Sandpiper CDN, LLC
4	8,719,886	5/6/2014	Sandpiper CDN, LLC
5	9,021,112	4/28/2015	Sandpiper CDN, LLC

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

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☑ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 10,924,573	2/16/2021	Sandpiper CDN, LLC
2		
3		
4		
5		

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

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

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

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/978,537	02/04/2014	8645517	0093-US-I2	1389

83579 7590 01/15/2014

LEVEL 3 COMMUNICATIONS, LLC
Attn: Patent Docketing
1025 Eldorado Blvd.
Broomfield, CO 80021

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 311 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

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

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

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

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

Paul E. Stolorz, Los Altos, CA;
John K. Salmon, Chappaqua, NY;
Michael S. Warren, Los Alamos, NM;
Mark Brady, San Rafael, CA;
Maksim Yevmenkin, Thousand Oaks, CA;
Jeffrey Koller, Oxnard, CA;
Aric Hagberg, Santa Fe, NM;
David Pfitzner, College Park, AUSTRALIA;
Ted Middleton, Moorpark, CA;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT FORM PTO-1449 (modified)	Application No.	12/978,537
	Filing Date	Dec. 24, 2010
	First Named Inventor	Mark BRADY
	Group Art Unit	2447
	Examiner Name	TBD
	Attorney Docket No.	0093-US-I2
Sheet 13 of 32	Confirmation No.	1389

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.	Document No.	Publication/ Issue Date	Name of Patentee or Applicant of Cited Document
	13-1	US-6694358	17-Feb-04	Swildens et al.
	13-2	US-6699418	02-Mar-04	Okada et al.
	13-3	US-6708137	16-Mar-04	Carley
	13-4	US-6718328	06-Apr-04	Norris
	13-5	US-6741563	25-May-04	Packer
	13-6	US-6751673	15-Jun-04	Shaw
	13-7	US-6754699	22-Jun-04	Swildens et al.
	13-8	US-6754706	22-Jun-04	Swildens et al.
	13-9	US-6763377	07/13/04	Belknap et al
	13-10	US-6763388	13-Jul-04	Tsimelzon
	13-11	US-6778502	17-Aug-04	Ricciulli
	13-12	US-6785704	08/2004	McCanne, Steve
	13-13	US-6799221	28-Sep-04	Kenner et al.
	13-14	US-6801576	05-Oct-04	Haldeman et al.
	13-15	US-6834306	21-Dec-04	Tsimelzon
	13-16	US-6842604	11-Jan-05	Cook et al.
	13-17	US-6859791	02/22/05	Spagna
	13-18	US-6870851	22-Mar-05	Leinwand et al.
	13-19	US-6874032	29-Mar-05	Gersht et al.
	13-20	US-6901604	~~19-Jun-01~~ May 31, 2005	Kiraly
	13-21	US-6915329	05-Jul-05	Kriegsman
	13-22	US-6928442	09-Aug-05	Farber et al.
	13-23	US-6934255	23-Aug-05	Toporek et al.
	13-24	US-6950623	27-Sep-05	Brown et al.
	13-25	US-6963910	11/08/05	Belknap
	13-26	US-6963980	08-Nov-05	Mattsson

Change(s) applied to document, /N.W.S./ 1/7/2014

Examiner Signature	/John Walsh/ (03/05/2013)	Date Considered	03/05/2013

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

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /JW/ (03/05/2013)

INFORMATION DISCLOSURE STATEMENT BY APPLICANT FORM PTO-1449 (modified) Sheet 10 of 32		
	Application No.	12/978,537
	Filing Date	Dec. 24, 2010
	First Named Inventor	Mark BRADY
	Group Art Unit	2447
	Examiner Name	TBD
	Attorney Docket No.	0093-US-I2
	Confirmation No.	1389

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.	Document No.	Publication/ Issue Date	Name of Patentee or Applicant of Cited Document
	10-1	US-6173311	01/2001	Hassett et al.
	10-2	US-6173322	01/2001	Hu
	10-3	US-6178160	01/2001	Bolton et al.
	10-4	US-6181867	30-Jan-01	Kenner et al.
	10-5	US-6185598	02/2001	Farber
	10-6	US-6185619	02/2001	Joffe et al.
	10-7	US-6189030	02/2001	Kirsch et al.
	10-8	US-6189039	02/13/01	Harvey
	10-9	US-6195680	02/27/01	Goldszmidt
	10-10	US-6205120	20-Mar-01	Packer et al.
	10-11	US-6226618	05/01/01	Downs
	10-12	US-6226642	05/2001	Beranek et al.
	10-13	US-6230196	05/2001	Guenthner et al.
	10-14	US-6243760	06/2001	Armbruster et al.
Change(s) applied to document, /N.W.S./ 1/7/2014	10-15	US-6249810	19-Jun-01	~~Toporek et al.~~ Kiraly
	10-16	US-6256675	07/2001	Rabinovich
	10-17	US-6263313	07/17/01	Milsted
	10-18	US-6266699	07/2001	Sevcik
	10-19	US-6269394	~~22-Apr-03~~	Kenner et al. July 31, 2001
	10-20	US-6272566	08/07/01	Craft
	10-21	US-6275470	14-Aug-01	Ricciulli
	10-22	US-6282569	08/2001	Wallis et al.
	10-23	US-6282574	08/28/2001	Voit
	10-24	US-6286045	09/2001	Griffiths et al.
	10-25	US-6298041	02-Oct-01	Packer
	10-26	US-6311214	10/2001	Rhoads

Examiner Signature	/John Walsh/ (03/05/2013)	Date Considered	03/05/2013

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

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /JW/ (03/05/2013)

INFORMATION DISCLOSURE STATEMENT BY APPLICANT FORM PTO-1449 (modified) Sheet 6 of 32		
	Application No.	12/978,537
	Filing Date	Dec. 24, 2010
	First Named Inventor	Mark BRADY
	Group Art Unit	2447
	Examiner Name	TBD
	Attorney Docket No.	0093-US-I2
	Confirmation No.	1389

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.	Document No.	Publication/ Issue Date	Name of Patentee or Applicant of Cited Document
	6-1	US-5796952	Aug-98	Davis
	6-2	US-5799141	Aug-98	Galipeau et al.
	6-3	US-5802106	01-Sep-98	Packer
	6-4	US-5802291	09/1998	Balick et al.
	6-5	US-5812769	09/1998	Graber et al.
	6-6	US-5815664	09/1998	Asano
	6-7	US-5826031	10/1998	Nielsen
	6-8	US-5828847	Oct-98	Gehr
	6-9	US-5832506	11/1998	Kuzma
	6-10	US-5832514	11/1998	Norin et al.
	6-11	US-5835718	11/1998	Blewett
	6-12	US-5838906	11/1998	Doyle et al.
	6-13	US-5845303	01-Dec-98	Templeman
	6-14	US-5856974	01/1999	Gervais et al.
	6-15	US-5862339	01/1999	Bonnaure
	6-16	US-5867706	02/1999	Martin et al.
	6-17	US-5867799	02/1999	Lang et al.
	6-18	US-5870546	Feb-99	Kirsch
	6-19	US-5870559	02/1999	Leshem et al.
	6-20	US-5878212	03/1999	Civanlar et al.
	6-21	US-5884038	03/1999	Kapoor
	6-22	US-5890171	03/1999	Blumer et al.
	6-23	US-5893116	04/1999	Simmonds et al.
	6-24	US-5894554	04/1999	Lowery et al.
	6-25	US-5896533	04/1999	Ramos et al.
	6-26	US-5903723	05/1999	Beck et al.

Change(s) applied to document, /N.W.S./ 1/7/2014

Examiner Signature	/John Walsh/ (03/05/2013)	Date Considered	03/05/2013

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

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /JW/ (03/05/2013)

INFORMATION DISCLOSURE STATEMENT BY APPLICANT FORM PTO-1449 (modified)	Application No.	12/978,537
	Filing Date	Dec. 24, 2010
	First Named Inventor	Mark BRADY
	Group Art Unit	2447
	Examiner Name	TBD
	Attorney Docket No.	0093-US-I2
Sheet 5 of 32	Confirmation No.	1389

U.S. PATENT DOCUMENTS				
Examiner Initials*	Cite No.	Document No.	Publication/ Issue Date	Name of Patentee or Applicant of Cited Document
	5-1	US-5638443	06/1997	Stefik et al.
	5-2	US-5644714	Jul-97	Kikinis
	5-3	US-5646676	~~05/1995~~ July 8, 1997	Dewkett et al.
	5-4	US-5649186	Jul-97	Ferguson
	5-5	US-5659729	Aug-97	Nielsen
	5-6	US-5666362	Sep-97	Chen
	5-7	US-5671279	Sep-97	Elgamai
	5-8	US-5675734	7-Oct-97	Hair
	5-9	US-5682512	Oct-97	Tetrick
	5-10	US-5699513	Dec-97	Feigen et al.
	5-11	US-5708780	01/13/98	Levergood et al.
	5-12	US-5712979	01/1998	Graber et al.
	5-13	US-5715453	Feb-98	Stewart
	5-14	US-5721914	Feb-98	DeVries
	5-15	US-5734831	Mar-98	Sanders
	5-16	US-5740423	04/1998	Logan et al.
	5-17	US-5742762	Apr-98	Scholl
	5-18	US-5751961	05/1998	Smyk
	5-19	US-5761507	06/1998	Govett
	5-20	US-5761663	Jun-98	Largarde et al.
	5-21	US-5764906	06/1998	Edelstein et al.
	5-22	US-5774660	June 1998	Brendel et al.
	5-23	US-5774668	Jun-98	Choquier et al.
	5-24	US-5777988	Jul-98	Cisneros
	5-25	US-5777989	07/1998	McGarvey
	5-26	US-5784058	07/1998	LaStrange et al.

Change(s) applied to document, /N.W.S./ 1/7/2014

Examiner Signature	/John Walsh/ (03/05/2013)	Date Considered	03/05/2013

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

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /JW/ (03/05/2013)

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

LEVEL 3 COMMUNICATIONS, LLC
Attn: Patent Docketing
1025 Eldorado Blvd.
Broomfield CO 80021

MAILED
DEC 19 2013
OFFICE OF PETITIONS

In re Application of :
STOLORZ et al. :
Application No. 12/978,537 : DECISION ACCORDING STATUS
Filed: December 24, 2010 : UNDER 37 CFR 1.47(a)
Attorney Docket No. 0093-US-I2 :

This is in response to the petition under 37 CFR 1.47(a) filed December 17, 2013.

Applicants established that they mailed a copy of the application, including the declaration, to non-signing inventor, Paul E. Stolorz, at his last known address. Applicants state that they confirmed Stolorz's last known address of by performing an online search. Applicants indicated that they included a letter with the documents, advising Stolorz that if he did not respond by returning the signed declaration to patent practitioner, Brian Siritzky, by December 12, 2013, it would be assumed that Stolorz refused to sign the declaration. Applicants asserted that they did not receive a response as of the date of the filing of the petition and that Stolorz's actions constituted a constructive refusal to sign the declaration and join in the application. Lastly, applicants stated that previously non-signing inventor, Aric Hagberg, has joined the application. Applicants provided a declaration executed by Hagberg with the petition.

The Office has reviewed the above-identified application and papers and has found that they are in compliance with 37 CFR 1.47(a). Accordingly, the above-identified application is hereby accorded Rule 1.47(a) status. As stated in 37 CFR 1.47(c), this Office will forward notice of this application's filing to the non-signing inventor at the last known address provided in the petition. Notice of the filing of this application will also be published in the Official Gazette.

The application is being forwarded to the Office of Data Management.

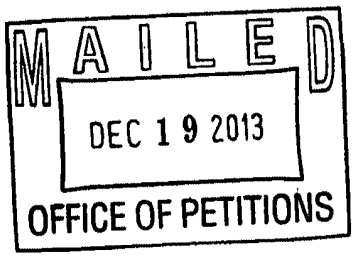
Inquiries regarding this decision should be directed to the undersigned at (571) 272-3211.

/Christina Tartera Donnell/

Christina Tartera Donnell
Attorney Advisor
Office of Petitions

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov



Paul E. Stolorz
124 University Ave.
Los Altos, CA 94022

In re Application of :
STOLORZ et al. : LETTER
Application No. 12/978,537 :
Filed: December 24, 2010 :
Attorney Docket No. 0093-US-I2 :

Dear Mr. Stolorz:

You are named as a joint inventor in the above identified United States patent application, filed under the provisions of 35 U.S.C. 116 (United States Code), and 37 CFR 1.47(a), Rules of Practice in Patent Cases. Should a patent be granted on the application you will be designated therein as a joint inventor.

As a named inventor you are entitled to inspect any paper in the file wrapper of the application, order copies of all or any part thereof (at a prepaid cost per 37 CFR 1.19) or make your position of record in the application. Alternatively, you may arrange to do any of the preceding through a registered patent attorney or agent presenting written authorization from you. If you care to join the application, counsel of record (see below) would presumably assist you. Joining in the application would entail the filing of an appropriate oath or declaration by you pursuant to 37 CFR 1.63.

Requests for information regarding your application should be directed to the File Information Unit at 571-272-3150. Information regarding how to pay for and order a copy of the application, or a specific paper in the application should be directed to Certification Division at 571-272-3150 or 1-800-972-6382 (outside the Washington D.C. area).
Inquiries regarding this decision should be directed to the undersigned at (571) 272-3211.

/Christina Tartera Donnell/

Christina Tartera Donnell
Attorney Advisor
Office of Petitions

LEVEL 3 COMMUNICATIONS, LLC
Attn: Patent Docketing
1025 Eldorado Blvd.
Broomfield CO 80021

In the United States Patent & Trademark Office

In re PATENT Application of: STOLORZ et al. Appl. S.N.: 12/978,537 Filing Date: December 24, 2010	Confirmation No.: 1389 Docket: 0093-US-I2

RENEWED PETITION UNDER RULE 1.47(A) (PRE-AIA)

Mail Stop Petition
Hon. Commissioner of Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Applicant respectfully petitions under 37 CFR 1.47(a) (pre-AIA) to have this application accepted when one of the inventors refuses to sign.

Submitted herewith are:

1. A declaration signed by one of the inventors.
2. Proof of pertinent facts regarding non-signing inventor.
3. Last known address of non-signing inventor.
4. The fee set forth in § 1.17(g).

Facts

1. This application was filed on December 24, 2010 naming nine (9) inventors (Paul E. **Stolorz**; John K. **Salmon**; Michael S. **Warren**; Mark **Brady**; Maksim **Yevmenkin**; Jeffrey **Koller**; Aric **Hagberg**; David **Pfitzner**; and Ted **Middleton**).
2. This application is a continuation of Application No. 11/976,648.
3. Applicant has previously submitted in this application a declaration from Application No. 11/976,648, signed by 7 of the 9 inventors (by Salmon; Warren; Brady; Yevmenkin; Koller;

Pfitzner; and Middleton). Inventors Hagberg and Stolorz did not sign that declaration.

4. Inventor Aric Hagberg has now joined this application, and a declaration for this application signed by inventor Hagberg on 12/01/2013 is submitted herewith.
5. Inventor Paul E. Stolorz has not joined this application.
6. **The last know address** of the nonsigning inventor (Paul E. Stolorz) is: 124 University Ave., Los Altos, CA 94022
7. This address for Stolorz was confirmed by an online search of public records [using http://www.whitepages.com] [Exhibit 1]
8. On November 20, 2013 the undersigned sent a letter by certified U.S. Mail to Mr. Paul E. Stolorz at his last known address (listed above). [Exhibit 2, hereinafter the "Letter"]
9. A copy of the certified receipt is enclosed. [Exhibit 3]
10. With the Letter Mr. Stolorz was provided with (i) a complete copy of this application as filed and (ii) an inventors' declaration, listing all nine inventors, including him.
11. The Letter asked Mr. Stolorz to sign and date the declaration and to return the signed declaration to the undersigned. Mr. Stolorz was provided with a stamped and addressed envelope for return of the document and was also advised that he could send the signed document to the undersigned by email or facsimile to an address/number provided in the Letter. (Exh. 2)
12. The Letter advised Mr. Stolorz that if the undersigned did not receive a response from him by December 12, 2013 then it would be assumed that he, Mr. Stolorz, had refused to sign the declaration.

13. No return receipt was received for the Letter sent to Mr. Stolorz.
14. As of today, December 17, 2013, Mr. Stolorz has not returned the signed declaration to the undersigned.
15. As of today, Mr. Stolorz has not contacted the undersigned.

LAST KNOW ADDRESS OF THE NONSIGNING INVENTOR:

124 University Ave.
Los Altos, CA 94022

Discussion

Applicant made a diligent effort to contact Mr. Stolorz at his last known address.

Mr. Stolorz has not signed the declaration in this application. Mr. Stolorz was provided with a complete copy of the application as filed at his last known address (listed above). Mr. Stolorz was also provided with the inventors' declaration at his last known address and was asked to sign the declaration and to return the executed document to the undersigned. Mr. Stolorz was provided with an e-mail address and telephone numbers for the undersigned and with a stamped and addressed envelope to use to send back the executed declaration.

Mr. Stolorz was given more than three (3) weeks to sign the declaration.

Mr. Stolorz previously refused to sign the declaration in the parent of this application (in Application No. 11/976,648).

In view of the above, Applicant respectfully submits that Mr. Stolorz's actions (or lack thereof) be treated as a refusal to join this application, and further petitions that this application be made by the other inventors on their behalf and on behalf of the Mr. Stolorz (the nonsigning inventor).

The Office is kindly requested to contact the undersigned at the number provided to deal with any outstanding issues relating to this petition.

CHARGE STATEMENT: Deposit Account No. **506253**, order no. **0093-US-I2**
The Commissioner is hereby authorized to charge any fee specifically authorized hereafter, or any missing or insufficient fee(s) filed, or asserted to be filed, or which should have been filed herewith or concerning any paper filed hereafter, and which may be required under Rules 16-18 (missing or insufficiencies only) now or hereafter relative to this application and the resulting Official Document under Rule 20, or credit any overpayment, to our Accounting/Order Nos. shown above. **This CHARGE STATEMENT does not authorize charge of the issue fee until/unless an issue fee transmittal sheet is filed.**

CUSTOMER NUMBER

83579

Siritzky Law, PLLC
8300 Greensboro Drive, Suite 800
McLean, Virginia 22102-3661
TEL. 703.531.8811 ● FAX. 703.563.948

Respectfully submitted,

/Brian Siritzky/Reg. No. 37,497

By: _____
Brian Siritzky, Ph.D.
Registration No.: 37,497
Date: December 17, 2013

In re PATENT Application of: STOLORZ et al. Appl. S.N.: 12/978,537	

RENEWED PETITION UNDER RULE 1.47(A) (PRE-AIA)

EXHIBIT 1

WhitePages.com

Paul E Stolorz
55-59
years old

Address

124 University Ave Los Altos, CA 94022-3514

People Paul may know

Bridget S Stolorz
Kieran Stolorz

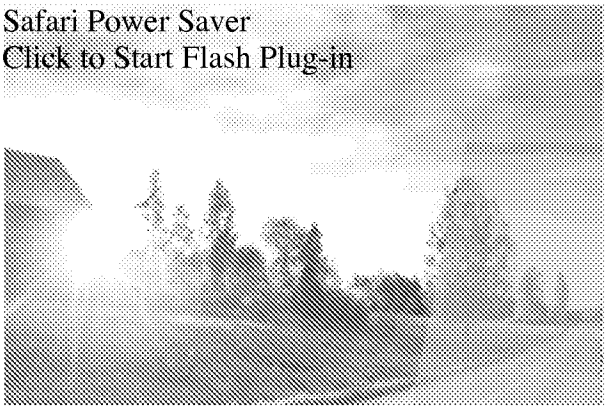
Previous locations

Altadena, CA

Thousand Oaks, CA

Santa Fe, NM

Los Altos Hills, CA



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In re PATENT Application of: STOLORZ et al. Appl. S.N.: 12/978,537	

RENEWED PETITION UNDER RULE 1.47(A) (PRE-AIA)

EXHIBIT 2

SIRITZKY LAW, PLLC

8300 GREENSBORO DRIVE, SUITE 800 MCLEAN, VIRGINIA 22102-3661, U.S.A.
TEL +1 703.918.4942 • FAX +1 703.563.9486

By Certified U.S. Mail
(return receipt requested)

November 20, 2013

Brian@SiritzkyLaw.com

Paul Stolorz
124 University Ave.
Los Altos, CA 94022

Re: Level 3 Communications, LLC
U.S. Patent Application No. 12/978,537
Filed: December 24, 2010
Titled: Policy-Based Content Delivery Network Selection
Level 3 Docket No. 0093-US-I2
Response needed by December 12, 2013

Dear Paul:

I represent *Level 3 Communications, LLC* and I am writing in connection with the above-referenced U.S. patent application. A complete copy of this application, as filed, is enclosed. Also enclosed is an inventors' declaration for this application and listing the following inventors, including you: (1) Paul E. Stolorz; (2) John K. Salmon; (3) Michael S. Warren; (4) Mark Brady; (5) Maksim Yevmenkin; (6) Jeffrey Koller; (7) Aric Hagberg; (8) David Pfitzner; and (9) Ted Middleton.

Please sign and date the attached declaration in the place provided and return the signed document to me for filing in the U.S. Patent & Trademark Office ("PTO"). You can return the document using the enclosed stamped and addressed envelope or you can send it to me by email (to brian@siritzkylaw.com) or by facsimile (to 703.563.9486).

If I do not receive any response from you by December 12, 2013 (three weeks from today) then I will assume that you have refused to sign the declaration.

Please contact me if you have any questions about any of the above or if you need any additional information.

Very truly yours,

SIRITZKY LAW, PLLC

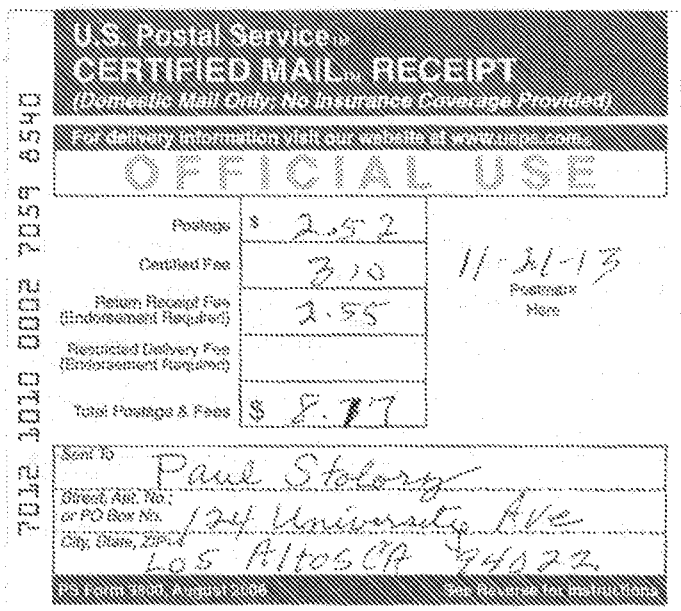
By: _____
Brian Siritzky, PhD, Esq.
Title: Managing Member

Enclosures:
1. Complete copy of U.S. Patent Application No. 12/978,537 as filed
2. Inventors' Declaration
3. Stamped envelope addressed to Siritzky Law, PLLC

In re PATENT Application of: STOLORZ et al. Appl. S.N.: 12/978,537	

RENEWED PETITION UNDER RULE 1.47(A) (PRE-AIA)

EXHIBIT 3


U.S. Postal Service™
CERTIFIED MAIL™ RECEIPT
(Domestic Mail Only; No Insurance Coverage Provided)
For delivery information visit our website at www.usps.com®
OFFICIAL USE
Postage $ 2.92
Certified Fee 3.10
Return Receipt Fee (Endorsement Required) 2.55
Restricted Delivery Fee (Endorsement Required)
Total Postage & Fees $ 8.57
11-21-13
Postmark Here
Sent To Paul Stolarz
Street, Apt. No.; or PO Box No. 124 University Ave
City, State, ZIP+4 Los Altos CA 94022
PS Form 3800, August 2006 See Reverse for Instructions
7012 3010 0002 7059 4340

Electronic Patent Application Fee Transmittal

Application Number:	12978537
Filing Date:	24-Dec-2010
Title of Invention:	Policy-Based Content Delivery Network Selection
First Named Inventor/Applicant Name:	Paul E. Stolorz
Filer:	Brian Siritzky
Attorney Docket Number:	0093-US-I2

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:				
Petition fee- 37 CFR 1.17(g) (Group II)	1463	1	200	200
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
			Total in USD ($)	**200**

Electronic Acknowledgement Receipt

EFS ID:	17685356
Application Number:	12978537
International Application Number:	
Confirmation Number:	1389
Title of Invention:	Policy-Based Content Delivery Network Selection
First Named Inventor/Applicant Name:	Paul E. Stolorz
Customer Number:	83579
Filer:	Brian Siritzky
Filer Authorized By:	
Attorney Docket Number:	0093-US-I2
Receipt Date:	17-DEC-2013
Filing Date:	24-DEC-2010
Time Stamp:	16:17:03
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$200
RAM confirmation Number	3712
Deposit Account	506253
Authorized User	

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 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		0093-US-I2-Renewed_Petition_under_1_47_a_12-17-2013_w_DEC_and_EXHIBITS.pdf	3947340 f2301872d8eac82ab887f0e1d3c276d2c1cfeed4	yes	12

Multipart Description/PDF files in .zip description		
Document Description	**Start**	**End**
Oath or Declaration filed	1	2
Petition for review by the Office of Petitions.	3	12

Warnings:

Information:

2	Fee Worksheet (SB06)	fee-info.pdf	30166 9982768c7dbac05dbdeb210c65c665e7f837482d	no	2

Warnings:

Information:

Total Files Size (in bytes):	3977506

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

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

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

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

PTO/SB/01A (09-12)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

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

Title of Invention	Policy-Based Content Delivery Network Selection

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

This declaration is directed to:

☐ The attached application, or

☒ United States application or PCT international application number 12/978,537

filed on December 24, 2010

☐ As amended on _____ (if applicable);

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

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

I/we acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me/us to be material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT International filing date of the continuation-in-part application. The above-identified application was made or authorized to be made by me/us.

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

All statements made herein of my/our own knowledge are true, all statements made herein 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 are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001, and may jeopardize the validity of the application or any patent issuing thereon. I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5), or both.

FULL NAME OF INVENTOR(S)

Inventor one: Paul E. Stolorz Date: _____

Signature: _____ Citizen of: USA

Inventor two: John K. Salmon Date: _____

Signature: _____ Citizen of: USA

☒ Additional inventors or a legal representative are being named on 1 additional form(s) attached hereto.

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. 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 1 minute 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.

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

Application No. 12/978,537
Filing Date: 12-24-2010
Attorney Docket Number: 0093-US-I2

Additional Inventors Supplemental Sheet
Page 2 of 2

Inventor 3:	Michael S. Warren	**Date:**	
Signature:		**Citizen of:**	U.S.A.

Inventor 4:	Mark Brady	**Date:**	
Signature:		**Citizen of:**	U.S.A.

Inventor 5:	Maksim Yevmenkin	**Date:**	
Signature:		**Citizen of:**	U.S.A.

Inventor 6:	Jeffrey Koller	**Date:**	
Signature:		**Citizen of:**	U.S.A.

Inventor 7:	Aric Hagberg	**Date:**	1 Dec 2013
Signature:		**Citizen of:**	U.S.A.

Inventor 8:	David Pfitzner	**Date:**	
Signature:		**Citizen of:**	Australia

Inventor 9:	Ted Middleton	**Date:**	
Signature:		**Citizen of:**	U.S.A.

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

LEVEL 3 COMMUNICATIONS, LLC
Attn: Patent Docketing
1025 Eldorado Blvd.
Broomfield CO 80021

MAILED
NOV 13 2013
OFFICE OF PETITIONS

In re Application of :
STOLORZ et al. :
Application No. 12/978,537 : ON PETITION
Filed: December 24, 2010 :
Attorney Docket No. 0093-US-I2 :

This is in response to the communication entitled "RESPONSE TO NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION", filed March 2, 2011, which is being treated as a request to extend status under 37 CFR 1.47(a) to the present application from Application No. 11/976,648.

On January 14, 2011, the Office mailed a Notice to File Missing Parts of Nonprovisional Application, which gave applicants an extendable period of two months from the date of the Notice to submit, *inter alia*, a properly signed oath or declaration.

On March 2, 2011, applicants filed a "RESPONSE TO NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION", which included a copy of the declaration filed in Application No. 11/976,648 signed by 7 of the 9 joint inventors. Inventors Paul E. Stolorz and Aric Hagberg did not execute the declaration. Additionally, applicants submitted a copy of a decision granting a petition under 37 CFR 1.48(a)(1) to add Ted Middleton as a named inventor and a petition under 37 CFR 1.183 to waive the requirement under 37 CFR 1.64 that originally signing inventors Stolorz and Hagberg execute the supplemental declaration. Applicants indicated that the present application is a continuation of Application No. 11/976,648 and that no inventor who refused to join the prior application has subsequently joined the prior application or another application for which this application claims benefit under 35 U.S.C. 120, 121 or 365(c).

37 CFR 1.63(d)(3) provides for the situation in which the executed oath or declaration, of which a copy is submitted for a continuation or divisional application, was originally filed in a prior application accorded status under 37 CFR 1.47.

Pursuant to 37 CFR 1.63(d) (3):

> Where the executed oath or declaration of which a copy is submitted for a continuation or divisional application was originally filed in a prior application accorded status under § 1.47, the copy of the executed oath or declaration for such prior application must be accompanied by:
>
> (i) A copy of the decision granting a petition to accord § 1.47 status to the prior application, unless all inventors or legal representatives have filed an oath or declaration to join in an application accorded status under § 1.47 of which the continuation or divisional application claims a benefit under 35 U.S.C. 120, 121, or 365(c)[.]

Petitions under 37 CFR 1.47 are only applicable to an original oath or declaration and do not apply to the re-execution of another oath or declaration by a signing inventor. MPEP 201.03(II)(B). If an inventor who signed the original declaration refuses or cannot be reached to sign a supplemental declaration, the proper relief is the filing of a petition under 37 CFR 1.183 requesting waiver of the requirement of 37 CFR 1.64 and 1.67. Id.

The Office notes that the decision in Application No. 11/976,648 did not grant a petition to accord status under 37 CFR 1.47 to that prior application. Rather, the decision granted the petition under 37 CFR 1.183 requesting waiver of the requirement of 37 CFR 1.64 and 1.67 that inventors Stolorz and Hagberg sign a supplemental declaration. Relief under 37 CFR 1.47 was inapplicable because inventors Stolorz and Hagberg signed the original declaration in Application No. 11/976,648. Therefore, no status under 37 CFR 1.47 was accorded to prior Application No. 11/976,648. For this reason, applicants may not seek § 1.47 status in the present application based on 37 CFR 1.63(d)(3).

The request to extend status under 37 CFR 1.47(a) to the subject application from Application No. 11/976,648 is **dismissed**.

Applicants are given TWO (2) MONTHS from the mailing date of this decision to file a petition under 37 CFR 1.47(a) (and fee) or a declaration executed by the non-signing inventors. Extensions of the two-month time period are available pursuant to 37 CFR 1.136(a). Failure to respond will result in abandonment of the application.

Further correspondence with respect to this matter should be addressed as follows and directed to Attorney Advisor Christina Tartera Donnell:

By mail: Mail Stop Petition
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

By FAX: (571) 273-8300
Attn: Office of Petitions, Attorney Advisor Christina Tartera Donnell

By hand: Customer Service Window
Randolph Building
401 Dulany Street
Alexandria, VA 22314

Registered users may also submit correspondence electronically via EFS-Web.

Telephone inquiries specific to this decision should be directed to the undersigned at (571) 272-3211.

/Christina Tartera Donnell/

Christina Tartera Donnell
Attorney Advisor
Office of Petitions

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)

83579 7590 10/23/2013
LEVEL 3 COMMUNICATIONS, LLC
Attn: Patent Docketing
1025 Eldorado Blvd.
Broomfield, CO 80021

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

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

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/978,537	12/24/2010	Paul E. Stolorz	0093-US-I2	1389

TITLE OF INVENTION: Policy-Based Content Delivery Network Selection

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1780	$300	$0	$2080	01/23/2014

EXAMINER	ART UNIT	CLASS-SUBCLASS
WALSH, JOHN B	2451	709-223000

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

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

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

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

(A) NAME OF ASSIGNEE: Level 3 Communications, LLC
(B) RESIDENCE: (CITY and STATE OR COUNTRY): Broomfield, CO

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)

❑ Applicant certifying micro entity status. See 37 CFR 1.29	NOTE: Absent a valid certification of Micro Entity Status (see form PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
❑ Applicant asserting small entity status. See 37 CFR 1.27	NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
❑ Applicant changing to regular undiscounted fee status.	NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

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

Authorized Signature /David D. Wier/ Date October 24, 2013

Typed or printed name David D. Wier Registration No. 48,229

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

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

Electronic Patent Application Fee Transmittal

Application Number:	12978537
Filing Date:	24-Dec-2010
Title of Invention:	Policy-Based Content Delivery Network Selection
First Named Inventor/Applicant Name:	Paul E. Stolorz
Filer:	David Dewey Wier
Attorney Docket Number:	0093-US-I2

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:				
Utility Appl Issue Fee	1501	1	1780	1780
Publ. Fee- Early, Voluntary, or Normal	1504	1	300	300

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**2080**

Electronic Acknowledgement Receipt

EFS ID:	17216574
Application Number:	12978537
International Application Number:	
Confirmation Number:	1389
Title of Invention:	Policy-Based Content Delivery Network Selection
First Named Inventor/Applicant Name:	Paul E. Stolorz
Customer Number:	83579
Filer:	David Dewey Wier
Filer Authorized By:	
Attorney Docket Number:	0093-US-I2
Receipt Date:	24-OCT-2013
Filing Date:	24-DEC-2010
Time Stamp:	12:59:44
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$2080
RAM confirmation Number	13813
Deposit Account	505063
Authorized User	WIER, DAVID D

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

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

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

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

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	20131024IssueFeeTransmittal.pdf	104730 75188134c28e588358e2cfe5cecfd4e9f2fafa0b	no	2
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	31765 53abe808e85b503e3495439bdc69506f1647bdcc	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	136495		

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
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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

83579 7590 10/23/2013
LEVEL 3 COMMUNICATIONS, LLC
Attn: Patent Docketing
1025 Eldorado Blvd.
Broomfield, CO 80021

EXAMINER
WALSH, JOHN B

ART UNIT	PAPER NUMBER
2451	

DATE MAILED: 10/23/2013

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/978,537	12/24/2010	Paul E. Stolorz	0093-US-I2	1389

TITLE OF INVENTION: Policy-Based Content Delivery Network Selection

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1780	$300	$0	$2080	01/23/2014

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

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

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

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

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

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

PART B - FEE(S) TRANSMITTAL

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

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

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

83579 7590 10/23/2013
LEVEL 3 COMMUNICATIONS, LLC
Attn: Patent Docketing
1025 Eldorado Blvd.
Broomfield, CO 80021

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

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

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/978,537	12/24/2010	Paul E. Stolorz	0093-US-I2	1389

TITLE OF INVENTION: Policy-Based Content Delivery Network Selection

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1780	$300	$0	$2080	01/23/2014

EXAMINER	ART UNIT	CLASS-SUBCLASS
WALSH, JOHN B	2451	709-223000

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

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

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

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

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

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

4a. The following fee(s) are submitted:
- ❑ Issue Fee
- ❑ Publication Fee (No small entity discount permitted)
- ❑ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**
- ❑ A check is enclosed.
- ❑ Payment by credit card. Form PTO-2038 is attached.
- ❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

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

❑ Applicant certifying micro entity status. See 37 CFR 1.29	NOTE: Absent a valid certification of Micro Entity Status (see form PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
❑ Applicant asserting small entity status. See 37 CFR 1.27	NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
❑ Applicant changing to regular undiscounted fee status.	NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

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

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

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

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

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/978,537	12/24/2010	Paul E. Stolorz	0093-US-I2	1389

83579 7590 10/23/2013

LEVEL 3 COMMUNICATIONS, LLC
Attn: Patent Docketing
1025 Eldorado Blvd.
Broomfield, CO 80021

EXAMINER	
WALSH, JOHN B	

ART UNIT	PAPER NUMBER
2451	

DATE MAILED: 10/23/2013

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 319 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 319 day(s).

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

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

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

Privacy Act Statement

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

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

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

Notices of Allowance and Fee(s) Due mailed between October 1, 2013 and December 31, 2013

(Addendum to PTOL-85)

If the "Notice of Allowance and Fee(s) Due" has a mailing date on or after October 1, 2013 and before January 1, 2014, the following information is applicable to this application.

If the issue fee is being timely paid on or after January 1, 2014, the amount due is the issue fee and publication fee in effect January 1, 2014. On January 1, 2014, the issue fees set forth in 37 CFR 1.18 decrease significantly and the publication fee set forth in 37 CFR 1.18(d)(1) decreases to $0.

If an issue fee or publication fee has been previously paid in this application, applicant is not entitled to a refund of the difference between the amount paid and the amount in effect on January 1, 2014.

Notice of Allowability	Application No. 12/978,537	Applicant(s) STOLORZ ET AL.	
	Examiner John B. Walsh	Art Unit 2451	AIA (First Inventor to File) Status No

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

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

1. ☒ This communication is responsive to *8/12/13*.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on_____.
2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.
3. ☒ The allowed claim(s) is/are *2-21*. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov .
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

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

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
5. ☐ Examiner's Amendment/Comment
6. ☐ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/John B Walsh/
Primary Examiner, Art Unit 2451

Search Notes	Application/Control No.	Applicant(s)/Patent under Reexamination
	12/978,537	STOLORZ ET AL.
	Examiner	Art Unit
	John B. Walsh	2451

SEARCHED			
Class	Subclass	Date	Examiner

INTERFERENCE SEARCHED			
Class	Subclass	Date	Examiner
709	**219,232**	10/16/2013	**JW**
709	223-225	10/16/2013	JW
709	235	10/16/2013	JW
709/238-244		10/16/2013	JW

SEARCH NOTES (INCLUDING SEARCH STRATEGY)		
	DATE	EXMR
inventor name search	10/16/2013	JW

Issue Classification	Application/Control No. 12/978,537	Applicant(s)/Patent under Reexamination STOLORZ ET AL.
	Examiner John B. Walsh	Art Unit 2451

ISSUE CLASSIFICATION

ORIGINAL		INTERNATIONAL CLASSIFICATION									
CLASS	SUBCLASS	CLAIMED					NON-CLAIMED				
709	223	G	06	F	15	/173	G	06	F	15	/173
CROSS REFERENCES		G	06	F	15	/16	G	06	F	15	/16
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)										

709	238	219							/						/
									/						/
									/						/
									/						/
									/						/

N/A (Assistant Examiner) (Date)	/John B. Walsh/ 10/16/13 (Primary Examiner) (Date)	**Total Claims Allowed: 20**
(Legal Instruments Examiner) (Date)		O.G. Print Claim(s): 1 / O.G. Print Fig.: 1

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
	1		31		61		91		121		151		181
1	2		32		62		92		122		152		182
2	3		33		63		93		123		153		183
3	4		34		64		94		124		154		184
4	5		35		65		95		125		155		185
5	6		36		66		96		126		156		186
6	7		37		67		97		127		157		187
7	8		38		68		98		128		158		188
8	9		39		69		99		129		159		189
9	10		40		70		100		130		160		190
10	11		41		71		101		131		161		191
11	12		42		72		102		132		162		192
12	13		43		73		103		133		163		193
13	14		44		74		104		134		164		194
14	15		45		75		105		135		165		195
15	16		46		76		106		136		166		196
16	17		47		77		107		137		167		197
17	18		48		78		108		138		168		198
18	19		49		79		109		139		169		199
19	20		50		80		110		140		170		200
20	21		51		81		111		141		171		201
	22		52		82		112		142		172		202
	23		53		83		113		143		173		203
	24		54		84		114		144		174		204
	25		55		85		115		145		175		205
	26		56		86		116		146		176		206
	27		57		87		117		147		177		207
	28		58		88		118		148		178		208
	29		59		89		119		149		179		209
	30		60		90		120		150		180		210

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

BIB DATA SHEET

CONFIRMATION NO. 1389

SERIAL NUMBER	FILING or 371(c) DATE RULE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
12/978,537	12/24/2010	709	2451	0093-US-I2

APPLICANTS

Paul E. Stolorz, Los Altos, CA;
John K. Salmon, Chappaqua, NY;
Michael S. Warren, Los Alamos, NM;
Mark Brady, San Rafael, CA;
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Jeffrey Koller, Oxnard, CA;
Aric Hagberg, Santa Fe, NM;
David Pfitzner, College Park, AUSTRALIA;
Ted Middleton, Moorpark, CA;

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

This application is a CON of 11/976,648 10/26/2007 PAT 7860964
which is a CIP of 10/259,497 09/30/2002 PAT 7822871
which claims benefit of 60/325,177 09/28/2001
This application 12/978,537 12/24/2010
is a CIP of 11/932,162 10/31/2007
which is a CON of 10/259,497 09/30/2002 PAT 7822871
which claims benefit of 60/325,177 09/28/2001

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

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

01/12/2011

Foreign Priority claimed ☐ Yes ☑ No 35 USC 119(a-d) conditions met ☐ Yes ☑ No Verified and Acknowledged /JOHN B WALSH/ Examiner's Signature	☐ Met after Allowance Initials	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
		CA	31	1	1

ADDRESS

LEVEL 3 COMMUNICATIONS, LLC
Attn: Patent Docketing
1025 Eldorado Blvd.
Broomfield, CO 80021
UNITED STATES

TITLE

Policy-Based Content Delivery Network Selection

FILING FEE RECEIVED		
1220	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 _____

BIB (Rev. 05/07).

		❑ Credit

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	83	(stolorz-paul.in. or salmon-john.in. or warren-michael.in. or koller-jeffrey.in. or hagberg-aric.in. or yevmenkin-maksim.in. or brady-mark.in. or pfitzner-david.in.)	US-PGPUB; USPAT	OR	ON	2013/10/16 20:10
L2	2	L1 and (polic$3 and domain and server and answer).clm.	US-PGPUB; USPAT	OR	ON	2013/10/16 20:11
L3	1	("20110145386").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/10/16 20:12
L4	1	("6484261").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/10/16 20:25
L5	6	709/219,223-225,232,235,238-244.ccls. and (polic$3 and domain and server and answer).clm.	US-PGPUB; USPAT	OR	ON	2013/10/16 20:28
L6	2	L5 and (@ad<"20010928" or @prad<"20010928" or @rlad<"20010928")	US-PGPUB; USPAT	OR	ON	2013/10/16 20:29

10/16/2013 9:22:55 PM
C:\Users\jwalsh\Documents\EAST\Workspaces\11932162_11976648_12978537.wsp

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re the Application of:

Applicant	: Paul E. Stolorz, *et al.*	
Appln. No.	: 12/978,537	Confirmation No: 1389
Filed	: 24 December 2010	Group Art Unit: 2451
Title	: POLICY-BASED CONTENT DELIVERY NETWORK SELECTION	Examiner: John B. WALSH
		Docket No. 0093-US-I2

RESPONSE TO OFFICE ACTION

Via EFS-Web
MAIL STOP AMENDMENT
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

This Response is address the Office Action mailed on 11 March 2013. Applicant respectfully requests that the Examiner reconsider the above-identified U.S. patent application in view of the amendments and comments set forth below.

Request for Extension of Time is found on page **2** of this paper.

Amendments to the Claims, if any, is found on page **3** of this paper.

Remarks begin on page **9** of this paper.

Request for Extension of Time

Applicant hereby petitions for a **TWO-month** extension of time and is electronically submitting the required fee with this Response. Applicant believes no other petitions or fees are necessary, but if this is incorrect, please consider this a petition and authorization of payment therefor. The Commissioner is authorized to deduct any additional fees from or credit any overpayment to the undersigned's account no. 50-5063.

Amendments to the Claims:

1. (canceled)

2. (Previously Presented) A method, operable in a framework in which an adaptive traffic control name server network implements policy-based traffic direction, the name server network comprising at least one domain name server comprising hardware in combination with software and constructed and adapted to provide adaptive policy-based domain name service, the method comprising:
(A) providing a graphical user interface (GUI);
(B) using said GUI to obtain at least one policy for direction of network traffic, wherein the GUI supports the setting of said at least one policy using a decision tree representing rules; and
(C) providing said at least one policy to the name server network, wherein the decision tree comprises one or more resource nodes, and one or more branch nodes, wherein the one or more resource nodes specify one or more answers to be provided in response to a Domain Name Service (DNS) request, and wherein the one or more branch nodes specify one or more decision criteria to be applied, and wherein the GUI supports the specification of:
    (i) one or more answers for the one or more resource nodes, and
    (ii) one or more decision criteria for the one or more branch nodes, wherein the one or more criteria are selected from criteria related to: world zones, countries, states, time zones, and blocks of Internet Protocol (IP) addresses, and wherein the one or more resource nodes are selected from: IP addresses, canonical name (CNAME) records, mail exchange (MX) records, name server (NS) records, and load sharing server sets; and wherein the answers are selected from: IP addresses and CNAMEs.

3. (Previously Presented) The method of claim 2 wherein the at least one policy relates to direction of network traffic based on sub-domains of a domain of a subscriber.

4. (Previously Presented) The method of claim 3 wherein the at least one policy that relates to direction of network traffic based on sub-domains of a domain of the subscriber relates to one or more of the sub-domains: "ftp", "download", "www" , and "images".

5. (Previously Presented) The method of claim 2 further comprising:
(D) generating reports based on information gathered from the name server network; and
(E) providing said reports.

6. (Previously Presented) The method of claim 5 wherein the information gathered from the name server network comprises: DNS log summaries from the at least one domain name server in the name server network.

7. (Previously Presented) The method of claim 6 wherein the information includes a number of requests directed to particular servers in a given time period.

8. (Previously Presented) The method of claim 5 wherein the reports are made available via a secure web-based GUI.

9. (Previously Presented) The method of claim 2 wherein the act (C) comprises:
providing said at least one policy to the name server network as an XML file.

10. (Previously Presented) An administrative agent, operable in a framework in which an adaptive traffic control name server network implements policy-based traffic direction, the name server network comprising at least one domain name server comprising hardware in combination with software and constructed and adapted to provide adaptive policy-based domain name service, said administrative agent comprising hardware in combination with software and constructed and adapted to:

(a) provide a graphical user interface (GUI);

(b) use said GUI to obtain at least one policy for direction of network traffic, wherein the GUI supports the setting of said at least one policy using a decision tree representing rules; and

(c) provide said at least one policy to the name server network, wherein the decision tree comprises one or more resource nodes, and one or more branch nodes, wherein the one or more resource nodes specify one or more answers to be provided in response to a Domain Name Service (DNS) request, and wherein the one or more branch nodes specify one or more decision criteria to be applied, and wherein the GUI supports the specification of:

(i) one or more answers for the one or more resource nodes, and

(ii) one or more decision criteria for the one or more branch nodes,

wherein the one or more criteria are selected from criteria related to: world zones, countries, states, time zones, and blocks of Internet Protocol (IP) addresses, and

wherein the one or more resource nodes are selected from: IP addresses, canonical name (CNAME) records, mail exchange (MX) records, name server (NS) records, and load sharing server sets; and

wherein the answers are selected from: IP addresses and CNAMEs.

11. (Previously Presented) The administrative agent of claim 10 wherein the at least one policy relates to direction of network traffic based on sub-domains of a domain of a subscriber.

12. (Previously Presented) The administrative agent of claim 11 wherein the at least one policy that relates to direction of network traffic based on sub-domains of a domain of the subscriber relates to one or more of the sub-domains: "ftp", "download", "www" , and "images".

13. (Previously Presented) The administrative agent of claim 10 wherein said administrative agent comprises hardware in combination with software and constructed and adapted to:
(d) generate reports based on information gathered from the name server network; and
(e) provide said reports.

14. (Previously Presented) The administrative agent of claim 13 wherein the information gathered from the name server network comprises: DNS log summaries from the at least one domain name server in the name server network.

15. (Previously Presented) The administrative agent of claim 13 wherein the information includes a number of requests directed to particular servers in a given time period.

16. (Previously Presented) The administrative agent of claim 13 wherein the reports are made available via a secure web-based GUI.

17. (Previously Presented) The administrative agent of claim 10 wherein said at least one policy is provided to the name server network as an XML file.

18. (Previously Presented) A system comprising:

(A) an adaptive traffic control name server network comprising at least one domain name server comprising hardware in combination with software and constructed and adapted to provide adaptive policy-based domain name service, and

(B) an administrative agent comprising hardware in combination with software and constructed and adapted to:

(a) provide a graphical user interface (GUI);

(b) use said GUI to obtain at least one policy for direction of network traffic, wherein the GUI supports the setting of said at least one policy using a decision tree representing rules; and

(c) provide said at least one policy to the name server network,

wherein the decision tree comprises one or more resource nodes, and one or more branch nodes,

wherein the one or more resource nodes specify one or more answers to be provided in response to a Domain Name Service (DNS) request, and

wherein the one or more branch nodes specify one or more decision criteria to be applied, and

wherein the GUI supports the specification of:

(i) one or more answers for the one or more resource nodes, and

(ii) one or more decision criteria for the one or more branch nodes,

wherein the one or more criteria are selected from criteria related to: world zones, countries, states, time zones, and blocks of Internet Protocol (IP) addresses, and

wherein the one or more resource nodes are selected from: IP addresses, canonical name (CNAME) records, mail exchange (MX) records, name server (NS) records, and load sharing server sets; and

wherein the answers are selected from: IP addresses and CNAMEs.

19. (Previously Presented) The system of claim 18 wherein said administrative agent comprises hardware in combination with software and constructed and adapted to:

(d) generate reports based on information gathered from the name server network; and

(e) provide said reports.

20. (Previously Presented) The system of claim 19 wherein the information gathered from the name server network comprises: DNS log summaries from the at least one domain name server in the name server network.

21. (Previously Presented) The system of claim 19 wherein the information includes a number of requests directed to particular servers in a given time period.

Remarks

Applicant hereby traverses the current rejections, and requests reconsideration and withdrawal in light of the remarks contained herein. Claims 2-21 are pending in the application.

Rejection Under 35 U.S.C. § 102(e)

Claims 2-5, 10-13, and 18-19 are rejected under 35 U.S.C. § 102(e) as being anticipated by Wiegel, U.S. Patent 6,484,261(hereinafter Wiegel).

It is well settled that to anticipate a claim, the reference must teach every element of the claim, see M.P.E.P. § 2131. To anticipate a claim under 35 U.S.C. § 102, a single reference must teach each and every element of the claim. *See Verdegaal Bros. v. Union Oil Co. of California*, 814 F. 2d 628, 631 (Fed. Cir. 1987). Moreover, in order for a prior art reference to be anticipatory under 35 U.S.C. § 102 with respect to a claim, "[t]he elements must be arranged as required by the claim," see M.P.E.P. § 2131, citing *In re Bond*, 15 US.P.Q.2d 1566 (Fed. Cir. 1990). Furthermore, in order for a prior art reference to be anticipatory under 35 U.S.C. § 102 with respect to a claim, "[t]he identical invention must be shown in as complete detail as is contained in the . . . claim," see M.P.E.P. § 2131, citing Richardson v. Suzuki Motor Co., 9 U.S.P.Q. 2d 1913 (Fed. Cir. 1989). Applicant respectfully asserts that the rejection does not satisfy at least one of these requirements.

Independent Claim 2

Claim 2 defines a method, operable in a framework in which an adaptive traffic control name server network implements policy-based traffic direction, the name server network comprising at least one domain name server comprising hardware in combination with software and constructed and adapted to provide adaptive policy-based domain name service. The method comprises(C) providing said at least one policy to the name server network, wherein the decision tree comprises one or more resource nodes, and one or more branch nodes, wherein the one or more resource nodes specify one or more answers to be provided in response to a Domain Name Service (DNS) request.

Wiegel does not disclose at least these elements. The Office Action cites Figure 4E and the text at column 12, lines 45-55 paragraph [0076] of Wiegel as purportedly teaching these elements. Figure 9 depicts an example of policy editing using a then command. The cited text

discusses a network stack that satisfies a organization's requirements for a specific service. This portion of cited text notes that the Domain Name Server (DNS) Service 714 is well-defined at port 53 of the transport layer protocol TCP, which in turn requires the network layer protocol IP. Nothing in the cited Figure or the cited text discusses having one or more resource nodes specify one or more answers to be provided in response to a Domain Name Service (DNS) request. Thus, Weigel does not teach all of the claimed elements.

Therefore, the Applicant respectfully asserts that for the above reasons claim 2 is patentable over the 35 U.S.C. § 102 rejection of record.

Independent Claim 10

Claim 10 defines an administrative agent, operable in a framework in which an adaptive traffic control name server network implements policy-based traffic direction, the name server network comprising at least one domain name server comprising hardware in combination with software and constructed and adapted to provide adaptive policy-based domain name service. The administrative agent comprises hardware in combination with software and constructed and adapted to provide said at least one policy to the name server network, wherein the decision tree comprises one or more resource nodes, and one or more branch nodes, herein the one or more resource nodes specify one or more answers to be provided in response to a Domain Name Service (DNS) request.

Wiegel does not disclose at least these elements. The Office Action cites Figure 4E and the text at column 12, lines 45-55 paragraph [0076] of Wiegel as purportedly teaching these elements. Figure 9 depicts an example of policy editing using a then command. The cited text discusses a network stack that satisfies a organization's requirements for a specific service. This portion of cited text notes that the Domain Name Server (DNS) Service 714 is well-defined at port 53 of the transport layer protocol TCP, which in turn requires the network layer protocol IP. Nothing in the cited Figure or the cited text discusses having the one or more resource nodes specify one or more answers to be provided in response to a Domain Name Service (DNS) request. Thus, Wiegel does not teach all of the claimed elements.

Therefore, the Applicant respectfully asserts that for the above reasons claim 10 is patentable over the 35 U.S.C. § 102 rejection of record.

Independent Claim 18

Claim 18 defines system that comprises (B) an administrative agent comprising hardware in combination with software and constructed and adapted to (c) provide said at least one policy to the name server network, wherein the decision tree comprises one or more resource nodes, and one or more branch nodes, wherein the one or more resource nodes specify one or more answers to be provided in response to a Domain Name Service (DNS) request.

Wiegel does not disclose at least these elements. The Office Action cites Figure 4E and the text at column 12, lines 45-55 paragraph [0076] of Wiegel as purportedly teaching these elements. Figure 9 depicts an example of policy editing using a then command. The cited text discussing a network stack that satisfies a organization's requirements for a specific service. This portion of cited text notes that the Domain Name Server (DNS) Service 714 is well-defined at port 53 of the transport layer protocol TCP, which in turn requires the network layer protocol IP. Nothing in the cited Figure or the cited text discusses having the one or more resource nodes specify one or more answers to be provided in response to a Domain Name Service (DNS) request. Thus, Wiegel does not teach all of the claimed elements.

Therefore, the Applicant respectfully asserts that for the above reasons claim 18 is patentable over the 35 U.S.C. § 102 rejection of record.

Dependent Claims 3-5, 11-13, and 19

Claims 3-5, 11-13, and 19 depend from base claims 2, 10 and 18, respectively, and thus inherit all elements of their respective base claims. Each of claims 3-5, 11-13, and 19 sets forth features and elements not recited by Wiegel. Thus, the Applicant respectfully asserts that for the above reasons claims 3-5, 11-13, and 19 are patentable over the 35 U.S.C. § 102 rejection of record.

Rejection Under 35 U.S.C. § 103

Claims 9 and 17 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Wiegel in view of MeLampy *et al.*, U.S. Patent Application 2002/0145975 (hereinafter MeLampy).

Claims 6-7, 14-15, and 20-21 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Wiegel in view of Jindal *et al.*, U.S. Patent 6,092,178 (hereinafter Jindal).

Claims 8 and 16 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Wiegel in view of Wesinger, Jr., *et al.*, U.S. Patent 6,052,788 (hereinafter Wesinger).

To establish prima facie obviousness of a claimed invention, two basic criteria must be met. First, all the claim elements must be shown by the prior art. *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974). Second, there must be some rationale or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art to modify the reference or to combine reference teachings. In other words, there should be an explicit analysis regarding whether there was an apparent reason to combine the known elements in the fashion claimed in the Application at issue. *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1741 (2007). Without conceding the second criteria, the Applicant respectfully asserts that the rejection does not satisfy the first criteria.

Base claims 2, 10, and 18 are defined as described above. Wiegel does not disclose these elements, as discussed above. MeLampy, Jindal, and Wesinger are not relied upon in the Office Action as disclosing these elements. Therefore, each of the recited combinations of Wiegel with MeLampy, Jindal, and Wesinger do not teach all elements of the claimed invention.

Claims 6-9, 14-17, and 20-21 depend from base claims 2, 10 and 18, respectively, and thus inherit all elements of their respective base claims. Each of claims 6-9, 14-17, and 20-21 sets forth features and elements not recited by each of the combinations of Wiegel with MeLampy, Jindal, and Wesinger. Thus, the Applicant respectfully asserts that for the above reasons claims 6-9, 14-17, and 20-21 are patentable over the 35 U.S.C. § 102 rejection of record.

Conclusion

Claims 2-21 are currently pending in the application. Applicant believes that all pending claims are in a condition for allowance. Applicant therefore requests that a timely Notice of Allowance be issued in this case.

Applicant respectfully requests that the Examiner call the below listed attorney if the Examiner believes that such a discussion would be helpful in resolving any remaining problems.

Applicant believes no additional fee is due with this response. However, if an additional fee is due, please charge Deposit Account No. 50-5063 from which the undersigned is authorized to draw. Similarly, please credit any overage amount to the same account.

Respectfully submitted,

Date: August 12, 2013

/David D. Wier/

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Electronic Patent Application Fee Transmittal

Application Number:	12978537
Filing Date:	24-Dec-2010
Title of Invention:	Policy-Based Content Delivery Network Selection
First Named Inventor/Applicant Name:	Paul E. Stolorz
Filer:	David Dewey Wier
Attorney Docket Number:	0093-US-I2

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:				
Extension - 3 months with $0 paid	1252	1	600	600

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
			Total in USD ($)	**600**

Electronic Acknowledgement Receipt

EFS ID:	16569260
Application Number:	12978537
International Application Number:	
Confirmation Number:	1389
Title of Invention:	Policy-Based Content Delivery Network Selection
First Named Inventor/Applicant Name:	Paul E. Stolorz
Customer Number:	83579
Filer:	David Dewey Wier
Filer Authorized By:	
Attorney Docket Number:	0093-US-I2
Receipt Date:	12-AUG-2013
Filing Date:	24-DEC-2010
Time Stamp:	20:13:05
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$600
RAM confirmation Number	7348
Deposit Account	505063
Authorized User	WIER, DAVID D

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

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

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

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

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		20130812Response.pdf	65239 34d703ce4295e550c78a444e27f649b54a13d719	yes	13

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1
	Extension of Time	2	2
	Claims	3	8
	Applicant Arguments/Remarks Made in an Amendment	9	13

Warnings:

Information:

2	Fee Worksheet (SB06)	fee-info.pdf	30311 9d03122152481ec8d89aba14dd9961044722f459	no	2

Warnings:

Information:

Total Files Size (in bytes):	95550

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

New Applications Under 35 U.S.C. 111

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

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

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

New International Application Filed with the USPTO as a Receiving Office

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

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 12/978,537	Filing Date 12/24/2010	☒ To be Mailed

ENTITY: ☒ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	08/12/2013	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 20	Minus	** 20	= 0	X $80 =	0
	Independent (37 CFR 1.16(h))	* 2	Minus	***3	= 0	X $420 =	0
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	0

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

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
/MONICA FRANCIS/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**
If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/978,537	12/24/2010	Paul E. Stolorz	0093-US-I2	1389

83579 7590 03/11/2013

LEVEL 3 COMMUNICATIONS, LLC
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1025 Eldorado Blvd.
Broomfield, CO 80021

EXAMINER	
WALSH, JOHN B	

ART UNIT	PAPER NUMBER
2451	

NOTIFICATION DATE	DELIVERY MODE
03/11/2013	ELECTRONIC

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

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

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

patent.docketing@level3.com

Office Action Summary	Application No.	Applicant(s)	
	12/978,537	STOLORZ ET AL.	
	Examiner	Art Unit	
	John B. Walsh	2451	

-- 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 *12/24/10;6/21/11*.

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

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

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

Disposition of Claims

5)☒ Claim(s) *2-21* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *2-21* is/are rejected.

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

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

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

Application Papers

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

11)☒ The drawing(s) filed on *24 December 2010 and 3/2/11* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

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

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

Priority under 35 U.S.C. § 119

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

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) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *See Continuation Sheet*.

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

4) ☐ Other: _____.

Continuation of Attachment(s) 2). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :3/3/11;4/19/11;8/18/11;12/16/11;12/20/11;12/27/11;2/7/12;7/24/12;10/5/12.

DETAILED ACTION

Claim Rejections - 35 USC § 102

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

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

2. Claims 2-5, 10-13, 18 and 19 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,484,261 to Wiegel.

As concerns claims 2 and 10, (A) providing a graphical user interface (GUI) (col. 4, lines 31-33); (B) using said GUI to obtain at least one policy (col. 1, lines 35-40-administrators applying policies; col. 4, lines 34-37-create and manage policies) for direction of network traffic, wherein the GUI supports the setting of said at least one policy (col. 1, lines 35-40-administrators applying policies; col. 4, lines 34-37-create and manage policies) using a decision tree representing rules (col. 4, lines 63-64);

and (C) providing said at least one policy to the name server network (col. 4, lines 1-10-interacts with device; col. 5, lines 1-10; col. 12, lines 45-55-DNS service),wherein the decision tree comprises one or more resource nodes (col. 5, lines 61-67-nodes of decision tree), and one or more branch nodes (col. 5, lines 61-67-nodes of decision tree; col. 9, lines 60-65), wherein the one or more resource nodes specify one or more answers (fig. 4E) to be provided in response to a Domain Name Service (DNS) request (col. 12, lines 45-55-DNS service), and wherein the one or more branch nodes specify one or more decision criteria to be applied (col. 5, lines 61-67-nodes

of decision tree; col. 9, lines 60-65), and wherein the GUI supports the specification of:

(i) one or more answers (col. 5, lines 61-67-nodes of decision tree; col. 24, line 65-col. 25, line 1) for the one or more resource nodes, and

(ii) one or more decision criteria for the one or more branch nodes, wherein the one or more criteria are selected from criteria related to: world zones, countries, states, time zones, and blocks of Internet Protocol (IP) addresses (col. 16, lines 40-55-packet destination, time range; col. 24, lines 55-60-IP address; fig. 4E), and wherein the one or more resource nodes are selected from: IP addresses (col. 24, line 65-col. 25, line 1), canonical name (CNAME) records, mail exchange (MX) records, name server (NS) records, and load sharing server sets; and wherein the answers are selected from: IP addresses and CNAMEs (col. 24, line 65-col. 25, line 1).

As concerns claims 3 and 11, wherein the at least one policy relates to direction of network traffic (col. 6, lines 65-67-manage network traffic) based on sub-domains of a domain (col. 12, line 67) of a subscriber.

As concerns claims 4 and 12, wherein the at least one policy that relates to direction of network traffic based on sub-domains of a domain of the subscriber relates to one or more of the sub-domains: "ftp" (col. 8, lines35-40), "download", "www", and "images".

As concerns claims 5, 13 and 19, (D) generating reports (col. 11, lines 38-41) based on information gathered from the name server network; and (E) providing said reports (col. 11, lines 38-41).

As concerns claim 18, a system comprising: (A) an adaptive traffic control name server network comprising at least one domain name server comprising hardware in combination with software and constructed and adapted to provide adaptive policy-based domain name service, and (B) an administrative agent (col. 11, lines 11-30-software and hardware; agents) comprising

hardware in combination with software and constructed and adapted to:

(A) providing a graphical user interface (GUI) (col. 4, lines 31-33); (B) using said GUI to obtain at least one policy (col. 1, lines 35-40-administrators applying policies; col. 4, lines 34-37-create and manage policies) for direction of network traffic, wherein the GUI supports the setting of said at least one policy (col. 1, lines 35-40-administrators applying policies; col. 4, lines 34-37-create and manage policies) using a decision tree representing rules (col. 4, lines 63-64);

and (C) providing said at least one policy to the name server network (col. 4, lines 1-10-interacts with device; col. 5, lines 1-10),wherein the decision tree comprises one or more resource nodes (col. 5, lines 61-67-nodes of decision tree), and one or more branch nodes (col. 5, lines 61-67-nodes of decision tree), wherein the one or more resource nodes specify one or more answers (fig. 4E) to be provided in response to a Domain Name Service (DNS) request (col. 12, lines 45-55-DNS service), and wherein the one or more branch nodes specify one or more decision criteria to be applied, and wherein the GUI supports the specification of:

(i) one or more answers (col. 5, lines 61-67-nodes of decision tree; col. 24, line 65-col. 25, line 1) for the one or more resource nodes, and

(ii) one or more decision criteria for the one or more branch nodes, wherein the one or more criteria are selected from criteria related to: world zones, countries, states, time zones, and blocks of Internet Protocol (IP) addresses (col. 16, lines 40-55-packet destination, time range; col. 24, lines 55-60-IP address; fig. 4E), and wherein the one or more resource nodes are selected from: IP addresses (col. 24, line 65-col. 25, line 1), canonical name (CNAME) records, mail exchange (MX) records, name server (NS) records, and load sharing server sets and wherein the answers are selected from: IP addresses and CNAMEs (col. 24, line 65-col. 25, line 1).

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 negatived by the manner in which the invention was made.

4. Claims 9 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,484,261 to Wiegel as applied to claims 2 and 10 above in view of U.S. Patent Application Publication 2002/0145975 to MeLampy et al.

Wiegel '261 discloses using multiple protocols for communicating (col. 7, lines 28-35- multiple protocols).

Wiegel '261 does not disclose an XML file.

MeLampy et al. '975 teach providing said at least one policy data as an XML file (0110).

It would have been obvious to one having ordinary skill in the art at the time of the invention to provide the system of Wiegel '261 with transferring policy data as XML data, as taught by MeLampy et al. '975, in order to provide the data in a readily accessible form to a user. Such a modification is a combination of known elements yielding predictable results.

5. Claims 6, 7, 14, 15, 20 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,484,261 to Wiegel as applied to claims 5, 13 and 19 above in view of U.S. Patent No. 6,092,178 to Jindal et al.

Wiegel ‘261 does not disclose wherein the information gathered from the name server network comprises: DNS log summaries from the at least one domain name server in the name server network and the information includes a number of requests.

Jindal et al. ‘178 teach the information gathered from the name server network comprises: DNS log summaries (abstract-resource records) from the at least one domain name server in the name server network.

As concerns claims 7, 15 and 21, the information includes a number of requests directed to particular servers in a given time period (col. 8, lines 1-10).

It would have been obvious to one having ordinary skill in the art at the time of the invention to provide the system of Wiegel '261 with DNS log summaries, as taught by Jindal et al. ‘178, in order to collect data to aid in load balancing. Such a modification is a combination of known elements yielding predictable results.

6. Claims 8 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,484,261 to Wiegel as applied to claims 5 and 13 above in view of U.S. Patent No. 6,052,788 to Wesinger, Jr. et al.

Wiegel ‘261 does not disclose a secure web-based GUI.

Wesinger, Jr. et al. ‘788 teach a secure web-based GUI (col. 9, lines 35-45-secure connection client; web browser GUI).

It would have been obvious to one having ordinary skill in the art at the time of the invention to provide the system of Wiegel '261 with a secure web-based GUI, as taught by Wesinger, Jr. et al. ‘788, in order to provide a secure interface. Such a modification is a combination of known elements yielding predictable results.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See PTO-892.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to John B. Walsh whose telephone number is (571)272-7063. The examiner can normally be reached on Monday-Thursday from 8:00-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Follansbee can be reached on 571-272-3964. 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.

/John B Walsh/
Primary Examiner, Art Unit 2451

Notice of References Cited	Application/Control No. 12/978,537	Applicant(s)/Patent Under Reexamination STOLORZ ET AL.	
	Examiner John B. Walsh	Art Unit 2451	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2002/0145975	10-2002	MeLampy et al.	370/235
*	B	US-6,092,178	07-2000	Jindal et al.	712/27
*	C	US-6,052,788	04-2000	Wesinger et al.	726/11
*	D	US-6,484,261	11-2002	Wiegel, Scott L.	726/11
*	E	US-2002/0087684	07-2002	Foth, Thomas J.	709/225
	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.

Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Complete if Known	
Application Number	12/978,537
Filing Date	Dec 24, 2010
First Named Inventor	Paul E. Stolorz
Art Unit	2447
Examiner Name	Joon H. Hwang

Sheet	1	of	1	Attorney Docket No: 0093-US-I2

US PATENT DOCUMENTS					
Examiner Initial *	**Cite No**	**Document Number**	**Publication Date**	**Name of Patentee or Applicant of Cited Document**	Pages, Columns, Lines, Where Relevant Passages or RelevantFigures Appear
		6976090B2	Dec 13, 2005	Ben-shaul, I	

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	**Cite No**	**Foreign Patent Document**	**Publication Date**	**Name of Patentee or Applicant of cited Document**	Pages, Columns, Lines, Where Relevant Passages or RelevantFigures Appear	**T[2]**

OTHER DOCUMENTS -- NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	**Cite No [1]**	**Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.**	**T[2]**

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /JW/ (03/05/2013)

EXAMINER /John Walsh/ (03/05/2013) **DATE CONSIDERED** 03/05/2013

Substitute Disclosure Statement Form (PTO-1449)

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Art Unit	2447
Examiner Name	Imran Moorad

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		Chinese Reexamination Notification, dated July 5, 2012, Appl. No. 02821371.8, Dkt No. 0093-CN-01, 5 pgs.	

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Examiner Name	Joon H. Hwang

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US PATENT DOCUMENTS

Examiner Initial *	Cite No	Document Number	Publication Date	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or RelevantFigures Appear
		20070055764A1	Mar 8, 2007	DILLEY, J. A., et al.	
		20090254661	Oct 8, 2009	Fullagar, David et al.	
		20100332595A1	Dec 30, 2010	Fullagar,, David et al.	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No	Foreign Patent Document	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or RelevantFigures Appear	T[2]

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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L12	6	((domain adj name adj service) or (domain adj name adj server)) and ((report$3 or log or logging) same (request adj number)) and @ad<"20010928"	US-PGPUB; USPAT	OR	ON	2013/03/05 18:40
L11	1	(((domain adj name adj service) or (domain adj name adj server)) near (report$3)) and @ad<"20010928"	US-PGPUB; USPAT	OR	ON	2013/03/05 18:38
L10	4	(((domain adj name adj service) or (domain adj name adj server)) adj (report))	US-PGPUB; USPAT	OR	ON	2013/03/05 18:35
L9	5	(((domain adj name adj service) or (domain adj name adj server)) adj (log$4 or summar$4))	US-PGPUB; USPAT	OR	ON	2013/03/05 18:32
L8	19	L5 and requests	US-PGPUB; USPAT	OR	ON	2013/03/05 18:20
L7	92	L4 and requests	US-PGPUB; USPAT	OR	ON	2013/03/05 18:20
L6	12	L5 and report$3	US-PGPUB; USPAT	OR	ON	2013/03/05 18:20
L5	68	L4 and @ad<"20010928"	US-PGPUB; USPAT	OR	ON	2013/03/05 18:20
L4	313	(DNS adj (log$4 or summar$4))	US-PGPUB; USPAT	OR	ON	2013/03/05 18:19
L3	0	L2 and (DNS adj (log$4 or summar$4))	US-PGPUB; USPAT	OR	ON	2013/03/05 18:19
L2	678	@ad<"20010928" and (policy or policies) and network and (("DNS" or (domain adj name adj service)) same (request$3 or resolv$3))	US-PGPUB; USPAT	OR	ON	2013/03/05 18:19
L1	1	("6484261").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/03/05 17:58
S122	17	S118 and (secure same GUI)	US-PGPUB; USPAT	OR	ON	2013/03/05 11:02
S121	0	S118 and ((XML adj file) same polic$3)	US-PGPUB; USPAT	OR	ON	2013/03/05 10:47
S120	23	S118 and (XML same polic$3)	US-PGPUB; USPAT	OR	ON	2013/03/05 10:47

S119	199	S118 and (DNS same (log$4 or summar$4))	US-PGPUB; USPAT	OR	ON	2013/03/05 10:32
S118	678	@ad<"20010928" and (policy or policies) and network and (("DNS" or (domain adj name adj service)) same (request$3 or resolv$3))	US-PGPUB; USPAT	OR	ON	2013/03/05 10:32
S117	1	"6484261".pn. and (name adj server)	US-PGPUB; USPAT	OR	ON	2013/03/04 16:57
S116	0	"6484261".pn. and (CNAME)	US-PGPUB; USPAT	OR	ON	2013/03/04 16:57
S115	1	("20110145386").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/03/04 15:49
S114	7	S113 and (decision adj tree)	US-PGPUB; USPAT	OR	ON	2013/03/04 13:48
S113	246	S112 and ((set$6 or establish$3) near (policy or policies or rules))	US-PGPUB; USPAT	OR	ON	2013/03/04 13:47
S112	678	@ad<"20010928" and (policy or policies) and network and (("DNS" or (domain adj name adj service)) same (request$3 or resolv$3))	US-PGPUB; USPAT	OR	ON	2013/03/04 13:46
S111	2	S110 and ("GUI" or (graphical adj user adj interface))	US-PGPUB; USPAT	OR	ON	2013/03/01 16:35
S110	7	S109 and ((rules or set$4) same polic$3)	US-PGPUB; USPAT	OR	ON	2013/03/01 16:35
S109	7	S108 and @ad<"20010928"	US-PGPUB; USPAT	OR	ON	2013/03/01 16:35
S108	11	S107 and (policy or policies) and (network) and (("DNS" or (domain adj name adj service)) same (request$3 or resolv$3))	US-PGPUB; USPAT	OR	ON	2013/03/01 16:35
S107	26	(US-20080215718-$ or US-20020078233-$ or US-20020163882-$ or US-20020129134-$ or US-20030149581-$ or US-20030101278-$ or US-20020188732-$ or US-20020116444-$ or US-20040064832-$).did. or (US-7441045-$ or US-6981029-$ or US-6785704-$ or US-7096266-$ or US-6973485-$ or US-6754699-$ or US-6751673-$ or US-6415280-$ or US-6144996-$ or US-6041307-$ or US-6003030-$ or US-5884038-$ or US-5777989-$ or US-6968389-$ or US-7254645-$ or US-6976090-$ or US-6108703-$).did.	US-PGPUB; USPAT	OR	ON	2013/03/01 16:35
S106	4	S105 and ((("DNS" or (domain adj name adj service)) same response) same (address or CNAME))	US-PGPUB; USPAT	OR	ON	2013/03/01 14:58
S105	7	S103 and ((rules or set$4) same polic$3)	US-PGPUB; USPAT	OR	ON	2013/03/01 14:53
S104	3	S103 and (rules same polic$3)	US-PGPUB; USPAT	OR	ON	2013/03/01 14:53

S103	7	S102 and @ad<"20010928"	US-PGPUB; USPAT	OR	ON	2013/03/01 14:53
S102	11	S101 and (policy or policies) and (network) and (("DNS" or (domain adj name adj service)) same (request$3 or resolv$3))	US-PGPUB; USPAT	OR	ON	2013/03/01 14:53
S101	26	(US-20080215718-$ or US-20020078233-$ or US-20020163882-$ or US-20020129134-$ or US-20030149581-$ or US-20030101278-$ or US-20020188732-$ or US-20020116444-$ or US-20040064832-$).did. or (US-7441045-$ or US-6981029-$ or US-6785704-$ or US-7096266-$ or US-6973485-$ or US-6754699-$ or US-6751673-$ or US-6415280-$ or US-6144996-$ or US-6041307-$ or US-6003030-$ or US-5884038-$ or US-5777989-$ or US-6968389-$ or US-7254645-$ or US-6976090-$ or US-6108703-$).did.	US-PGPUB; USPAT	OR	ON	2013/03/01 14:53
S100	7	S99 and @ad<"20010928"	US-PGPUB; USPAT	OR	ON	2013/03/01 12:28
S99	11	S98 and (policy or policies) and (network) and (("DNS" or (domain adj name adj service)) same (request$3 or resolv$3))	US-PGPUB; USPAT	OR	ON	2013/03/01 12:27
S98	26	(US-20080215718-$ or US-20020078233-$ or US-20020163882-$ or US-20020129134-$ or US-20030149581-$ or US-20030101278-$ or US-20020188732-$ or US-20020116444-$ or US-20040064832-$).did. or (US-7441045-$ or US-6981029-$ or US-6785704-$ or US-7096266-$ or US-6973485-$ or US-6754699-$ or US-6751673-$ or US-6415280-$ or US-6144996-$ or US-6041307-$ or US-6003030-$ or US-5884038-$ or US-5777989-$ or US-6968389-$ or US-7254645-$ or US-6976090-$ or US-6108703-$).did.	US-PGPUB; USPAT	OR	ON	2013/03/01 12:25
S97	0	S96 and (answer and decision).clm.	US-PGPUB; USPAT	OR	ON	2013/02/28 14:55
S96	74	(stolorz-paul.in. or salmon-john.in. or warren-michael.in. or koller-jeffrey.in. or hagberg-aric.in. or yevmenkin-maksim.in. or brady-mark.in. or pfitzner-david.in.)	US-PGPUB; USPAT	OR	ON	2013/02/28 14:55
S95	0	S94 and (answer and decision).clm.	US-PGPUB; USPAT	OR	ON	2013/02/28 14:55
S94	2	(("7860964") or ("7822871")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/02/28 14:54
S93	2	(("7860964") or ("7822871")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/01/28 16:27
S92	4	(("20040064832") or ("20040010588") or ("20100169772") or ("20050240966")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/01/28 16:05
S91	1	("7860964").PN.	US-PGPUB;	OR	OFF	2013/01/28 15:59

			USPAT; USOCR			

3/5/2013 7:03:47 PM
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

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Application Number	12/978,537
Filing Date	Dec 24, 2010
First Named Inventor	Paul E. Stolorz
Art Unit	2447
Examiner Name	Joon H. Hwang

Sheet	1	of	1	Attorney Docket No: 0093-US-I2

US PATENT DOCUMENTS

Examiner Initial *	Cite No	Document Number	Publication Date	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or RelevantFigures Appear
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		20040064832A1	Apr 1, 2004	Tsukidate, R et al.	
		20050060493A1	Mar 17, 2005	Krissell, D et al.	
		20050240966A1	Oct 27, 2005	Hindle, J et al.	
		20100169772A1	Jul 1, 2010	Stallings, H et al.	
		7219153B1	May 15, 2007	Day, M	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No	Foreign Patent Document	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or RelevantFigures Appear	T[2]

OTHER DOCUMENTS -- NON PATENT LITERATURE DOCUMENTS

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		, "International Search Report, dated 1/23/2012, Intl Appl. No. PCT/US11/51252", Intl Filing Date 9/12/2011, Dkt No. 0137-WO-I1 , 3 pgs.	
		, "Written Opinion, dated 1/23/2012, Intl Appl No. PCT/US11/51252", Intl Filing Date 9/12/2011, Dkt No. 0137-WO-I1 , 5 pgs.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /JW/ (03/05/2013)

EXAMINER /John Walsh/ (03/05/2013) **DATE CONSIDERED** 03/05/2013

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PTO/SB/08a (01-08)
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				Art Unit 2447
				Examiner Name Joon H. Hwang
Sheet	1	of	1	Attorney Docket No: 0093-US-I2

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Examiner Initial *	**Cite No**	**Document Number**	**Publication Date**	**Name of Patentee or Applicant of Cited Document**	Pages, Columns, Lines, Where Relevant Passages or RelevantFigures Appear
		20020116444A1	Aug 22, 2002	Chaudhri, Imran et al.	

FOREIGN PATENT DOCUMENTS						
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EXAMINER /John Walsh/ (03/05/2013) **DATE CONSIDERED** 03/05/2013

Substitute Disclosure Statement Form (PTO-1449)
* 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. [1] Applicant's unique citation designation number (optional) [2] Applicant is to place a check mark here if English language Translation is attached

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Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Complete if Known	
Application Number	12/978,537
Filing Date	Dec 24, 2010
First Named Inventor	Paul E. Stolorz
Art Unit	2447
Examiner Name	Imran Moorad

Sheet	1	of	1	Attorney Docket No: 0093-US-I2

US PATENT DOCUMENTS

Examiner Initial *	Cite No	Document Number	Publication Date	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or RelevantFigures Appear

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No	Foreign Patent Document	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or RelevantFigures Appear	T[2]

OTHER DOCUMENTS -- NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No [1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
		Chinese Reexamination Notification, dated September 13, 2012, Chinese App. No. 02821371.8, Dkt No. 0093-CN-01, including translation, 10 pgs.	
		European Examination Report dated September 6, 2012, EP Application No. 10178695.2, Dkt No. 0093-EP-C1, 4 pgs.	

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Application Number	12/978,537
Filing Date	Dec 24, 2010
First Named Inventor	Paul E. Stolorz
Art Unit	2447
Examiner Name	Joon H. Hwang

Sheet	1	of	1	Attorney Docket No: 0093-US-I2

US PATENT DOCUMENTS					
Examiner Initial *	**Cite No**	**Document Number**	**Publication Date**	**Name of Patentee or Applicant of Cited Document**	Pages, Columns, Lines, Where Relevant Passages or RelevantFigures Appear
		20100312861A1	Dec 9, 2010	Kolhi, J et al.	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT FORM PTO-1449 (modified) Sheet 1 of 32	Application No.	12/978,537
	Filing Date	Dec. 24, 2010
	First Named Inventor	Mark BRADY
	Group Art Unit	2447
	Examiner Name	TBD
	Attorney Docket No.	0093-US-I2
	Confirmation No.	1389

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Examiner Initials*	Cite No.	Document No.	Publication/ Issue Date	Name of Patentee or Applicant of Cited Document
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT FORM PTO-1449 (modified) Sheet 2 of 32		
	Application No.	12/978,537
	Filing Date	Dec. 24, 2010
	First Named Inventor	Mark BRADY
	Group Art Unit	2447
	Examiner Name	TBD
	Attorney Docket No.	0093-US-I2
	Confirmation No.	1389

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.	Document No.	Publication/ Issue Date	Name of Patentee or Applicant of Cited Document
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT FORM PTO-1449 (modified) Sheet 3 of 32	Application No.	12/978,537
	Filing Date	Dec. 24, 2010
	First Named Inventor	Mark BRADY
	Group Art Unit	2447
	Examiner Name	TBD
	Attorney Docket No.	0093-US-I2
	Confirmation No.	1389

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Examiner Initials*	Cite No.	Document No.	Publication/ Issue Date	Name of Patentee or Applicant of Cited Document
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT FORM PTO-1449 (modified) Sheet 4 of 32	Application No.	12/978,537
	Filing Date	Dec. 24, 2010
	First Named Inventor	Mark BRADY
	Group Art Unit	2447
	Examiner Name	TBD
	Attorney Docket No.	0093-US-I2
	Confirmation No.	1389

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Examiner Initials*	Cite No.	Document No.	Publication/ Issue Date	Name of Patentee or Applicant of Cited Document
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT FORM PTO-1449 (modified) Sheet 5 of 32		
	Application No.	12/978,537
	Filing Date	Dec. 24, 2010
	First Named Inventor	Mark BRADY
	Group Art Unit	2447
	Examiner Name	TBD
	Attorney Docket No.	0093-US-I2
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U.S. PATENT DOCUMENTS				
Examiner Initials*	Cite No.	Document No.	Publication/ Issue Date	Name of Patentee or Applicant of Cited Document
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT FORM PTO-1449 (modified) Sheet 6 of 32	Application No.	12/978,537
	Filing Date	Dec. 24, 2010
	First Named Inventor	Mark BRADY
	Group Art Unit	2447
	Examiner Name	TBD
	Attorney Docket No.	0093-US-I2
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U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.	Document No.	Publication/ Issue Date	Name of Patentee or Applicant of Cited Document
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Examiner Signature	/John Walsh/ (03/05/2013)	Date Considered	03/05/2013

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT FORM PTO-1449 (modified) Sheet 7 of 32	Application No.	12/978,537
	Filing Date	Dec. 24, 2010
	First Named Inventor	Mark BRADY
	Group Art Unit	2447
	Examiner Name	TBD
	Attorney Docket No.	0093-US-I2
	Confirmation No.	1389

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.	Document No.	Publication/ Issue Date	Name of Patentee or Applicant of Cited Document
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Examiner Signature	/John Walsh/ (03/05/2013)	Date Considered	03/05/2013

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT FORM PTO-1449 (modified) Sheet 8 of 32	Application No.	12/978,537
	Filing Date	Dec. 24, 2010
	First Named Inventor	Mark BRADY
	Group Art Unit	2447
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Examiner Initials*	Cite No.	Document No.	Publication/ Issue Date	Name of Patentee or Applicant of Cited Document
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT FORM PTO-1449 (modified) Sheet 9 of 32	Application No.	12/978,537
	Filing Date	Dec. 24, 2010
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	Group Art Unit	2447
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	Group Art Unit	2447
	Examiner Name	TBD
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	31-4	SNMPV2 Working Group J Case SNMP Research et al: "Management Information Base for Version 2 of the Simple Network Management Protocol (SNMPv2); rfc1907.txt" IETF Standard, Internet Engineering Task Force, IETF, CH, Jan. 1996.	
	31-5	Tarjan, Robert E., et al., "Storing a Sparse Table", Commun.ACM, 22, 11, (Nov. 1979), 606-611.	
	31-6	Thaler, D. G. and Ravishankar, C. V. 1998. Using name-based mappings to increase hit rates. IEEE/ACM Trans. Netw. 6, 1 (Feb. 1998), 1-14.	
	31-7	U.S. P.T.O. Non-Final Office Action in U.S. Appln. No. 11/980,689, May 20, 2009.	

Examiner Signature	/John Walsh/ (03/05/2013)	Date Considered	03/05/2013

*Examiner: Initial if reference was considered, whether or not citation is in conformance with MPEP 609. Draw a line through citation if not in conformance and not considered. Include a copy of this form with next communication to applicant. Notes: If identified, the following is provided: EA = English Abstract, T = Translation, PT = Partial Translation, SOR = Statement of Relevancy, PF = Patent Family.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /JW/ (03/05/2013)

INFORMATION DISCLOSURE STATEMENT BY APPLICANT FORM PTO-1449 (modified) Sheet 32 of 32		
	Application No.	12/978,537
	Filing Date	Dec. 24, 2010
	First Named Inventor	Mark BRADY
	Group Art Unit	2447
	Examiner Name	TBD
	Attorney Docket No.	0093-US-I2
	Confirmation No.	1389

NON-PATENT REFERENCES

Examiner Initials*	Cite No.	Non-patent Reference bibliographic information, where available	Notes
	32-1	Vitter, J. S., et al., "Optimal Prefetching via Data Compression," Proc. 32nd Annual IEEE Symposium on Foundations of Computer Science (October 1991)	
	32-2	Vixie, Paul; "Name Server Operations Guide for BIND," Internet Software Consortium; La Honda, CA; p. SMM:10-2--SMM:10-30 (undated, 1996). no month available	
	32-3	WESSELS, Intelligent Caching for World-Wide Web Objects, Masters Thesis, University of Colorado, Jan. 1995 (also presented at INET '95 in June '95).	
	32-4	Yao, A. C. 1981. Should Tables Be Sorted?. J. ACM 28, 3 (Jul. 1981), 615-628.	
	32-5		
	32-6		
	32-7		

Examiner Signature	/John Walsh/ (03/05/2013)	Date Considered	03/05/2013

*Examiner: Initial if reference was considered, whether or not citation is in conformance with MPEP 609. Draw a line through citation if not in conformance and not considered. Include a copy of this form with next communication to applicant. Notes: If identified, the following is provided: EA = English Abstract, T = Translation, PT = Partial Translation, SOR = Statement of Relevancy, PF = Patent Family.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /JW/ (03/05/2013)

Search Notes	Application/Control No.	Applicant(s)/Patent under Reexamination	
	12/978,537	STOLORZ ET AL.	
	Examiner	Art Unit	
	John B. Walsh	2451	

SEARCHED			
Class	Subclass	Date	Examiner

INTERFERENCE SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES (INCLUDING SEARCH STRATEGY)		
	DATE	EXMR
inventor name search	3/4/2013	JW
text search in EAST	3/5/2013	JW

Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

	Complete if Known
Application Number	12/978,537
Filing Date	Dec 24, 2010
First Named Inventor	Paul E. Stolorz
Art Unit	2447
Examiner Name	Joon H. Hwang

Sheet	1	of	1	Attorney Docket No: 0093-US-I2

US PATENT DOCUMENTS

Examiner Initial *	Cite No	Document Number	Publication Date	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or RelevantFigures Appear
		6157648	Dec 5, 2000	Volt, Eric A., et al.	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No	Foreign Patent Document	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or RelevantFigures Appear	T[2]
		WO-2000/052594A2	Sep 8, 2000	LACHMAN, R. et al.		

OTHER DOCUMENTS -- NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No [1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
		, "Extended European Search Report dated December 6, 2011", App. No. 10178695.2, Dkt. No. 0093-EP-C1, , 7 pgs.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /JW/ (03/05/2013)

EXAMINER /John Walsh/ (03/05/2013) **DATE CONSIDERED** 03/05/2013

Substitute Disclosure Statement Form (PTO-1449)

* 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. [1] Applicant's unique citation designation number (optional) [2] Applicant is to place a check mark here if English language Translation is attached

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

Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Complete if Known	
Application Number	12/978,537
Filing Date	Dec 24, 2010
First Named Inventor	Paul E. Stolorz
Art Unit	2447
Examiner Name	Imran Moorad

Sheet	1	of	1	Attorney Docket No: 0093-US-I2

US PATENT DOCUMENTS

Examiner Initial *	Cite No	Document Number	Publication Date	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or RelevantFigures Appear

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No	Foreign Patent Document	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or RelevantFigures Appear	T[2]

OTHER DOCUMENTS -- NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No [1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
		Chinese Reexamination Notification, dated September 13, 2012, Chinese App. No. 02821371.8, Dkt No. 0093-CN-01, including translation, 10 pgs.	
		European Examination Report dated September 6, 2012, EP Application No. 10178695.2, Dkt No. 0093-EP-C1, 4 pgs.	

EXAMINER **DATE CONSIDERED**

Substitute Disclosure Statement Form (PTO-1449)

* 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. [1] Applicant's unique citation designation number (optional) [2] Applicant is to place a check mark here if English language Translation is attached

Electronic Acknowledgement Receipt

EFS ID:	13923995
Application Number:	12978537
International Application Number:	
Confirmation Number:	1389
Title of Invention:	Policy-Based Content Delivery Network Selection
First Named Inventor/Applicant Name:	Paul E. Stolorz
Customer Number:	83579
Filer:	David Dewey Wier/Kathleen McInnish
Filer Authorized By:	David Dewey Wier
Attorney Docket Number:	0093-US-I2
Receipt Date:	05-OCT-2012
Filing Date:	24-DEC-2010
Time Stamp:	17:06:30
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	Transmittal Letter	93USI2_IDS.pdf	35957 f8744b7033521373fa886645c5736bfbbf3dd33c	no	5

Warnings:	
Information:	

2	Information Disclosure Statement (IDS) Form (SB08)	93USI2_SB08.pdf	27328 7d754a3761ca682f32b4fa599a329a0123b9b453	no	1
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
3	Non Patent Literature	028213718_CN_Reexam_9_13_12.pdf	1733135 39b01836e31de5cdbd0d4c09c35d432260abeb19	no	10
Warnings:					
Information:					
4	Non Patent Literature	101786952_ExamRpt_9_6_12.pdf	308859 40bfc37e02d63de387faaab79ac396a883bc18f6	no	4
Warnings:					
Information:					
		Total Files Size (in bytes):	2105279		

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

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

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

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

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	:	12/978,537	Confirmation No.	:	1389
First Applicant	:	STOLORZ et al.	Art Unit	:	2442
Filed	:	December 24, 2012	Examiner	:	Imran Moorad
Title	:	POLICY-BASED CONTENT DELIVERY NETWORK SELECTION			
Docket No.	:	0093-US-I2			

Submitted Via EFS-Web

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT PURSUANT TO 37 C.F.R. §§ 1.56, 1.97, AND 1.98

Sir:

The Examiner is respectfully requested to consider the patents, patent applications, publications, or other information cataloged on the enclosed Form (e.g., PTO-1449, PTO-892, PTO/SB/08, etc.) during examination of the above-identified patent application. The order of presentation of the references should not be construed as an indication of importance. These references are submitted for the Examiner's consideration and are submitted pursuant to an Applicant's duty of disclosure under 37 C.F.R. § 1.56.

Copies of all of the cited documents:

☐ are enclosed unless otherwise indicated on the enclosed Form PTO/SB/08a.

☐ have been previously furnished to the Office in prior application No. _____, filed _____, which the present application relies upon for an earlier effective filing date under 35 U.S.C. § 120. Therefore, no copies of the cited documents are included herewith pursuant to 37 C.F.R. § 1.98(d); MPEP § 609(III)(A)(2).

☒ are enclosed unless they are U.S. patents or U.S. patent application publications pursuant to 37 C.F.R. § 1.98(a).

I
BASIS

This information disclosure statement is filed pursuant to

☒ 37 C.F.R. § 1.97(b).
This information disclosure statement is filed either (1) within three months of the filing date of a national application other than a continued prosecution application under 37 C.F.R. § 1.53(d); (2) within three months of the date of entry of the national stage as set forth in 37 C.F.R. § 1.491 in an international application; (3) before the mailing date of a first Office action on the merits; (4) concurrently with the filing of a request for continued examination under 37 C.F.R. § 1.114; or (5) before the mailing of a first Office action after the filing of a request for continued examination under 37 C.F.R. § 1.114, whichever event occurs last.

Accordingly, this information disclosure statement requires no fee and no certification.

☐ 37 C.F.R. § 1.97(c).
This information disclosure statement is filed after the period specified in 37 C.F.R. § 1.97(b), but before the mailing date of any of (1) a final action under 37 C.F.R. § 1.113; (2) a notice of allowance under 37 C.F.R. § 1.311; or (3) an action that otherwise closes prosecution in the application.

Accordingly, this information disclosure statement requires either the fee specified in 37 C.F.R. § 1.17(p) for submission of an information disclosure statement under 37 C.F.R. § 1.97(c), or a statement under 37 C.F.R. § 1.97(e).

☐ 37 C.F.R. § 1.97(d).
This information disclosure statement is filed after the period specified in 37 C.F.R. § 1.97(c) since a:

☐ final action under 37 C.F.R. § 1.113

☐ notice of allowance under 37 C.F.R. § 1.311

was mailed to the Applicant on _____.

Accordingly, this information disclosure statement requires the fee set forth in 37 C.F.R. § 1.17(p) to consider an information disclosure statement under 37 C.F.R. § 1.97(d), and a statement under 37 C.F.R. § 1.97(e).

If this statement crosses in the mail with an Office action, or is otherwise not in the indicated category of 37 C.F.R. § 1.97, it is respectfully requested that this statement be treated in the next appropriate category and made of record. To the extent required, please treat this paper as a conditional petition for acceptance of the information disclosure statement.

II
FEES

Any required fee is being paid as indicated below:

☒ No fee is due.

☐ The $180 fee specified in 37 C.F.R. § 1.17(p) for submission of an information disclosure statement under 37 C.F.R. § 1.97(c) or (d) is due.

☐ This fee is paid by credit card.

☐ Please charge the required fee to Deposit Account No. 505063.

☒ The Commissioner is hereby authorized to charge any additional required fees or credit any overpayments associated with this information disclosure statement to the account.

III

CERTIFICATION

Pursuant to 37 C.F.R. § 1.97(e), I state as follows:

☒ No statement is necessary.

☐ Each item of information contained in this information disclosure statement was first 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 information disclosure statement. 37 C.F.R. § 1.97(e)(1).

☐ No item of information contained in this information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to my knowledge after making reasonable inquiry, no item of information contained in this information disclosure statement was known to any individual designated in 37 C.F.R. § 1.56(c) more than three months prior to the filing of this information disclosure statement. 37 C.F.R. § 1.97(e)(2).

Pursuant to 37 C.F.R. § 1.704(d), I state as follows:

☐ Each item of information contained in this information disclosure 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 37 C.F.R. § 1.56(c) more than thirty days prior to the filing of this information disclosure statement.

IV
FOREIGN LANGUAGE REFERENCES

Pursuant to 37 C.F.R. § 1.98(a)(3)(i), any information disclosure statement filed under 37 C.F.R. § 1.97 shall include a concise explanation of the relevance, as it is presently understood by the individual designated in § 1.56(c) most knowledgeable about the content of the information, of each patent, publication, or other information listed that is not in the English language. The concise explanation may be either separate from the specification or incorporated therein. In compliance with the rules, the Applicant states as follows:

☐ No concise explanation is required since all cited references are in English.

☐ A concise explanation of the relevance of one or more foreign language references is attached.

☒ According to the procedural policy adopted by the PTO with regard to disclosure requirements, the Applicant is satisfying the disclosure requirement pursuant to MPEP § 609.04(a)(III) by submitting herewith the following:

- ☐ English language versions of any non-English language documents.
- ☒ English language versions of one or more search reports or other actions by one or more foreign patent offices in one or more counterpart foreign applications, which indicate the degree of relevance found by the foreign office(s).
- ☐ Pursuant to 37 C.F.R. § 1.98(a)(3)(ii), a copy of a translation is not submitted herewith because a written English-language translation of a non-English-language document, or portion thereof, is not within the possession, custody, or control of, or is readily available to any individual designated in § 1.56(c).

The Applicant has not analyzed these documents and, therefore, declines to comment on their relevance at this time.

☐ One or more English language abstracts for the non-English language references are also enclosed.

V
REMARKS

It is respectfully requested that:

(1) The Examiner sign the enclosed Form to evidence that the cited information has been fully considered by the Patent and Trademark Office during the examination of this application; and

(2) The citations for the cited information be printed on any patent that issues from this application.

The submission of this information disclosure statement by the Applicant shall not be construed as a representation that a search has been performed or that no other material information under 37 C.F.R. § 1.56 exists. See 37 C.F.R. § 1.97(g).

The submission of this information disclosure statement by the Applicant shall not be construed as an admission that any information cited or referred to herein is, or is considered to be, material to the patentability of one or more of the pending claims in this application pursuant to 37 C.F.R. § 1.56(b), unless specifically designated by the Applicant as such. See 37 C.F.R. § 1.97(h).

The submission of this information disclosure statement by the Applicant shall not be construed as an admission that any information cited or referred to herein is, or is considered to be, or even qualifies as "prior art" under 35 U.S.C. § 102 with respect to this invention, unless specifically designated by the Applicant as such.

Notwithstanding any statements by the Applicant, the Examiner is urged to form his or her own conclusion regarding the relevance of the cited information.

VI
CONCLUSION

The Examiner is encouraged to contact the undersigned attorney to discuss any questions concerning this information disclosure statement or any of the information cited or referred to herein.

Respectfully submitted,

Date: October 5, 2012

/JCS/

Jonathan C. Siekmann
Registration No. 58,259
USPTO Customer No. 83579
Level 3 Communications, LLC
1025 Eldorado Blvd.
Broomfield, Colorado 80021
Tel: 720-888-2140
Fax: 720-888-5619

Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Complete if Known	
Application Number	12/978,537
Filing Date	Dec 24, 2010
First Named Inventor	Paul E. Stolorz
Art Unit	2447
Examiner Name	Imran Moorad

Sheet	1	of	1	Attorney Docket No: 0093-US-I2

US PATENT DOCUMENTS

Examiner Initial *	Cite No	Document Number	Publication Date	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or RelevantFigures Appear

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No	Foreign Patent Document	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or RelevantFigures Appear	T[2]

OTHER DOCUMENTS -- NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No [1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
		Chinese Reexamination Notification, dated July 5, 2012, Appl. No. 02821371.8, Dkt No. 0093-CN-01, 5 pgs.	

EXAMINER **DATE CONSIDERED**

Substitute Disclosure Statement Form (PTO-1449)

* 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. [1] Applicant's unique citation designation number (optional) [2] Applicant is to place a check mark here if English language Translation is attached

Electronic Acknowledgement Receipt

EFS ID:	13326505
Application Number:	12978537
International Application Number:	
Confirmation Number:	1389
Title of Invention:	Policy-Based Content Delivery Network Selection
First Named Inventor/Applicant Name:	Paul E. Stolorz
Customer Number:	83579
Filer:	David Dewey Wier/Kathleen McInnish
Filer Authorized By:	David Dewey Wier
Attorney Docket Number:	0093-US-I2
Receipt Date:	24-JUL-2012
Filing Date:	24-DEC-2010
Time Stamp:	15:32:39
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	Transmittal Letter	93_US_I2_SuppIDS.pdf	35722 82f6510b1883888a81811b21aad9a167bd157842	no	5

Warnings:	
Information:	

2	Information Disclosure Statement (IDS) Form (SB08)	93_US_I2_SB08.pdf	27210 7e1e92b7a8097f83b4a2541591acc7bc2fcd0677	no	1
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
3	Non Patent Literature	028213718_CN_ReExam_7_5_12.pdf	37139 10201c0da813da934d0dc450752bc4ea53d81a85	no	5
Warnings:					
Information:					
		Total Files Size (in bytes):	100071		

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

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

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

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

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	:	12/978,537	Confirmation No.	:	1389
First Applicant	:	STOLORZ et al.	Art Unit	:	2447
Filed	:	December 24, 2010	Examiner	:	Imran Moorad
Title	:	POLICY-BASED CONTENT DELIVERY NETWORK SELECTION			
Docket No.	:	0093-US-I2			

Submitted Via EFS-Web

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT PURSUANT TO 37 C.F.R. §§ 1.56, 1.97, AND 1.98

Sir:

The Examiner is respectfully requested to consider the patents, patent applications, publications, or other information cataloged on the enclosed Form (e.g., PTO-1449, PTO-892, PTO/SB/08, etc.) during examination of the above-identified patent application. The order of presentation of the references should not be construed as an indication of importance. These references are submitted for the Examiner's consideration and are submitted pursuant to an Applicant's duty of disclosure under 37 C.F.R. § 1.56.

Copies of all of the cited documents:

☐ are enclosed unless otherwise indicated on the enclosed Form PTO/SB/08a.

☐ have been previously furnished to the Office in prior application No. _____, filed _____, which the present application relies upon for an earlier effective filing date under 35 U.S.C. § 120. Therefore, no copies of the cited documents are included herewith pursuant to 37 C.F.R. § 1.98(d); MPEP § 609(III)(A)(2).

☒ are enclosed unless they are U.S. patents or U.S. patent application publications pursuant to 37 C.F.R. § 1.98(a).

I
BASIS

This information disclosure statement is filed pursuant to

☒ 37 C.F.R. § 1.97(b).
This information disclosure statement is filed either (1) within three months of the filing date of a national application other than a continued prosecution application under 37 C.F.R. § 1.53(d); (2) within three months of the date of entry of the national stage as set forth in 37 C.F.R. § 1.491 in an international application; (3) before the mailing date of a first Office action on the merits; (4) concurrently with the filing of a request for continued examination under 37 C.F.R. § 1.114; or (5) before the mailing of a first Office action after the filing of a request for continued examination under 37 C.F.R. § 1.114, whichever event occurs last.

Accordingly, this information disclosure statement requires no fee and no certification.

☐ 37 C.F.R. § 1.97(c).
This information disclosure statement is filed after the period specified in 37 C.F.R. § 1.97(b), but before the mailing date of any of (1) a final action under 37 C.F.R. § 1.113; (2) a notice of allowance under 37 C.F.R. § 1.311; or (3) an action that otherwise closes prosecution in the application.

Accordingly, this information disclosure statement requires either the fee specified in 37 C.F.R. § 1.17(p) for submission of an information disclosure statement under 37 C.F.R. § 1.97(c), or a statement under 37 C.F.R. § 1.97(e).

☐ 37 C.F.R. § 1.97(d).
This information disclosure statement is filed after the period specified in 37 C.F.R. § 1.97(c) since a:

☐ final action under 37 C.F.R. § 1.113

☐ notice of allowance under 37 C.F.R. § 1.311

was mailed to the Applicant on _____.

Accordingly, this information disclosure statement requires the fee set forth in 37 C.F.R. § 1.17(p) to consider an information disclosure statement under 37 C.F.R. § 1.97(d), and a statement under 37 C.F.R. § 1.97(e).

If this statement crosses in the mail with an Office action, or is otherwise not in the indicated category of 37 C.F.R. § 1.97, it is respectfully requested that this statement be treated in the next appropriate category and made of record. To the extent required, please treat this paper as a conditional petition for acceptance of the information disclosure statement.

II
FEES

Any required fee is being paid as indicated below:

☒ No fee is due.

☐ The fee specified in 37 C.F.R. § 1.17(p) for submission of an information disclosure statement under 37 C.F.R. § 1.97(c) or (d) is due.

☐ This fee is paid by credit card.

☐ Please charge the required fee to Deposit Account No. 505063.

☒ The Commissioner is hereby authorized to charge any additional required fees or credit any overpayments associated with this information disclosure statement to the account.

III

CERTIFICATION

Pursuant to 37 C.F.R. § 1.97(e), I state as follows:

☒ No statement is necessary.

☐ Each item of information contained in this information disclosure statement was first 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 information disclosure statement. 37 C.F.R. § 1.97(e)(1).

☐ No item of information contained in this information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to my knowledge after making reasonable inquiry, no item of information contained in this information disclosure statement was known to any individual designated in 37 C.F.R. § 1.56(c) more than three months prior to the filing of this information disclosure statement. 37 C.F.R. § 1.97(e)(2).

Pursuant to 37 C.F.R. § 1.704(d), I state as follows:

☐ Each item of information contained in this information disclosure 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 37 C.F.R. § 1.56(c) more than thirty days prior to the filing of this information disclosure statement.

IV
FOREIGN LANGUAGE REFERENCES

Pursuant to 37 C.F.R. § 1.98(a)(3)(i), any information disclosure statement filed under 37 C.F.R. § 1.97 shall include a concise explanation of the relevance, as it is presently understood by the individual designated in § 1.56(c) most knowledgeable about the content of the information, of each patent, publication, or other information listed that is not in the English language. The concise explanation may be either separate from the specification or incorporated therein. In compliance with the rules, the Applicant states as follows:

☐ No concise explanation is required since all cited references are in English.

☐ A concise explanation of the relevance of one or more foreign language references is attached.

☐ According to the procedural policy adopted by the PTO with regard to disclosure requirements, the Applicant is satisfying the disclosure requirement pursuant to MPEP § 609.04(a)(III) by submitting herewith the following:

- ☐ English language versions of any non-English language documents.
- ☐ English language versions of one or more search reports or other actions by one or more foreign patent offices in one or more counterpart foreign applications, which indicate the degree of relevance found by the foreign office(s).
- ☐ Pursuant to 37 C.F.R. § 1.98(a)(3)(ii), a copy of a translation is not submitted herewith because a written English-language translation of a non-English-language document, or portion thereof, is not within the possession, custody, or control of, or is readily available to any individual designated in § 1.56(c).

The Applicant has not analyzed these documents and, therefore, declines to comment on their relevance at this time.

☐ One or more English language abstracts for the non-English language references are also enclosed.

V
REMARKS

It is respectfully requested that:

(1) The Examiner sign the enclosed Form to evidence that the cited information has been fully considered by the Patent and Trademark Office during the examination of this application; and

(2) The citations for the cited information be printed on any patent that issues from this application.

The submission of this information disclosure statement by the Applicant shall not be construed as a representation that a search has been performed or that no other material information under 37 C.F.R. § 1.56 exists. See 37 C.F.R. § 1.97(g).

The submission of this information disclosure statement by the Applicant shall not be construed as an admission that any information cited or referred to herein is, or is considered to be, material to the patentability of one or more of the pending claims in this application pursuant to 37 C.F.R. § 1.56(b), unless specifically designated by the Applicant as such. See 37 C.F.R. § 1.97(h).

The submission of this information disclosure statement by the Applicant shall not be construed as an admission that any information cited or referred to herein is, or is considered to be, or even qualifies as "prior art" under 35 U.S.C. § 102 with respect to this invention, unless specifically designated by the Applicant as such.

Notwithstanding any statements by the Applicant, the Examiner is urged to form his or her own conclusion regarding the relevance of the cited information.

VI
CONCLUSION

The Examiner is encouraged to contact the undersigned attorney to discuss any questions concerning this information disclosure statement or any of the information cited or referred to herein.

Respectfully submitted,

Date: July 24, 2012

/JCS/

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Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Complete if Known	
Application Number	12/978,537
Filing Date	Dec 24, 2010
First Named Inventor	Paul E. Stolorz
Art Unit	2447
Examiner Name	Joon H. Hwang

Sheet	1	of	1	Attorney Docket No: 0093-US-I2

US PATENT DOCUMENTS

Examiner Initial *	Cite No	Document Number	Publication Date	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or RelevantFigures Appear
		20040010588A1	Jan 15, 2004	Slater, A et al.	
		20040064832A1	Apr 1, 2004	Tsukidate, R et al.	
		20050060493A1	Mar 17, 2005	Krissell, D et al.	
		20050240966A1	Oct 27, 2005	Hindle, J et al.	
		20100169772A1	Jul 1, 2010	Stallings, H et al.	
		7219153B1	May 15, 2007	Day, M	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No	Foreign Patent Document	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or RelevantFigures Appear	T^2

OTHER DOCUMENTS -- NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No [1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T^2
		, "International Search Report, dated 1/23/2012, Intl Appl. No. PCT/US11/51252", Intl Filing Date 9/12/2011, Dkt No. 0137-WO-I1 , 3 pgs.	
		, "Written Opinion, dated 1/23/2012, Intl Appl No. PCT/US11/51252", Intl Filing Date 9/12/2011, Dkt No. 0137-WO-I1 , 5 pgs.	

EXAMINER **DATE CONSIDERED**

Substitute Disclosure Statement Form (PTO-1449)

* 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. [1] Applicant's unique citation designation number (optional) [2] Applicant is to place a check mark here if English language Translation is attached

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

To:
GREGORY DURBIN
POLSINELLI SHUGHART PC
700 W. 47TH ST., SUITE 1000
KANSAS CITY, MO 64112

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT AND THE WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

	Date of mailing *(day/month/year)* 23 JAN 2012
Applicant's or agent's file reference 0137-WO-I1	**FOR FURTHER ACTION** See paragraphs 1 and 4 below
International application No. PCT/US 11/51252	International filing date *(day/month/year)* 12 September 2011 (12.09.2011)
Applicant LEVEL 3 COMMUNICATIONS, LLC	

1. ☒ The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.

   Filing of amendments and statement under Article 19:
   The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46):

   When? The time limit for filing such amendments is normally two months from the date of transmittal of the international search report.

   Where? Directly to the International Bureau of WIPO, 34 chemin des Colombettes 1211 Geneva 20, Switzerland, Facsimile No.: +41 22 338 82 70

   For more detailed instructions, see *PCT Applicant's Guide*, International Phase, paragraphs 9.004 – 9.011.

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.

3. ☐ **With regard to any protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

   ☐ the protest together with the decision thereon has been transmitted to the International Bureau together with any request to forward the texts of both the protest and the decision thereon to the designated Offices.

   ☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Reminders**

   The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established. Following the expiration of 30 months from the priority date, these comments will also be made available to the public.

   Shortly after the expiration of **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau before the completion of the technical preparations for international publication (Rules 90*bis*.1 and 90*bis*.3).

   Within **19 months** from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase **until 30 months** from the priority date (in some Offices even later); otherwise, the applicant must, **within 20 months** from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices.

   In respect of other designated Offices, the time limit of **30 months** (or later) will apply even if no demand is filed within 19 months.

   For details about the applicable time limits, Office by Office, see www.wipo.int/pct/en/texts/time_limits.html and the *PCT Applicant's Guide*, National Chapters.

Name and mailing address of the ISA/ Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Authorized officer Lee W. Young PCT Helpdesk: 571-272-4300 Telephone No. PCT OSP: 571-272-7774

Form PCT/ISA/220 (July 2010)

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 0137-WO-I1	**FOR FURTHER ACTION**	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
International application No. PCT/US 11/51252	International filing date *(day/month/year)* 12 September 2011 (12.09.2011)	(Earliest) Priority Date *(day/month/year)* 13 September 2010 (13.09.2010)
Applicant LEVEL 3 COMMUNICATIONS, LLC		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 2 sheets.

☐ It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**

a. With regard to the **language**, the international search was carried out on the basis of:

☒ the international application in the language in which it was filed.

☐ a translation of the international application into _____ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

b. ☐ This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6*bis*(a)).

c. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. ☐ **Certain claims were found unsearchable** (see Box No. II).

3. ☐ **Unity of invention is lacking** (see Box No. III).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the **drawings**,

a. the figure of the **drawings** to be published with the abstract is Figure No. 1

☒ as suggested by the applicant.

☐ as selected by this Authority, because the applicant failed to suggest a figure.

☐ as selected by this Authority, because this figure better characterizes the invention.

b. ☐ none of the figures is to be published with the abstract.

Form PCT/ISA/210 (first sheet) (July 2009)

International application No.
PCT/US 11/51252

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - G06F 15/16 (2012.01)
USPC - 709/203
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC: G06F 15/16 (2011.01)
USPC: 709/203

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
IPC: G06F 15/16 (2011.01)
USPC:709/203; 709/218, 220, 223, 229, 249, 250; 725/44, 47, 116; 370/352, 414, 416, 418 (keyword limited; terms below)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
pubWEST(USPT,PGPB,EPAB,JPAB,USOCR); Google(Web); Search terms used: popular high demand usage statistics metric frequency uncommon rare unpopular edge intermediate tier distributed server host catalog library index hash edge intermediate tier secondary auxiliary source provider origin CDN alphabetic hash

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2004/0064832 A1 (TSUKIDATE et al.) 01 April 2004 (01.04.2004) entire document, especially Abstract; Figs. 5, 11, 16; para [0066]-[0071], [0083]-[0088]	1-22
Y	US 2004/0010588 A1 (SLATER et al.) 15 January 2004 (15.01.2004) entire document, especially Abstract; para [0293]-[0306], [0335], [0410], [0411]	1-22
Y	US 2010/0169772 A1 (STALLINGS et al.) 01 July 2010 (01.07.2010) entire document, especially Abstract; para [0046], [0061]	4
Y	US 2005/0240966 A1 (HINDLE et al.) 27 October 2005 (27.10.2005) entire document, especially Abstract; para [0016], [0044], [0045]	7, 8, 18
A	US 2005/0060493 A1 (KRISSELL et al.) 17 March 2005 (17.03.2005) entire document	1-22
A	US 7,219,153 B1 (DAY) 15 May 2007 (15.05.2007) entire document	1-22

☐ Further documents are listed in the continuation of Box C. ☐

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
08 January 2012 (08.12.2012)	23 JAN 2012
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Authorized officer: Lee W. Young PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To: GREGORY DURBIN
POLSINELLI SHUGHART PC
700 W. 47TH ST., SUITE 1000
KANSAS CITY, MO 64112

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

Date of mailing *(day/month/year)*	23 JAN 2012

Applicant's or agent's file reference	FOR FURTHER ACTION
0137-WO-I1	See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US 11/51252	12 September 2011 (12.09.2011)	13 September 2010 (13.09.2010)

International Patent Classification (IPC) or both national classification and IPC
IPC(8) - G06F 15/16 (2012.01)
USPC - 709/203

Applicant LEVEL 3 COMMUNICATIONS, LLC

1. This opinion contains indications relating to the following items:

- [X] Box No. I Basis of the opinion
- [ ] Box No. II Priority
- [ ] Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- [ ] Box No. IV Lack of unity of invention
- [X] Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- [ ] Box No. VI Certain documents cited
- [ ] Box No. VII Certain defects in the international application
- [ ] Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1 *bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/US	Date of completion of this opinion	Authorized officer:
Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	08 January 2012 (08.12.2012)	Lee W. Young PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

Form PCT/ISA/237 (cover sheet) (July 2011)

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US 11/51252

Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of:

   ☒ the international application in the language in which it was filed.

   ☐ a translation of the international application into _____ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a))

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing filed or furnished:

   a. (means)

   ☐ on paper

   ☐ in electronic form

   b. (time)

   ☐ in the international application as filed

   ☐ together with the international application in electronic form

   ☐ subsequently to this Authority for the purposes of search

4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US 11/51252

Box No. V **Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	1-22	YES
	Claims	NONE	NO
Inventive step (IS)	Claims	NONE	YES
	Claims	1-22	NO
Industrial applicability (IA)	Claims	1-22	YES
	Claims	NONE	NO

2. Citations and explanations:

Claims 1-3, 5, 6, 9-17 and 19-22 lack an inventive step under PCT Article 33(3) as being obvious over US 2004/0064832 A1 to Tsukidate et al. (hereinafter 'Tsukidate') in view of US 2004/0010588 A1 to Slater et al. (hereinafter 'Slater').

Regarding claim 1, Tsukidate teaches a method of content delivery in a content delivery network comprising at least a first tier of servers (Fig. 5, 16; para [0066], [0071]), the method comprising: at a first server in the first tier of servers, obtaining a request from a client for a resource, wherein the resource is available as part of a content provider's library (available content is requested / subscribed at client terminals; para [0069], [0088]); if the resource is not available at the first server or at a peer of the first server, determining if the resource is popular; if the resource is determined to be popular, then the first server obtaining the resource and the first server serving the resource to the client (a level of servers is allocated to content that becomes most popular, i.e., a first level; para [0069], [0083]), otherwise, if the resource is determined not to be popular, directing the client to a second server in a second tier of servers distinct from the first tier of servers (less popular content is stored on a another level or tier where users are directed by a management / center device; para [0066], [0067], [0083]), and the second server serving the resource to the client (para [0071], [0083]), but fails to disclose the second server comprises a first portion of the content provider's library, the first portion comprising at least the resource, and wherein at least one other server in the second tier comprises a second portion of the content provider's library. Slater teaches the second server comprises a first portion of the content provider's library, the first portion comprising at least the resource, and wherein at least one other server in the second tier comprises a second portion of the content provider's library (to provide different servers for partitioning resources based on popularity for load balancing and maximizing capacity; para [0293], [0306], [0335], [0410]). It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the method of Tsukidate to include the second server comprises a first portion of the content provider's library, the first portion comprising at least the resource, and wherein at least one other server in the second tier comprises a second portion of the content provider's library as taught by Slater to enhance efficiency.

Regarding claim 2, Slater further teaches the first portion of the content provider's library is distinct from the second portion (para [0335], [0410]).

Regarding claim 3, Slater further teaches portions of the content provider's library are logically partitioned across servers in the second tier (para [0328], [0335]).

Regarding claim 5, Slater further teaches the content provider's library comprises a plurality of content-types, each resource in the library being associated with one of the plurality of content-types (para [0281], [0335], [0411]).

Regarding claim 6, Slater further teaches storing distinct portions of the content provider's library on two or more servers in the second tier, wherein the proportion of content-types on each of the two or more servers is substantially equal, the content-types comprising at least one of audio content, video content, gaming content, and software content (load-balancing content types / categories; para [0410], [0411]).

Regarding claim 9, Slater further teaches the second tier is any intermediate tier between the first tier and an origin server that stores resources associated with the content provider's library (para [0416], [0419]).

Regarding claim 10, Slater further teaches the step of determining whether the resource is popular comprises determining whether a current popularity value for the resource exceeds a popularity threshold (para [0293], [0324]).

Regarding claim 11, Tsukidate further teaches the first tier of servers comprises a first popularity threshold and the second tier of servers comprises a second popularity threshold, and wherein the first popularity threshold is different from the second popularity threshold (para [0068], [0069], [0083]).

--CONTINUED IN SUPPLEMENTAL BOX--

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US 11/51252

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of:
Box No. V. 2. Citations and explanations:

Regarding claim 12, Tsukidate teaches a content delivery framework comprising: a plurality of edge servers forming a first tier of servers (Fig. 5, 16; para [0066], [0071]); a plurality of parent servers forming a second tier of servers, the parent servers being distinct from the edge servers (0 level, i.e., parent level, servers distinct from the subsequent / child edge servers; para [0071]); and at least one popularity service constructed and adapted to obtain a first set of information from at least some of the edge servers about requests for content (para [0068]), and to provide the edge servers with a second set of information about which tier of servers should handle those requests for content (para [0083]), the popularity service making its determinations based, at least in part, on a measure of popularity of requested content (para [0068], [0083]); and wherein the requested content is available as part of a content provider's library (Fig. 11; para [0068], [0088]), but fails to disclose distinct portions of the content provider's library are logically partitioned across parent servers in the second tier. Slater teaches distinct portions of the content provider's library are logically partitioned across parent servers in the second tier (to provide different servers for partitioning resources based on popularity for load balancing and maximizing capacity; para [0293], [0306], [0335], [0410]). It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the method of Tsukidate to include distinct portions of the content provider's library are logically partitioned across parent servers in the second tier as taught by Slater to enhance efficiency.

Regarding claim 13, Slater further teaches a at least one of the parent servers in the second tier comprises a first logically partitioned portion of the content provider's library, the first logically partitioned portion comprising at least the requested content (para [0328], [0335]).

Regarding claim 14, Slater further teaches at least one other parent server in the second tier comprises a second logically partitioned portion of the content provider's library, the second logically partitioned portion being distinct from the first logically partitioned portion (para [0335], [0410]).

Regarding claim 15, Tsukidate further teaches the second set of information further includes identification of a parent server in the second tier that stores a logically partitioned portion of the content provider's library comprising the requested content (para [0071], [0088]).

Regarding claim 16, Slater further teaches the second tier of parent servers is any intermediate tier between the first tier and an origin server that stores the content provider's library (para [0416], [0419]).

Regarding claim 17, Tsukidate teaches a method of content delivery in a content delivery network comprising a plurality of tiers of servers, including at least a first tier of servers and a second tier of servers (Fig. 5, 16; para [0066], [0071]), the method comprising: at a first server in one tier of the tiers of servers, obtaining a request from a client for a resource, wherein the resource is available as part of a content provider's library (Fig. 11; para [0068], [0088]); if the resource is not available at the first server or at a peer of the first server, then selectively redirecting the request from the client to a second tier server, the second tier server being in a tier distinct from the tier containing the first server, the redirecting being based, at least in part, on a current popularity value for the resource (para [0068], [0069], [0083]), but fails to disclose the second tier server comprises a first portion of the content provider's library, the first portion comprising at least the resource, and wherein at least one other second tier server comprises a second portion of the content provider's library distinct from the first portion. Slater teaches the second tier server comprises a first portion of the content provider's library, the first portion comprising at least the resource, and wherein at least one other second tier server comprises a second portion of the content provider's library distinct from the first portion (to provide different servers for partitioning resources based on popularity for load balancing and maximizing capacity; para [0293], [0306], [0335], [0410]). It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the method of Tsukidate to include the second tier server comprises a first portion of the content provider's library, the first portion comprising at least the resource, and wherein at least one other second tier server comprises a second portion of the content provider's library distinct from the first portion as taught by Slater to enhance efficiency.

Regarding claim 19, Slater further teaches the second tier of servers is any intermediate tier between the first tier and an origin server that stores the content provider's library (para [0416], [0419]).

Regarding claim 20, Tsukidate further teaches the first tier of servers comprises a plurality of edge servers and the second tier of servers comprises a plurality of parent servers, and wherein the first server is a parent server in the second tier and the second server is an edge server in the first tier (0 level, i.e., parent level, servers distinct from the subsequent / child edge servers; para [0071]).

Regarding claim 21, Tsukidate further teaches the first tier of servers comprises a plurality of edge servers and the second tier of servers comprises a plurality of parent servers, and wherein the first server is an edge server in the first tier and the second server is a parent server in the second tier (0 level, i.e., parent level, servers distinct from the subsequent / child edge servers; para [0071], [0083]).

Regarding claim 22, Tsukidate further teaches the first tier of servers comprises a plurality of edge servers and the second tier of servers comprises a plurality of parent servers (0 level, i.e., parent level, servers distinct from the subsequent / child edge servers; para [0071, [0083]]), and wherein the plurality of tiers of servers further comprises an origin tier, and wherein the first server is a parent server in the second tier and the second server is a server in the origin tier (relocate new content to servers at 0 / origin levels based on expected / adjustable popularity ratings; para [0068], [0069], [0083]).

--CONTINUED IN NEXT SUPPLEMENTAL BOX--

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US 11/51252

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of:
Box No. V. 2. Citations and explanations:

Claim 4 lacks an inventive step under PCT Article 33(3) as being obvious over Tsukidate in view of Slater and in further view of US 2010/0169772 A1 to Stallings et al. (hereinafter 'Stallings').

Regarding claim 4, in the combination, Slater further teaches the first portion and the second portion are partitioned across servers in the second tier based on a naming convention associated with each distinct resource in the content provider's library (named category partitioning; para [0330], [0335]), however the combination fails to disclose alphabetically. Stallings teaches parenthetically (to provide more different types of partitioning; para [0046], [0061]). It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the method of Tsukidate in view of Slater to include alphabetically as taught by Stallings for the advantage of providing more flexible storage options.

Claims 7, 8 and 18 lack an inventive step under PCT Article 33(3) as being obvious over Tsukidate in view of Slater and in further view of US 2005/0240966 A1 to Hindle et al. (hereinafter 'Hindle').

Regarding claim 7, in the combination,Tsukidate further teaches resources of the content provider's library are distributed in a manner across servers in the second tier based on values of uniform resource locators (URLs) associated with two or more respective resources in the content provider's library (para [0071], [0335]) and Slater further teaches substantially equal (para [0410]), however the combination fails to disclose hash values. Hindle teaches hash values (to quickly find propagated content; para [0016], [0044], [0045]). It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the method of Tsukidate in view of Slater to include hash values as taught by Hindle for the advantage of finding content faster.

Regarding claim 8, in the combination, Slater further teaches the step of directing the client to a second server in a second tier is performed in response to a step of using a value to determine which second server in the second tier stores the first portion of the content provider's library (para [0306], [0419]), however the combination fails to disclose hash values. Hindle teaches hash values (to quickly find propagated content; para [0016], [0044], [0045]). It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the method of Tsukidate in view of Slater to include hash values as taught by Hindle for the advantage of finding content faster.

Regarding claim 18, in the combination, Slater further teaches the step of selectively redirecting the request from the client to a second tier server comprises determining to which second tier server the request should be directed, the determining step using a function to identify a second tier server that stores the first portion of the content provider's library (para [0335], [0411]), however the combination fails to disclose hash values. Hindle teaches hash values (to quickly find propagated content; para [0016], [0044], [0045]). It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the method of Tsukidate in view of Slater to include hash values as taught by Hindle for the advantage of finding content faster.

Claims 1-22 have industrial applicability as defined by PCT Article 33(4), because the subject matter can be made or used in industry.

Electronic Acknowledgement Receipt

EFS ID:	12019768
Application Number:	12978537
International Application Number:	
Confirmation Number:	1389
Title of Invention:	Policy-Based Content Delivery Network Selection
First Named Inventor/Applicant Name:	Paul E. Stolorz
Customer Number:	83579
Filer:	David Dewey Wier/Kathleen McInnish
Filer Authorized By:	David Dewey Wier
Attorney Docket Number:	0093-US-I2
Receipt Date:	07-FEB-2012
Filing Date:	24-DEC-2010
Time Stamp:	16:10:42
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	Transmittal Letter	93_US_I2_SuppIDS.pdf	35798 752018e3e999178b6a05949ed8af13872e77577b	no	5

Warnings:	
Information:	

2	Information Disclosure Statement (IDS) Form (SB08)	93_US_I2_SB08.pdf	28854 2de0d5972f97405d66bc65345839f71e751bd3f9	no	1
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
3	Non Patent Literature	2012_01_23_137WOI1_Search_Report.pdf	183645 b90bd63c465952c0b97988419aa1bb67b662b50e	no	3
Warnings:					
Information:					
4	Non Patent Literature	2012_01_23_137WOI1_Written_Opinion.pdf	300905 79e89efbc40fa2a7d1f6300beab37bbe3a4b6263	no	5
Warnings:					
Information:					
		Total Files Size (in bytes):	549202		

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

Application No.	:	12/978,537	Confirmation No.	:	1389
First Applicant	:	STOLORZ et al.	Art Unit	:	2447
Filed	:	December 24, 2010	Examiner	:	Joon H. Hwang
Title	:	POLICY-BASED CONTENT DELIVERY NETWORK SELECTION			
Docket No.	:	0093-US-I2			

Submitted Via EFS-Web

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT PURSUANT TO 37 C.F.R. §§ 1.56, 1.97, AND 1.98

Sir:

The Examiner is respectfully requested to consider the patents, patent applications, publications, or other information cataloged on the enclosed Form (e.g., PTO-1449, PTO-892, PTO/SB/08, etc.) during examination of the above-identified patent application. The order of presentation of the references should not be construed as an indication of importance. These references are submitted for the Examiner's consideration and are submitted pursuant to an Applicant's duty of disclosure under 37 C.F.R. § 1.56.

Copies of all of the cited documents:

☐ are enclosed unless otherwise indicated on the enclosed Form PTO/SB/08a.

☐ have been previously furnished to the Office in prior application No. _____, filed _____, which the present application relies upon for an earlier effective filing date under 35 U.S.C. § 120. Therefore, no copies of the cited documents are included herewith pursuant to 37 C.F.R. § 1.98(d); MPEP § 609(III)(A)(2).

☒ are enclosed unless they are U.S. patents or U.S. patent application publications pursuant to 37 C.F.R. § 1.98(a).

I
BASIS

This information disclosure statement is filed pursuant to

☒ 37 C.F.R. § 1.97(b).
This information disclosure statement is filed either (1) within three months of the filing date of a national application other than a continued prosecution application under 37 C.F.R. § 1.53(d); (2) within three months of the date of entry of the national stage as set forth in 37 C.F.R. § 1.491 in an international application; (3) before the mailing date of a first Office action on the merits; (4) concurrently with the filing of a request for continued examination under 37 C.F.R. § 1.114; or (5) before the mailing of a first Office action after the filing of a request for continued examination under 37 C.F.R. § 1.114, whichever event occurs last.

Accordingly, this information disclosure statement requires no fee and no certification.

☐ 37 C.F.R. § 1.97(c).
This information disclosure statement is filed after the period specified in 37 C.F.R. § 1.97(b), but before the mailing date of any of (1) a final action under 37 C.F.R. § 1.113; (2) a notice of allowance under 37 C.F.R. § 1.311; or (3) an action that otherwise closes prosecution in the application.

Accordingly, this information disclosure statement requires either the fee specified in 37 C.F.R. § 1.17(p) for submission of an information disclosure statement under 37 C.F.R. § 1.97(c), or a statement under 37 C.F.R. § 1.97(e).

☐ 37 C.F.R. § 1.97(d).
This information disclosure statement is filed after the period specified in 37 C.F.R. § 1.97(c) since a:

☐ final action under 37 C.F.R. § 1.113

☐ notice of allowance under 37 C.F.R. § 1.311

was mailed to the Applicant on _____.

Accordingly, this information disclosure statement requires the fee set forth in 37 C.F.R. § 1.17(p) to consider an information disclosure statement under 37 C.F.R. § 1.97(d), and a statement under 37 C.F.R. § 1.97(e).

If this statement crosses in the mail with an Office action, or is otherwise not in the indicated category of 37 C.F.R. § 1.97, it is respectfully requested that this statement be treated in the next appropriate category and made of record. To the extent required, please treat this paper as a conditional petition for acceptance of the information disclosure statement.

II
FEES

Any required fee is being paid as indicated below:

☒ No fee is due.

☐ The fee specified in 37 C.F.R. § 1.17(p) for submission of an information disclosure statement under 37 C.F.R. § 1.97(c) or (d) is due.

☐ This fee is paid by credit card.

☐ Please charge the required fee to Deposit Account No. 505063.

☒ The Commissioner is hereby authorized to charge any additional required fees or credit any overpayments associated with this information disclosure statement to the account.

III

CERTIFICATION

Pursuant to 37 C.F.R. § 1.97(e), I state as follows:

☒ No statement is necessary.

☐ Each item of information contained in this information disclosure statement was first 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 information disclosure statement. 37 C.F.R. § 1.97(e)(1).

☐ No item of information contained in this information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to my knowledge after making reasonable inquiry, no item of information contained in this information disclosure statement was known to any individual designated in 37 C.F.R. § 1.56(c) more than three months prior to the filing of this information disclosure statement. 37 C.F.R. § 1.97(e)(2).

Pursuant to 37 C.F.R. § 1.704(d), I state as follows:

☐ Each item of information contained in this information disclosure 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 37 C.F.R. § 1.56(c) more than thirty days prior to the filing of this information disclosure statement.

IV
FOREIGN LANGUAGE REFERENCES

Pursuant to 37 C.F.R. § 1.98(a)(3)(i), any information disclosure statement filed under 37 C.F.R. § 1.97 shall include a concise explanation of the relevance, as it is presently understood by the individual designated in § 1.56(c) most knowledgeable about the content of the information, of each patent, publication, or other information listed that is not in the English language. The concise explanation may be either separate from the specification or incorporated therein. In compliance with the rules, the Applicant states as follows:

☐ No concise explanation is required since all cited references are in English.

☐ A concise explanation of the relevance of one or more foreign language references is attached.

☐ According to the procedural policy adopted by the PTO with regard to disclosure requirements, the Applicant is satisfying the disclosure requirement pursuant to MPEP § 609.04(a)(III) by submitting herewith the following:

- ☐ English language versions of any non-English language documents.
- ☐ English language versions of one or more search reports or other actions by one or more foreign patent offices in one or more counterpart foreign applications, which indicate the degree of relevance found by the foreign office(s).
- ☐ Pursuant to 37 C.F.R. § 1.98(a)(3)(ii), a copy of a translation is not submitted herewith because a written English-language translation of a non-English-language document, or portion thereof, is not within the possession, custody, or control of, or is readily available to any individual designated in § 1.56(c).

The Applicant has not analyzed these documents and, therefore, declines to comment on their relevance at this time.

☐ One or more English language abstracts for the non-English language references are also enclosed.

V
REMARKS

It is respectfully requested that:

(1) The Examiner sign the enclosed Form to evidence that the cited information has been fully considered by the Patent and Trademark Office during the examination of this application; and

(2) The citations for the cited information be printed on any patent that issues from this application.

The submission of this information disclosure statement by the Applicant shall not be construed as a representation that a search has been performed or that no other material information under 37 C.F.R. § 1.56 exists. See 37 C.F.R. § 1.97(g).

The submission of this information disclosure statement by the Applicant shall not be construed as an admission that any information cited or referred to herein is, or is considered to be, material to the patentability of one or more of the pending claims in this application pursuant to 37 C.F.R. § 1.56(b), unless specifically designated by the Applicant as such. See 37 C.F.R. § 1.97(h).

The submission of this information disclosure statement by the Applicant shall not be construed as an admission that any information cited or referred to herein is, or is considered to be, or even qualifies as "prior art" under 35 U.S.C. § 102 with respect to this invention, unless specifically designated by the Applicant as such.

Notwithstanding any statements by the Applicant, the Examiner is urged to form his or her own conclusion regarding the relevance of the cited information.

VI
CONCLUSION

The Examiner is encouraged to contact the undersigned attorney to discuss any questions concerning this information disclosure statement or any of the information cited or referred to herein.

Respectfully submitted,

Date: February 7, 2012

/JCS/

Jonathan C. Siekmann
Registration No. 58,259
USPTO Customer No. 83579
Level 3 Communications, LLC
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Tel: 720-888-2140
Fax: 720-888-5619

Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Complete if Known	
Application Number	12/978,537
Filing Date	Dec 24, 2010
First Named Inventor	Paul E. Stolorz
Art Unit	2447
Examiner Name	Joon H. Hwang

Sheet	1	of	1	Attorney Docket No: 0093-US-I2

US PATENT DOCUMENTS

Examiner Initial *	Cite No	Document Number	Publication Date	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or RelevantFigures Appear
		6976090B2	Dec 13, 2005	Ben-shaul, I	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No	Foreign Patent Document	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or RelevantFigures Appear	T[2]

OTHER DOCUMENTS -- NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No [1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]

EXAMINER **DATE CONSIDERED**

Substitute Disclosure Statement Form (PTO-1449)

* 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. [1] Applicant's unique citation designation number (optional) [2] Applicant is to place a check mark here if English language Translation is attached

Electronic Acknowledgement Receipt

EFS ID:	11707196
Application Number:	12978537
International Application Number:	
Confirmation Number:	1389
Title of Invention:	Policy-Based Content Delivery Network Selection
First Named Inventor/Applicant Name:	Paul E. Stolorz
Customer Number:	83579
Filer:	David Dewey Wier/Kathleen McInnish
Filer Authorized By:	David Dewey Wier
Attorney Docket Number:	0093-US-I2
Receipt Date:	27-DEC-2011
Filing Date:	24-DEC-2010
Time Stamp:	10:57:28
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	Transmittal Letter	93_US_I2_SuppIDS.pdf	35791 acf88aaf8b98542be847bc9565e9daf847c3e44d	no	5

Warnings:	
Information:	

2	Information Disclosure Statement (IDS) Form (SB08)	93_US_I2_SB08.pdf	27240 7e6f54c6b6be707c9f11e46afb658d22b7c3cae3	no	1

Warnings:	
Information:	
This is not an USPTO supplied IDS fillable form	
Total Files Size (in bytes):	63031

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

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

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

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

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	:	12/978,537	Confirmation No.	:	1389
First Applicant	:	STOLORZ et al.	Art Unit	:	2447
Filed	:	December 24, 2010	Examiner	:	Joon H. Hwang
Title	:	POLICY-BASED CONTENT DELIVERY NETWORK SELECTION			
Docket No.	:	0093-US-I2			

Submitted Via EFS-Web

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT PURSUANT TO 37 C.F.R. §§ 1.56, 1.97, AND 1.98

Sir:

The Examiner is respectfully requested to consider the patents, patent applications, publications, or other information cataloged on the enclosed Form (e.g., PTO-1449, PTO-892, PTO/SB/08, etc.) during examination of the above-identified patent application. The order of presentation of the references should not be construed as an indication of importance. These references are submitted for the Examiner's consideration and are submitted pursuant to an Applicant's duty of disclosure under 37 C.F.R. § 1.56.

Copies of all of the cited documents:

☐ are enclosed unless otherwise indicated on the enclosed Form PTO/SB/08a.

☐ have been previously furnished to the Office in prior application No. _____, filed _____, which the present application relies upon for an earlier effective filing date under 35 U.S.C. § 120. Therefore, no copies of the cited documents are included herewith pursuant to 37 C.F.R. § 1.98(d); MPEP § 609(III)(A)(2).

☒ are enclosed unless they are U.S. patents or U.S. patent application publications pursuant to 37 C.F.R. § 1.98(a).

I
BASIS

This information disclosure statement is filed pursuant to

☒ 37 C.F.R. § 1.97(b).
This information disclosure statement is filed either (1) within three months of the filing date of a national application other than a continued prosecution application under 37 C.F.R. § 1.53(d); (2) within three months of the date of entry of the national stage as set forth in 37 C.F.R. § 1.491 in an international application; (3) before the mailing date of a first Office action on the merits; (4) concurrently with the filing of a request for continued examination under 37 C.F.R. § 1.114; or (5) before the mailing of a first Office action after the filing of a request for continued examination under 37 C.F.R. § 1.114, whichever event occurs last.

Accordingly, this information disclosure statement requires no fee and no certification.

☐ 37 C.F.R. § 1.97(c).
This information disclosure statement is filed after the period specified in 37 C.F.R. § 1.97(b), but before the mailing date of any of (1) a final action under 37 C.F.R. § 1.113; (2) a notice of allowance under 37 C.F.R. § 1.311; or (3) an action that otherwise closes prosecution in the application.

Accordingly, this information disclosure statement requires either the fee specified in 37 C.F.R. § 1.17(p) for submission of an information disclosure statement under 37 C.F.R. § 1.97(c), or a statement under 37 C.F.R. § 1.97(e).

☐ 37 C.F.R. § 1.97(d).
This information disclosure statement is filed after the period specified in 37 C.F.R. § 1.97(c) since a:

☐ final action under 37 C.F.R. § 1.113

☐ notice of allowance under 37 C.F.R. § 1.311

was mailed to the Applicant on _____.

Accordingly, this information disclosure statement requires the fee set forth in 37 C.F.R. § 1.17(p) to consider an information disclosure statement under 37 C.F.R. § 1.97(d), and a statement under 37 C.F.R. § 1.97(e).

If this statement crosses in the mail with an Office action, or is otherwise not in the indicated category of 37 C.F.R. § 1.97, it is respectfully requested that this statement be treated in the next appropriate category and made of record. To the extent required, please treat this paper as a conditional petition for acceptance of the information disclosure statement.

II
FEES

Any required fee is being paid as indicated below:

☒ No fee is due.

☐ The fee specified in 37 C.F.R. § 1.17(p) for submission of an information disclosure statement under 37 C.F.R. § 1.97(c) or (d) is due.

☐ This fee is paid by credit card.

☐ Please charge the required fee to Deposit Account No. 505063.

☒ The Commissioner is hereby authorized to charge any additional required fees or credit any overpayments associated with this information disclosure statement to the account.

III

CERTIFICATION

Pursuant to 37 C.F.R. § 1.97(e), I state as follows:

☒ No statement is necessary.

☐ Each item of information contained in this information disclosure statement was first 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 information disclosure statement. 37 C.F.R. § 1.97(e)(1).

☐ No item of information contained in this information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to my knowledge after making reasonable inquiry, no item of information contained in this information disclosure statement was known to any individual designated in 37 C.F.R. § 1.56(c) more than three months prior to the filing of this information disclosure statement. 37 C.F.R. § 1.97(e)(2).

Pursuant to 37 C.F.R. § 1.704(d), I state as follows:

☐ Each item of information contained in this information disclosure 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 37 C.F.R. § 1.56(c) more than thirty days prior to the filing of this information disclosure statement.

IV
FOREIGN LANGUAGE REFERENCES

Pursuant to 37 C.F.R. § 1.98(a)(3)(i), any information disclosure statement filed under 37 C.F.R. § 1.97 shall include a concise explanation of the relevance, as it is presently understood by the individual designated in § 1.56(c) most knowledgeable about the content of the information, of each patent, publication, or other information listed that is not in the English language. The concise explanation may be either separate from the specification or incorporated therein. In compliance with the rules, the Applicant states as follows:

☐ No concise explanation is required since all cited references are in English.

☐ A concise explanation of the relevance of one or more foreign language references is attached.

☐ According to the procedural policy adopted by the PTO with regard to disclosure requirements, the Applicant is satisfying the disclosure requirement pursuant to MPEP § 609.04(a)(III) by submitting herewith the following:

- ☐ English language versions of any non-English language documents.
- ☐ English language versions of one or more search reports or other actions by one or more foreign patent offices in one or more counterpart foreign applications, which indicate the degree of relevance found by the foreign office(s).
- ☐ Pursuant to 37 C.F.R. § 1.98(a)(3)(ii), a copy of a translation is not submitted herewith because a written English-language translation of a non-English-language document, or portion thereof, is not within the possession, custody, or control of, or is readily available to any individual designated in § 1.56(c).

The Applicant has not analyzed these documents and, therefore, declines to comment on their relevance at this time.

☐ One or more English language abstracts for the non-English language references are also enclosed.

V
REMARKS

It is respectfully requested that:

(1) The Examiner sign the enclosed Form to evidence that the cited information has been fully considered by the Patent and Trademark Office during the examination of this application; and

(2) The citations for the cited information be printed on any patent that issues from this application.

The submission of this information disclosure statement by the Applicant shall not be construed as a representation that a search has been performed or that no other material information under 37 C.F.R. § 1.56 exists. See 37 C.F.R. § 1.97(g).

The submission of this information disclosure statement by the Applicant shall not be construed as an admission that any information cited or referred to herein is, or is considered to be, material to the patentability of one or more of the pending claims in this application pursuant to 37 C.F.R. § 1.56(b), unless specifically designated by the Applicant as such. See 37 C.F.R. § 1.97(h).

The submission of this information disclosure statement by the Applicant shall not be construed as an admission that any information cited or referred to herein is, or is considered to be, or even qualifies as "prior art" under 35 U.S.C. § 102 with respect to this invention, unless specifically designated by the Applicant as such.

Notwithstanding any statements by the Applicant, the Examiner is urged to form his or her own conclusion regarding the relevance of the cited information.

VI
CONCLUSION

The Examiner is encouraged to contact the undersigned attorney to discuss any questions concerning this information disclosure statement or any of the information cited or referred to herein.

Respectfully submitted,

Date: December 27, 2011

/JCS/

Jonathan C. Siekmann
Registration No. 58,259
USPTO Customer No. 83579
Level 3 Communications, LLC
1025 Eldorado Blvd.
Broomfield, Colorado 80021
Tel: 720-888-2140
Fax: 720-888-5619

Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Complete if Known	
Application Number	12/978,537
Filing Date	Dec 24, 2010
First Named Inventor	Paul E. Stolorz
Art Unit	2447
Examiner Name	Joon H. Hwang

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Examiner Initial *	Cite No	Document Number	Publication Date	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or RelevantFigures Appear
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(57) Abstract

A domain name server (DNS) system for processing domain name requests includes a query mechanism constructed and adapted to obtain a user request for response information corresponding to a particular domain name; and provide complete response information in a single response to the user request. The user request may be a domain name resolution request and the query mechanism provides an Internet Protocol (IP) address corresponding to the domain name. A different response may be provided, depending on context information. The system may include an Internet protocol processor and an underlying database repository. The system incorporates a database layout and associated database query strategy that may comprise multiple components which significantly reduces the transaction processing time and overhead as compared to conventional implementations.

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SCALABLE AND EFFICIENT DOMAIN NAME RESOLUTION

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BACKGROUND

1. FIELD OF THE INVENTION

This invention relates generally to enhanced domain name servers, and more particularly, to efficiently processing domain name queries in a network such as the Internet.

2. BACKGROUND

The Internet has brought about an information revolution through the development of computerized information resources, on-line services and the World Wide Web (WWW). The Internet is growing rapidly, with an ever increasing number of computers and users being connected to the Internet daily.

In order for devices (computers, printers, and the like) on a network such as the Internet to be able to communicate with each other, the devices need to know (or be able to determine) each others' addresses. Many distributive systems (e.g., the Internet) assign device names in the distributive system by a hierarchical naming scheme known as domain names. An Internet domain name is generally a sequence of domain labels separated by periods. For example, "a.ultradns.com" is a domain name where "com" is a top level domain name of a top level domain, "ultradns" is a

second level domain name of a second level domain and "a" is a third level domain name of a third level domain. A device in a domain is labeled by the name of the device followed by the domain name. Thus, a device labeled "server" in the "a.ultradns.com" domain has the name, "server.a.ultradns.com". A device name is also referred to as a domain name. The Domain Name System (DNS) is a distributed hierarchical database comprised of client/server transaction servers that provide a mapping from domain names to associated information, e.g., to IP addresses.

While domain names partition a distributive system in a logical and hierarchical manner, messages are transferred between devices of the DNS by identifying devices using specific IP addresses. In the present Internet protocol, IP addresses are thirty-two-bit numbers that are expressed as four eight-bit values (i.e., four numbers in the range 0 to 255) separated by periods, e.g., "121.121.122.2". IP addresses contain information such as a network identifier ("ID") of a device network connection and a device ID. IP address are assigned by an address authority. The addresses are assigned in blocks to authoritative address servers.

A comprehensive description of the operation of domain name servers and IP addresses is given in *DNS and BIND In A Nutshell,* Paul Albitz and Cricket Liu, O'Reilly & Associates, 1994, ISBN: 1-56582-010-4, which is incorporated herein by reference.

IP addresses also relate to each other in a hierarchical manner. Thus, the DNS also provides a "reverse mapping" of IP addresses to domain names, by using a representation of the IP address that follows the DNS indexing model. However, the domain name hierarchy and the IP address hierarchy are not directly related to each other. While some name servers are also address servers, name and address servers do not have to be the same device. Thus, it is possible for a server to have authority to

resolve a domain name into a corresponding IP address of a device, the same name server may not be able to resolve the IP address to the corresponding domain name of the same device. Thus, resolution of IP addresses to domain names follows a similar process as resolving domain names to IP addresses except different servers may be involved.

Because IP addresses are numerical and, unlike domain names, are assigned without regard to the logical and hierarchical organization of the DNS, domain names are generally used in instructions for functions such as data transfers. Thus, a data transfer instruction identifies the receiving device by its domain name. However, the domain name must be translated into a corresponding IP address before the data transfer can occur.

Domain names are managed by authoritative devices called name servers. That is, domain name servers perform the task of converting names to IP addresses. Name servers translate domain names into corresponding IP addresses and vice versa. When a first device desires to transfer a message to a second device known only by its domain name, the first device must query a name server to acquire the corresponding IP address to the known domain name of the second device.

It is estimated that by the year 2003, the number of domains on the Internet will increase ten-fold, exceeding 150 million domains. Associated with this increase in the number of domains will be an increase in user dissonance. Current implementations of the Domain Name System are entirely inadequate and unable to handle resultant DNS files' size or the magnitude and frequency of changes to these DNS files. Even today, real problems exist with content access and/or content distribution over the Internet. It is estimated that ten to thirty percent of Internet connection events are unsuccessful or unsatisfactory.

SUMMARY

The present invention provides a scalable and flexible platform for providing global directory services. In some embodiments, the invention uses redundant information servers to provide ubiquitous and high-performance access to directory services. This system of servers leverages the scalability and replication mechanisms provided by commercial database software. The DNS according to the present invention has an underlying modular design which allows additional wire-protocol services to be easily incorporated into the system, and allows additional modules to provide intelligent/dynamic responses by affecting changes in the data repository.

In various aspects, the present invention:

- Supports large-scale service model better than alternative DNS servers.
- Integrates other Internet services, e.g. "whois", in a single data repository.
- Multi-threaded server provides scalability to exploit commercial-level hardware.
- Modular database implementation facilitates the addition of new features.
- Database replication provides for ease of management of distributed servers, and database backup features provide information integrity.

Globally distributed server replicas provide the reliability, throughput and low delay required to scale a large commercial service. The servers are tied together using advanced Internet routing mechanisms that are reactive to the state of individual server replicas.

Multiple servers provide increased system throughput, reliability in the event of server failure, reliability in the event of provider network failure and nearest server mechanics serve as basis for advanced redirection service.

Embodiments of the present invention provide a DNS system based on an information-centric design, where multiple system components interact with system state that is maintained in the database. The database provides both the principle Internet information, and the required associations and configuration to specify the operation of the active components. The system allows for reduced operational staff requirements by supporting custom user-interface for direct management of user data, with integrated security and data validation to maintain data integrity.

The present invention also provides:

- Information update via multiple user-specific custom interfaces, program APIs, or Internet services such as dynamic DNS updates.
- Fine-granularity security based on association between login and information objects.
- Modular active components for reporting, billing and data integrity checking.

In one aspect, this invention provides a system for processing domain name requests. The system includes a query mechanism constructed and adapted to (a) obtain a user request for response information corresponding to a particular domain name; and (b) provide complete response information in a single response to the user request. The user request may be a domain name resolution request, in which case the query mechanism provides an Internet Protocol (IP) address corresponding to the domain name. The system accommodates user requests for other typed DNS data.

In some embodiments the a query mechanism is further constructed and adapted to provide the response depending on context information. The context information may include at least one of (a) context information from the request; (b) context information from the system; and (c) global context information.

The context information may include address information indicating an address of the user; the local time; and/or the location of the system.

In some embodiments, the system has a data cache and the query mechanism is further constructed and adapted to, upon receipt of a user request, first attempt to find an answer to the user request in the data cache.

In some embodiments, the query mechanism is further constructed and adapted to (a) if the answer exists in the data cache and the answer is fresh, send the answer directly from the cached data; and (b) if the answer exists in the data cache and the answer is stale, or if the answer does not exist in the data cache, then acquire the answer from a database; send the answer; and update the data cache to reflect the acquired answer.

Sometimes items in the data cache have a maximum lifetime which ranges from the time to live of the lowest resource record in a complete answer to the maximum cache time value configured for the system as a whole.

In some embodiments, the query mechanism is further constructed and adapted to implement negative caching such that if a request is made for a host that does not exist in an active domain, the negative response will be saved in the cache.

In another aspect, this invention is a method of providing an Internet Protocol (IP) address of one of a plurality of devices on the Internet. The method includes obtaining a user request for an IP address corresponding to a particular domain name; and providing the IP address in a single response to the user request. The method may include providing the IP address depending on context information. The context information may include at least one of (a) context information from the user request; (b) local context information; and (c) global context information.

In yet another aspect, this invention is a system comprising a network of distributed Domain Name Servers (DNSs), each DNS comprising a database; and a query mechanism constructed and adapted to obtain from the database a user request for response information corresponding to a particular domain name; and to provide complete response information in a single response to the user request. The databases in the network are replicated.

BRIEF DESCRIPTION OF THE DRAWINGS

The objects and advantages of the invention will be apparent upon consideration of the following detailed description, taken in conjunction with the accompanying drawings, in which the reference characters refer to like parts throughout and in which:

FIGURE 1 provides an overview of embodiments of the present invention operating within the Internet; and

FIGURE 2 depicts the logical structure of the database schema according to embodiments of the present invention.

DETAILED DESCRIPTION

With reference to **FIGURE 1**, a Domain Name System (DNS) server **100** (DNS_1) according to the present invention comprises a database **102** having a unique database schema and a complementary unique SQL interface **104**. A query mechanism **106** uses the SQL interface **104** to query the database **102** and to return results to requesting users, e.g., user **108**.

The present invention can be considered at two levels, namely at a server level (e.g., *DNS*$_1$ **100**) and at a system level (e.g., *DNS*$_1$, *DNS*$_2$, ..., *DNS*$_n$).

1. **Server-level**: At the server level, this invention provides mechanisms that enable a DNS server (e.g., *DNS*$_1$ **100**) according to the present invention to

achieve sufficient performance (circa thousands of queries/second) even though the underlying data repository supports basic data retrieval at a rate of hundreds of queries/second.

Features of this server level, discussed below in detail, include:

- Aggregate database queries
- Common case optimizations
- Data caching (and consequently-required cache invalidation mechanisms)

2. **System-level**: At the system level, this invention provides mechanisms that enable a system of DNS servers (e.g., DNS_1, DNS_2, ..., DNS_n in **FIGURE 1**) to provide enhanced/integrated management of information, and provides various levels of performance enhancement for incoming queries and internal transactions.

Features of this system level, discussed below in detail, include:

- Modular data-centric design
- Database-layer synchronization
- Single IP address announcement of replicated servers

The server-level mechanisms according to the present invention enable the DNS server to achieve a greater transaction throughput rate. The system-level mechanisms work synergistically, and allow the DNS System according to the present invention to provide a diverse set of features and benefits.

The server-level mechanisms according to the present invention enable the modular data-centric design and database-layer synchronization.

SERVER-LEVEL MECHANISMS

A name server response to a DNS query requires a complex set of calculations that allow:

(a) different responses to be returned depending on the servers authority,

(b) different answers depending on the existing domain name data, and

(c) the server to return an answer comprised of multiple inter-dependent sections.

Specifically, a DNS's response algorithm must consider at least the following:

- Three response sections: *Answers*, *Authority*, and *Additional*
- CNAME (domain name alias) dereferencing
- Wild card matching (matching of leading superstrings)
- Iterative domain name search (matching the longest recognized domain name)

Conventional (prior art) DNS servers make many distinct queries to the data repository in order to determine the correct records to include in a response. Consequently, the transaction rate of the DNS server will be reduced by a similar factor (e.g., if eight database queries are required, transaction rate will be reduced by approximately a factor of eight). The DNS server according to the present invention significantly reduce the average number of queries required to construct a DNS response, as compared with conventional so-called "straight forward" algorithms that depend on many distinct queries to the data repository.

Aggregate Database Queries

The DNS server according to the present invention uses compound database queries so that a single query can return multiple component records required to construct a DNS response. Moreover, database queries are correlated so that in instances where multiple queries are required, subsequent queries can be optimized

based on records retrieved by earlier database queries. The DNS query strategy according to the present invention:

(a) retrieves combinations of *Answer*, *Authority*, and *Additional* records in a single query,

(b) retrieves available CNAME records along with *Answer/Authority/Additional* records, and

(c) reduces iterative domain name search overhead by correlating records from different iterations.

With this invention, the number of database queries required to construct a complete DNS response can be as low as one. This is a considerably improvement when compared to a similar strategy based on simple database queries that would require a separate query for each of *Answers* and *Authority*, and multiple queries for *Additional* records.

Common Case Optimizations

In general, common case optimizations are effective in systems where there are a number of distinct potential outcomes (a) with different probabilities of occurrence, (b) requiring varying levels of incremental overhead, and (c) where a determination can be made that a specific outcome has been reached, without an exhaustive outcome analysis.

The present invention recognizes that common case optimization is applicable to the DNS server database query strategy, and has identified two specific optimizations based on knowledge of DNS protocols and the expected incoming query stream. The DNS system according to the present invention implements these optimizations by making the test for (and handling of) each case a separate code segment, and promotes this code to handle the task prior to the execution of any general query code.

Case #1:

The DNS server according to the present invention contains authoritative answer for a domain name query that is one label longer than the zone's domain name (e.g., with a zone name of "*foo.com*", then an optimization is effective for "*www.foo.com*" but not for "*www.mkt.foo.com*").

Case #2:

The DNS server according to the present invention has delegated the next-level subdomain name (e.g., the incoming query is for the domain name "*www.mkt.foo.com*", which is in the zone "*foo.com*", then the optimization is effective if the "*mkt.foo.com*" zone has been subdelegated).

The use of these specific optimizations does not preclude the development of additional optimizations. The fundamental realization and requirements remain unchanged, allowing common case optimizations to be applied to outcomes based on revised outcome probabilities.

Specifically, further common case optimizations specified rely on restrictions on the records in the database to guarantee the validity of the query response. For example, a generalization of *Case #1* (above) that optimizes for arbitrary length domain name queries (e.g., the incoming query is for the domain name "*www.unit.mkt.foo.com*" within the zone for "*foo.com*"). This case can be optimized if no conflicting records are present, i.e., any record that could alter the precedence made for the optimization case (e.g., an intervening NS record or wildcard record associated with the domain name "*mkt.foo.com*" would have an impact on the above example of "*www.unit.mkt.foo.com*" in zone "*foo.com*").

Additionally, the DNS query strategy according to the present invention allows for flexible/dynamic optimization code to be constructed, where, e.g., a

specific ordering of individual common case optimizations is associated with each zone, based on prior knowledge or statistics maintained about each zone. This technique can be applied so that the best strategy is selected at the granularity of each zone, each server, or any identifiable class of query stream.

Data Caching and Cache Invalidation

Dynamic data caching is a mechanism that has been applied to achieve performance in many types of systems, but has never before been use to provide a fast-access data repository of authoritative data within an Domain Name Server.

The Domain Name System was designed with an integrated "time to live" (TTL) caching mechanism, and we note three example applications of caching elsewhere within the Internet and Domain Name System.

- Applications such as web browsers frequently maintain copies of DNS records obtained while processing HTTP requests, and use applicable DNS records for subsequent requests. This use of caching does not maintain authoritative data, nor does it directly effect the operation of a DNS server.
- Caching DNS servers (also known as recursive servers or "helper" servers) provide a separate function from "hosting" DNS servers. Recursive servers act on the behalf of an application (e.g., a user's web browser) and query a hierarchical series of hosting DNS servers to obtain the required DNS response. Information obtained in the course of a DNS query resolution may be maintained and used to expedite subsequent DNS queries, until each record's specified time-to-live has expired. This is a fundamental use within the DNS, but only addresses the behavior of non-authoritative servers when handling authoritative data.

- Conventional primary DNS servers (e.g., as embodied by the "bind" server distribution) read all authoritative domain information into a computer memory directly from files, and answer queries based on a complete memory-resident copy of all domain information. Unlike the above caching examples, this is not an application of dynamic caching, but is a static copy of DNS information that does not change or replace based on well-known caching criteria such as frequency of use, nor does it embody any dynamic mechanisms for maintaining cache consistency. There is no dynamic mechanism for a "cache miss" that involves the standard alternative method of making a backup query to the primary (i.e., non-cache) repository.

According to embodiments of the present invention, the DNS server maintains an internal dynamic cache of recently-used authoritative DNS records taken from the database repository. Two embodiments are specified: (1) where individual resource records are cached separately and subsequent DNS response are comprised of the individual records, and (2) where the entire response to a DNS query is cached as an aggregate and are immediately available for a subsequent response, eliminating overhead required to construct a complete response. The strategy for handling incoming DNS queries includes an examination of the internal cache for efficient access to data, and if not available, a subsequent query to the primary data repository (database) is made. These mechanisms are used for both "positive caching," i.e., when the data exists, and "negative caching," i.e., when the server can authoritatively respond that the information does not exist.

The DNS server according to the present invention also embodies cache replacement mechanisms to control the amount of "stale" (infrequently used) data in the cache, and to allow for effective utilization of cache and system resources.

Multiple embodiments exist to remove DNS data from the cache based on frequency or timeliness of use.

Cache Invalidation

A dynamic caching system must employ cache invalidation mechanisms to guarantee that information in the cache corresponds to the state of the primary data repository. This requires that data items are removed from (or replaced within) the cache when the corresponding information is changed within the primary data repository. This allows a DNS server according to the present invention to accurately reflect the correct information within the system.

The DNS server according to the present invention are embodied by a number of related cache invalidation mechanisms that address the complete range of transaction types that can be performed on the primary data repository, and the type of cache data that can be maintained in the system. The design space that defines the cache transactions of interest is represented by the Table below which specifies twenty four different cache invalidation transactions that can be addressed by the invention's cache invalidation strategy. Note that not every space need be addressed by a particular embodiment of the invention, and that some cache invalidation mechanisms will address multiple invalidation requirements.

	Record Cache	**Query Cache (*Answers*)**	**Query Cache (*Authority*)**	**Query Cache (*Additional*)**
Delete from Primary Dbase	Positive -vs.- Negative	Positive -vs.- Negative	Positive -vs.- Negative	Positive -vs.- Negative
Addition to Primary Dbase	Positive -vs.- Negative	Positive -vs.- Negative	Positive -vs.- Negative	Positive -vs.- Negative
Modify within Primary Dbase	Positive -vs.- Negative	Positive -vs.- Negative	Positive -vs.- Negative	Positive -vs.- Negative

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Addition to Primary Dbase	Positive -vs.- Negative	Positive -vs.- Negative	Positive -vs.- Negative	Positive -vs.- Negative
Modify within Primary Dbase	Positive -vs.- Negative	Positive -vs.- Negative	Positive -vs.- Negative	Positive -vs.- Negative

Multiple invalidation mechanisms can be applied together, so that each addresses a subset of the potential cache interactions and requirements. Further, these mechanisms can embody varying criteria for timeliness of data invalidation, according to the importance assigned to each subset. For example, when caching entire DNS responses the data within an Answer section may be considered more critical than the data within an *Authority* section. In this case, mechanisms can be employed that immediately respond to updates to information in the Answer section, while other less timely mechanisms will eventually invalidate the records within the *Authority* section.

SYSTEM-LEVEL MECHANISMS

The system-level mechanisms according to the present invention work synergistically, enabling the DNS System according to the present invention to provide enhanced/integrated management of information, and to provide a range of performance enhancement for incoming queries and internal transactions.

- Modular data-centric design
- Database-layer synchronization
- Single IP address announcement of replicated servers

Modular Data-Centric Design

The DNS domain name server according to the present invention (e.g., DNS_1 **100** of **FIGURE 1**) separates the functionality of the standard monolithic Internet server into two distinct components: a commercial database system as the data repository, and a DNS wire-protocol server designed to answer queries based on authoritative DNS data from the database component. This architectural choice

provides for a clean modular design, which in turn provides a flexible and scalable platform that is leveraged to provide a diverse set of features and inventions.

- Data-Centric Modeling and Functional Server Module Extensions—The two-component design allows for modular extensions to both the data model, and the functions (e.g., servers) that operate on the system. Embodiments of this invention include, but are not limited to, one or more user interfaces for data management, transaction processors to provide an extensible API for data management, Internet system monitors that can query external system status (e.g., webserver availability) and affect changes to the data repository, and servers for other Internet directory servers (e.g., *whois, radius*, etc).
- Integrated Access Control Mechanisms—Using a database repository for DNS information allows several principle objects (e.g., users and other network data schemas) to be modeled and managed. A significant feature of the DNS Domain Management System according to the present invention is the ability to control and delegate the many-to-many access patterns of users accessing domain name data.
- Query and Context Specific Responses—Conventional (prior art) DNS servers take as input a <*domain name, query type, query class*> tuple, and return the appropriate resource records. The DNS system according to the present invention has revised the basic query/response transaction by incorporating additional fields within the data model such that the response to a query can be based on additional criteria. These criteria can be comprised of information obtained from the incoming query (e.g., source IP address), information available to the local server (e.g., time of day or server identity), and similar context or query specific information.

- Dynamically Configurable DNS Record Types—The DNS server according to the present invention allows new resource record types to be defined, and immediately incorporated into the system. Based on resource record templates included in the data model, the DNS server according to the present invention system can incorporate new record types in minutes without additional low-level code development. This is in contrast to the conventional (prior art), where deployment of a new resource record type requires considerable low-level program design and coding, and requires a new server binary be deployed on all applicable machines. Moreover, combined with context specific responses (above), domain administrators may define their own "local" types that are specific to the answers returned for their DNS domain.
- Ability to deploy and maintain a state-of-the-art data management service based on commodity implementations of core database technologies. The conventional (prior art) systems for Domain Name System management deploy integrated ad-hoc implementations of database technology, which lag advanced database features and make it difficult to deploy new features based on database technology advances.

Database-Layer Synchronization

The DNS system according to the present invention maintains data consistency between multiple redundant servers (e.g., DNS_1, DNS_2, ..., DNS_n in FIGURE 1) by propagating changes to the managed data using database-level transaction processing. This has advantages over conventional (prior art) consistency mechanisms, which are based on application-level transactions. These advantages include:

- Virtually immediate propagation of changes to Domain Name System information. This is particularly important when inaccurate information must be corrected, or when critical domain information changes frequently and changes must be visible quickly. For example, one of the most frequently changed zones, ".COM", also has the greatest number of records. Using conventional (prior art) systems, ".COM" has historically been restricted to a twelve-hour periodic updates. Using the DNS system of the present invention, changes to ".COM" are routinely propagated within 5-15 minutes.
- Ability to accept and propagate changes to Domain Name System information from multiple servers, and consequently, the ability to make data management more reliable with better system availability and performance. This is in contrast to conventional (prior art) DNS systems, which do not have the conflict resolution mechanisms required to support multiple sources of update transactions.

Single IP Address Deployment for Replicated Servers

Globally distributed server replicas (e.g., DNS_1, DNS_2, ..., DNS_n) provide the reliability, throughput and low delay required to scale a large commercial service. The servers are tied together using advanced Internet routing mechanisms that are reactive to the state of individual server replicas. In preferred embodiments, each DNS system according to the present invention shares a common IP address and supports a name server replica. The shared IP addresses are injected into the Internet routing mesh by each server so that Internet routers will direct IP packets to the nearest topological server. Each server replica is monitored for correct behavior, and the IP route is withdrawn if the server no longer responds to DNS queries. This mechanism provides the following benefits:

- User DNS queries are directed to the nearest DNS replica minimizes the delay experienced for DNS resolution.
- Transitory server and network failures are transparent to a user's DNS query and application transaction. Servers that are not reachable or functional are invisible, and DNS queries arrive at the nearest functional server without experiencing the delay for standard DNS timeout and retransmission.
- The DNS system acquires user proximity information based on the server replica that receives the user DNS query. This information can be used to provide proximity based responses to direct users to nearby application servers.

IMPLEMENTATION

THE DATABASE

This section describes the unique database schema of the database **102**.

OVERVIEW

The database **102** according to preferred embodiments of this invention is organized and structured according to the following unique database schema. The database schema involves fourteen (14) tables. Only three (3) of these tables contain actual data (i.e., DNS & Contact), the other eleven (11) tables are needed to manage the data. The schema allows management of who has access to which data, how can they access it, who can create new data, and how they should be billed for use of the system.

The data managed by the DNS Server **100** is (a) contact information, (b) zone information, and (c) resource record information. Although zones and resource records are related, the system must have the ability to manage them distinctly. The

reason for this is to enable targeting different users, some of which want to use the Server **100** to manage an entire zone for them, and some of which will just enter individual resource records (in a particular zone).

For any data that can put in the system, there are two access control mechanisms involved: (1) a mechanism that specifies whether the item can be put in (created) in the system, and (2) a mechanism that specifies how items can be accessed.

TABLE LIST & SUMMARY

Table Name	Description
LOGIN	User information (to establish identity on the system)
SYS_MGMT	Describes how the DNS system is managed (e.g., who can create new zones, billing policy, etc)
RRJUMBO	combined Resource Record (RR) index and data.
CONTACT	people/role/organization (like whois)
CONTACT_ASSOC	indicates association between contact information, and other data/items (e.g., zones or RRs)
ZONE	basic mgmt information for a related set of DNS RRs
ZONE_INTERFACE	list of "outside" servers the system must talk to primaries/masters OR secondaries we update)
ZONE_CNTL	much like information in SOA record
ZONE_MGMT	zone owner describes how zone may be used (e.g., who can create new RRs, billing policy, etc)
ZONE_SERVERS	maintains list of which zones in system, and which IP addresses can do zone transfer
RR_MGMT	indicates logins that can modify specific RRs (Resource Records)
BillingPolicy	rules/policy owners set for billing others for use
BillingInfo	actual billing information for a particular object (derived from owners BillingPolicy)
USAGE_HISTORY	contains past usage data (to answer billing concerns)

Table Name	Description
IPV4RANGE	restricts (or allows) access per source IP address

TABLE SCHEMA

This section describes what information is in the tables and, in some cases, gives the formats and sizes of the data used in some embodiments of the present invention.

The LOGIN table describes identity within DNS system of the present invention. The table includes information on how to authenticate a user to system. The LOGIN Table is established via login/password, X.509, PGP, DNSSec, etc.

The following table summarizes the fields of the LOGIN table.

LOGIN		
Field	**Description**	**Relationship to other Tables**
Id	internal dbase index/pointer	appears in other tables indicating this users has some claim/access to the object
Email	contact information	
Ipaddr	restrict logins to specific IP range	index to IPV4RANGE table
x509id	ID for primary authentication method	
Username	backup login name	
Password	backup password	
Passques	user-supplied question for lost information	
Passansw	user-supplies answer for lost information	

The SYS_MGMT table (described below) provides a template about use, access, etc. It provides information about how the system is managed; who can access, modify, create new "objects", and information on how users are charged for

access. The SYS_MGMT table allows the DNS according to the present invention to be deployed in different ways (e.g., closed access at large companies versus open ISP access). Some preferred embodiments allow deployment of two object types to be created, namely contacts and zones. Both can be created by anyone. Contacts can be created at no charge; zones may or may not incur charges (perhaps per-user).

SYS_MGMT		
Field	**Description**	**Relationship to other Tables**
Objtype	what type of objects can be created	
Access	type (create or read)	
Login	(loginid OR "ANY")	ID in LOGIN table about who can create
Ipaddr	restrict/grant access by IPsrc Addr	
Billing	specifies how to charge for access	index into BILLING table

The RRJUMBO table represents DNS resource record (RR) information. This table is for the "index" or "lookup" of the incoming query, and contains columns for different parts of RR data section. Resource records are defined in RFC 1035 [Network Working Group Request for Comments: 1035, P. Mockapetris, ISI, November 1987] which is incorporated herein by reference.

RRJUMBO		
Field	**Description**	**Relationship to other Tables**
Id	internal dbase ID	referenced by other tables
Active	indicates RR is "active" (e.g., paid for)	
Dead	indicates "machine" inactive	
Zone	zone membership identifier	indicates RR associated with ZONE table
Dname	domain name (e.g., "www.ultradns.com")	
Lname	Lower case Dname to optimize lookups	
Type	RR type	
Class	RR Class	

RRJUMBO		
Field	**Description**	**Relationship to other Tables**
Servers	indicates which server return particular RR	
Time	Indicates time frame RR is returned	
ipv4addr	index into IPV4RANGE Table	index into IPV4RANGE table (to specify per IPaddress RRs)
ip_low	simple (hi-performance) IP source address specification	
ip_high	simple (hi-performance) IP source address specification	
ip_bits	simple (hi-performance) IP source address specification	
Create_who	login ID of record creator	indicates record created by LOGIN table
Create_ip	IP address of creator (if anonymous)	
Create_date	when created	
Update_who	login ID last modify	login id of last update
Update_when	last modified time	
Billing	index to BillingInfo	billing information associated with RR
Readcnt	recent RR reads	
Readsince	start time of read count	
Writecnt	recent RR changes	
Writesince	start time of write count	
Ttl	Resource record TTL (time to live) (seconds)	
f1	RRdata field #1	
F2	RRdata field #2	
F3	RRdata field #3	
F4	RRdata field #4	
F5	RRdata field #5	
F6	RRdata field #6	
F7	RRdata field #7	
F8	RRdata field #8	
refl	dname reference for "additional" RRs	

A "DNS lookup" in the RRJUMBO table uses (matches against) the following six values to find the requested DNS resource record:

1. domain name (from dns query packet)
2. dns type (from dns query packet)

3. dns class (from dns query packet)
4. server id (name/id of server answering query)
5. time (current time of day at server)
6. source IP address (from the IP packet)

Note that the use of the RRdata fields, f1 ... f8, depends on the type of RR (e.g., MX records will use f1 and f2, A records will only use f1, and SOA records will use f1 - f7).

The RRJUMBO table is used to store data for multiple purposes: in addition to storing "live" domain records, "template" records are stored which embody the mechanism to provide configurable DNS records. Each DNS Resource Record type is represented by one or more template records in the RRJUMBO table which specify the format and structure of each record type.

The CONTACT Table contains information about a person, role, or organization (i.e., this is basically "whois" information). Note that the information in the CONTACT Table has nothing to do system login.

CONTACT		
Field	**Description**	**Relationship to other Tables**
Id	Internal dbase index	referenced by other tables
Order	Sequence information for related records	
Type	name, phone, fax, email, etc. (see list below)	
Information	Associated information (e.g., name: Steve Hotz)	
Anonacl	read permission for field (e.g., do not give out phone number)	
ipaddr	IP address based read restrictions/permissions	index into IPV4RANGE Table

The TYPE values for above "type" field (similar to RIPE-181) include:

- name

- email
- email-alt
- phone
- phone-alt
- fax-no
- nic-hdl
- nic-hdl-alt
- address (multiple-line text string)
- source (in case information came from another place)
- date-create
- date-update

The CONTACT_ASSOC Table indicates association between contact information, and other data/items (e.g., zones or RRs)

CONTACT_ASSOC		
Field	**Description**	**Relationship to other Tables**
Id	name/id of object (e.g., "ultradns.com".)	internal identifier of DNS data item (e.g., contact, zone, or RR)
Objtype	{system, zone, record}	
contact	id of CONTACT information	
Type	{admin, tech, billing, registration}	
Public	{yes, no} read access for general public	

The ZONE table basic information about a group of related RRs.

ZONE		
Field	**Description**	**Relationship to other Tables**
Zone	Name of the zone (e.g., "ultradns.com")	Every column in this table relates to other tables.
Owner	LOGIN id of zone owner	
Billing	How this zone is billed (BillingInfo)	
zonecntl	ZONE_CTRL id for internal consistency	

The ZONE_INTERFACE Table specifies external servers (i.e., servers that are not embodiments of the present invention) that must either be used as primary/master, or updated as secondary/slave.

ZONE_INTERFACE		
Field	**Description**	**Relationship to other Tables**
Zone	zone being updated/transferred	refers to zone name in numerous tables
inout	{in, out}	
srvname	name of server	
Srvip	IP address of server	
ctrl	ZONE_CTRL id for record controlling frequency	reference into ZONE_CTRL table
view_ip	if multi-dimension records, snapshot this IP	
view_time	if multi-dimension, snapshot at this time	
view_srv	if multi-dimension, snapshot for server	

The ZONE_CNTL Table contains zone control information, similar to SOA parameters. This Table is used for database consistency (may not be needed with internal Oracle, however, can specify interface with external servers).

ZONE_CNTL		
Field	**Description**	**Relationship to other Tables**
Id	Internal Identifier	Referenced by other tables
Serial		
Refresh		
Retry		
Expire		
Mincache		
Flags	Notify turned on	

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The ZONE_MGMT table includes information about how a particular zone is managed; who can access, modify, create new "objects", and information on how the user is charged for access.

ZONE_MGMT		
Field	**Description**	**Relationship to other Tables**
Zone	zone being managed	relates several tables holding zone information
login	login ID with access (or "ANY")	LOGIN table for who has access

ZONE_MGMT		
Field	**Description**	**Relationship to other Tables**
ipaddr	source IP access restrictions	IPv4Range table for src address access
Billing	billing policy associated with access	index into BillingPolicy table
rrlist	bit map of RR types that can be created	
Mods	allow zone modifications: • can modify via dynamic update • modify all RRs • modify all contact information • modify zone information • modify zone_mgmt information	
Features	• Bit map of allowed features • define new types • create multi-dimensional • can create RRs that allow dynamic updates • can create new RRs using dynamic update • dead machine monitoring • other	
Flags	indicate other actions associated with update/access • indicating required per-record information (i.e., contact) • owner requires change notification (via email)	

The ZONE_SERVERS table is an auxiliary table listing zones for which the system is responsible. This table is used by servers to find zones for which they are authoritative.

ZONE_SERVERS		
Field	**Description**	**Relationship to other Tables**
Zone	Zone name	Zone name relates to multiple tables
Server	Server holding zone	
xferip	IPV4RANGE allowed zone transfers	IPv4Range index

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The RR_MGMT Table provides an access list for specific RRs.

RR_MGMT		
Field	**Description**	**Relationship to other Tables**
Rrod	Rrindex id	Every column (except flags) relates columns in other tables.
Login	Login allowed to change (or "ANY")	
ipaddr	src IP based access restrictions	
Flags	access allowed (initially, all or nothing)	

The BillingPolicy table (set by owner(s) of system or zone) contains information about how to bill for system use. The owner of system sets this up ahead of time, and the system enforces the various billing policies.

BillingPolicy		
Field	**Description**	**Relationship to other Tables**
billp_id	internal dbase index	referenced by other table columns
what	zone, contact, dname, RRtype(s), feature	
type	one-time, read, write, time, <feature_name>	
Unit	<count> for read/write day|week|month|year for time or feature	
Amt	Amount (in dollars)	
cnd_type	reads OR writes [must be greater than]	
cnd_unit	count [per]	
cnd_time	time unit (day|week|month|year)	
intro_time	days before billing starts	
period	yearly/monthly/choice	
year_discount	can offer (percentage) discount for yearly rate	

Each zone may specify more than one policy. For example,:

<what>	**<type>**	**<unit>**	**<amt>**	**<cond>**			
				Type	**>**	**Unit**	**Time**
Zone	1-time		29.99				
Zone	Time	Year	9.99				
Zone	Write	1	1.00	Write	>	10	Month

<what>	<type>	<unit>	<amt>	<cond>			
				Type	>	Unit	Time
Feature	Dyn_Upd	Month	1.99				

The BILLINGINFO Table contains information about who and when to bill for use.

BILLINGINFO		
Field	**Description**	**Relationship to other Tables**
billi_id	internal dbase index	referenced by other table columns
who_id	billing contact index	reference to CONTACT table
Method	Credit card, usmail, email	
billp_id	Reference to BillingPolicy table	
Credcard	credit card account	
expire	credit card expire date	
card_id	billing address for credit card (if different from who_id)	reference to CONTACT table
billp_id	index to Billing Policy record	
Create_date	when billing record was created	
next_date	next statement date	

The USAGE_HIST Table contains historical system/information usage information. Can attach to various objects: RRdata, Zone, Contact, etc. (Some preferred embodiments attach to RRs)

USAGE_HIST		
Field	**Description**	**Relationship to other Tables**
Id	internal dbase ID of object tracked	relates to id field of other tables
Objtype	RR/zone/contact/other	determines which "other table"
Access	read/write/other	
start	start of period (seconds since epoch)	
End	duration of period (e.g., in seconds)	
cnt	number of accesses	

Preferably use logging is (a) only turned on for some records, and (b) could be a "premium service". Must keep "current" usage for billing, but this feature is "turned on".

The IPv4Range Table contains CIDRized subnet masks, primarily used for address based (i.e., weak) authentication. This table is used for (a) handing out RRs based on srcipaddress, and (b) simple access control for updates to data (e.g., using dynamic updates as implemented).

IPv4Range		
Field	**Description**	**Relationship to other Tables**
Ipid	index of IP range spec	this table id serves as index, and appears in other tables (indicating whether access is allowed from specific source IP addresses
Flag	flag indicating allowed/prohibited	
bits	number of bits in mask	
Low	lowest address value	
High	highest address value	

Example

listid	**Flag**	**bits**	**iprangelow**	**Iprangehi**
#1	Prohibit	0	0x00000000	0xffffffff
#1	Allow	16	0x80090000	0x8009ffff
#2	Allow	0	0x00000000	0xffffffff
#2	Prohibit	16	0xa0070000	0xa007ffff
#2	Prohibit	16	0xa0090000	0xa009ffff
#3	Prohibit	0	0x00000000	0xffffffff
#3	allow	16	0xc9140000	0xc914ffff
#3	prohibit	24	0xc9142800	0xc91428ff
#3	prohibit	24	0xc9142a00	0xc9142aff

#1 allows small number of addresses;

#2 prohibits small number of addresses;

#3 allows all in range, with exceptions;

The following section provides the database field formats and sizes for a preferred embodiment of the present invention. Some of the fields have common sizes:

256 char == dnames
10 num == 32bit integers (e.g., IPv4addr and time in seconds)
14 num == internal identifier

LOGIN		
Id	num 14	
Email	vch 256	
Ipaddr	num 14	null-ok
x509id	vch 256	
Username	vch 64	
Password	vch 32	
Passques	vch 80	
Passansw	vch 80	

SYS_MGMT		
objtype	Vch 16	
access	Vch 16	
login	Num 14	
ipaddr	Num 14	null-ok
billing	Num 14	null-ok

RRJUMBO		
id	num 14	
active	num 1	
dead	num 2	
zone	vch 256	
dname	vch 256	
type	vch 16	
class	vch 16	
servers	vch 32	null-ok
time	vch 168	null-ok
ipv4addr	num 14	null-ok
ip_low	num 10	null-ok
ip_high	num 10	null-ok
ip_bits	num 3	null-ok
create_who	num 14	
create_ip	num 10	
create_date	num 10	
update_who	num 14	
update_when	num 10	
billing	num 14	null-ok
readcnt	num 8	null-ok

RRJUMBO		
readsince	num 10	null-ok
writecnt	num 8	null-ok
writesince	num 10	null-ok
TTL	num 10	
f1	vch 1024	
f2	vch 1024	null-ok
f3	vch 256	null-ok
f4	vch 256	null-ok
f5	vch 256	null-ok
f6	vch 256	null-ok
f7	vch 256	null-ok
f8	vch 256	null-ok
ref1	vch 256	null-ok

CONTACT		
id	num 14	
order	num 2	
type	vch 16	
info	vch 168	
anonacl	vch 8	null-ok
ipaddr	num 14	null-ok

CONTACT_ASSOC		
id	num 14	
objtype	vch 16	
contact	num 14	
type	vch 20	null-ok
public	vch 8	

ZONE		
zone	vch 256	
owner	num 14	
billing	num 14	null-ok
zonecntl	num 14	

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ZONE_INTERFACE		
zone	vch 256	
inout	vch 8	
srvname	vch 256	null-ok
srvip	num 10	null-ok
ctrl	num 14	
view_ip	num 10	null-ok
view_time	num 3	null-ok
view_srv	num 3	null-ok

ZONE_CNTL		
id	num 14	
serial	num 10	
refresh	num 10	
retry	num 10	
expire	num 10	
mincache	num 10	
flags	vch 8	null-ok

ZONE_MGMT		
zone	vch 256	
login	num 14	null-ok
ipaddr	num 14	null-ok
billing	num 14	null-ok
rrlist	vch 256	
mods	vch 16	
features vch 16	null-ok	
flags	vch 8	

ZONE_SERVERS		
zone	vch 256	
server	vch 256	
xferip	num 14	null-ok

RR_MGMT		
rrid	num 14	
login	num 14	null-ok
ipaddr	num 14	null-ok
flags	vch 8	null-ok

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BILLINGPOLICY		
billp_id	num 14	
what	vch 32	
type	vch 32	
unit	vch 16	
amt	num 8	
cnd_type	vch 8	null-ok
cnd_unit	num 8	null-ok
cnd_time	vch 8	null-ok
intro_time	num 6	
period	vch 8	
year_discount	num 4	

BILLINGINFO		
billi_id	num 14	
who_id	num 14	

BILLINGINFO		
method	vch 12	
credcard	num 16	null-ok
expire	vch 7	null-ok
card_id	num 14	null-ok
billp_id	num 14	
create_date	num 10	
next_date	num 10	

USAGE_HIST	
id	num 14
objtype	vch 16
access	vch 16
start	num 10
end	num 10
cnt	num 12

IPV4RANGE	
ipid	num 14
flag	num 2
bits	num 2
low	num 10
high	num 10

5 **DESIGN CHOICES**

Probably the least obvious design choice is the way that CONTACT is laid out. What would be more obvious/natural is to have one table row represent each particular contact record . However, this design breaks contact information into multiple fields, and represents each field as a row in the database. This method is 10 more flexible (given the flexible nature of the data), and supports the association and efficient lookup of "ACCESS POLICY" to individual fields (e.g., to allow random people looking at a CONTACT record to see an email address but not see a phone number associated with that record).

THE SQL INTERFACE

15 The SQL Interface **104** takes queries/requests for domain name/address resolution and returns the appropriate address and other information. The SQL

implementing the interface **104** in a preferred embodiment is listed below (in the Table titled **SQL Query**).

EXAMPLE

Here is a sample query made by a user **108** of the DNS **100** according to the present invention. The request is processed by the query mechanism **106** which uses the SQL interface **104** to access the database **102**.

Query: a.b.c.d.wonk.com. <type>

where the system knows that it has "wonk.com. ZONE"

Then, in the worst case, the system has to make the following queries into the database **102**:

a.b.c.d.wonk.com. <type> ## commonly returns ANSWER

b.c.d.wonk.com. NS ## commonly returns AUTH data

a.b.c.d.wonk.com. NS ## common to indicate sub-delegation

*.b.c.d.wonk.com. <type>

b.c.d.wonk.com. NS

*.c.d.wonk.com. <type>

c.d.wonk.com. NS

*.d.wonk.com. <type>

d.wonk.com. NS

*.wonk.com. <type>

This invention embodies a query strategy that significantly reduces the average number of database queries required to complete a DNS query.

There are essentially two common cases:

(1) no sub-delegation—Query gets simple answer for foo.wonk.com

(2) the system will end-up telling about sub-delegation—Query made for a.b.c.d.wonk.com gets NS for d.wonk.com

In both of the common cases noted above, the answer "dname" is likely to be one component longer than the zone name. So, the system tests this before making the query (i.e., the system does not want to query for "a.b.c.d.wonk.com", "b.c.d.wonk.com", and "c.d.wonk.com" just to finally say that the delegation is made at "d.wonk.com").

Consequently, the following query optimization (in the query mechanism **106**) can be used:

If the requested name is one component longer than zone name, then look for a quick answer.

This can be written as:

```
if (shorten(req.dname) == ZONE) {
      SQL(<req.dname>, <type>          ##
SQL(d.wonk.com, <type>,
      shorten(<req.dname>), NS)        ##
wonk.com,     NS)
if (<type> found)
      return_answer;
      save_NS_for_later();
SQL(req.dname, NS,
      "*" + shorten(req.dname), <type>);
      if ("*" found, return answer and my NS
records);
      if (NS found, return authority);
      return(NXDOMAIN);
}
```

If long request name, check for shortest delegation first. For example, if the request name is "a.b.c.d.wonk.com", check if "d.wonk.com" has NS.

```
SQL(shorten.to_one_piece(<req.dname>), NS); if (NS
found) return;
```

If neither optimization worked then start with original question.

```
SQL(<req.name>, <type>,
```

```
        zone.name,     NS);
    if (answer found) {
        return(answer + NS);
    } else {
        save_NS_for_later();
    }
```

If no answer is found then loop through and look for NS delegations.

```
    for (working_name = req.dname,
        next_name = shorten(working_name);
        next != zone;
        working_name = next_name, next_name =
    shorten(working_name)
    ) {
        SQL(working_name, NS);
        if (NS found) return;
    }
```

No delegation made.

Now loop looking for "*" records.

```
    for (working_name = shorten(req.dname),
        next_name = shorten(working_name);
        next != zone;
        working_name = next_name, next_name =
    shorten(working_name)
    ) {
        SQL("*" + working_name, <type>;
        if (<type> found) {
        return (answer + save_NS_records);
    }
    }

        return(NXDOMAIN);
```

EXAMPLE

Give the example query "foo.bar.wonk.com. MX", call following SQL (Table XX) with following variables:

```
req.name1 = "foo.bar.wonk.com."

req.name2 =   "*.bar.wonk.com."

req.name3 =     "bar.wonk.com."

req.type  = 15  (this is the MX type)
```

```
req.class = 1    (this is the IN class)

req.time  = <current_time>

req.server = <server ID#>

req.ipaddr = <incoming pkt IP source>
```

5

SQL QUERY

```
SELECT * FROM rrjumbo, RR
```

The main "start with" clause gets the ANSWERS and AUTHORATATIVE, plus it gets any "" records that exist.*

```
START WITH
(
      (RR.dname = 'req.name1' AND ((RR.type =
      'req.type')
       OR (RR.type = = 2)))
           OR
      (RR.dname = 'req.name2' AND (RR.type =
      'req.type'))
           OR
      (RR.dname = 'req.name3' AND (RR.type = 2))
)
      AND
      RR.class = 'req.class'                          AND
      substr(RR.time, 'req.time', 1) = 1              AND
      substr(RR.servers, 'req.server', 1) = 1         AND
      RR.active = 1                                   AND
      RR.dead   = 0                                   AND
```

This is part of main query, that handles the IPv4range

```
EXISTS (select * FROM ipv4range, IP WHERE
      RR.ipv4addr = IP.ipid      AND
      IP.low  <= req.ipaddr      AND
      IP.high >= req.ipaddr      AND
      IP.flag = 2                AND)
```

This part of query grabs ADDITIONAL records

```
CONNECT BY
      PRIOR ref1 = dname           AND
            type = 1               AND
            class = 'req.class'    AND
            substr(time, 'req.time', 1) = 1          AND
            substr(servers, 'req.server', 1) = 1     AND
            active = 1                               AND
            dead   = 0                               AND
```

Make certain ADDITIONAL RECORDS also have IPv4 permission

SQL QUERY

```
      EXISTS (select * FROM ipv4range, IP WHERE
           RR.ipv4addr = IP.ipid     AND
           IP.low  <= req.ipaddr     AND
           IP.high >= req.ipaddr     AND
           IP.flag = 2               AND)

SELECT * FROM rrjumbo, RR
START WITH
(
      (RR.dname = 'req.name1' AND ((RR.type =
      'req.type')
       OR (RR.type = = 2)))
           OR
      (RR.dname = 'req.name2' AND (RR.type =
      'req.type'))
           OR
      (RR.dname = 'req.name3' AND (RR.type = 2))
)
      AND
      RR.class = 'req.class'                        AND
      substr(RR.time, 'req.time', 1) = 1            AND
      substr(RR.servers, 'req.server', 1) = 1       AND
      RR.active = 1                                 AND
      RR.dead   = 0                                 AND

EXISTS (select * FROM ipv4range, IP WHERE
      RR.ipv4addr = IP.ipid     AND
      IP.low  <= req.ipaddr     AND
      IP.high >= req.ipaddr     AND
      IP.flag = 2               AND)

CONNECT BY
      PRIOR ref1 = dname          AND
           type = 1               AND
           class = 'req.class'    AND
           substr(time, 'req.time', 1) = 1          AND
           substr(servers, 'req.server', 1) = 1     AND
           active = 1                               AND
           dead   = 0                               AND

      EXISTS (select * FROM ipv4range, IP WHERE
           RR.ipv4addr = IP.ipid     AND
           IP.low  <= req.ipaddr     AND
           IP.high >= req.ipaddr     AND
           IP.flag = 2               AND)
```

OTHER FEATURES

Building a modular system has allowed additional mechanisms to be incorporated easily into the system which can serve as the base for new features/uses.

CONFIGURABLE RESOURCE RECORD TYPES

The DNS according to some embodiments of the present invention has over thirty (30) defined resource record types, which provide data formats/fields for use by different applications; current implementations hard-code the type definitions. Thus, the present invention offers users the ability to dynamically configure RR types, to allow directory-enabled applications to be deployed and tested within short time frames.

CONTEXT SENSITIVE (QUERY-SPECIFIC) ANSWERS

In the abstract, a directory service maps a query's incoming request (key) to an outgoing response (data indexed by the key). Using a relational database model gives the present invention an effective mechanism to add other components to the lookup key. In the DNS example, a different answer can be given depending on various context information: from the packet (IP address), from the machine (local time), and from global system (which server location). Thus, for example, the system may provide different answers at different times of day or to different geographic regions.

DYNAMIC DATA CACHE

In some embodiments, the DNS server **100** incorporates a dynamic load-on-demand cache algorithm which significantly enhances performance by reducing the amount of data that must be retrieved from the database **102**.

When an inbound query is received, the server **100** will first attempt to find the answer in the data cache **110**. If the answer exists and is fresh, the response will

be sent directly from the cached data stored in data cache **110**. If the answer exists in the cache **110** but is stale, or if the answer does not yet exist in the cache, the data will be acquired from the database **102**, transmitted in the response, and then added to or updated within the cache **110**. In some embodiments, the cache is maintained in a Most Recently Used order to optimize lookup times and facilitate cache management.

Items in the cache **110** have a maximum lifetime which ranges from the time to live (TTL) of the lowest resource record (RR) in the complete answer to the maximum cache time value configured for the server as a whole. For records that change frequently, the TTL value can be set to zero to ensure the data is never added to cache and always retrieved from the database.

By setting a relatively short lifetime on data in the cache **110**, the server **100** can provide maximum throughput while still offering near real-time propagation of zone changes. Because the cache is load-on-demand, the DNS daemon can be up and ready to respond to queries within moments of execution.

In addition to normal caching of DNS response data, the cache algorithm is designed so that negative caching is also achieved. For example, if a request is made for a host that does not exist in an active domain, the negative response will be saved just like a valid response. If the server is for some reason hit with a barrage of requests for this same invalid host, they can be filled using the negative response in cache, once again eliminating unnecessary calls to the database.

Further, in some embodiments, a management thread is incorporated into the cache design. This thread comes to life at a configurable interval and walks through the RR data cache, deleting any stale entries that it encounters. This feature ensures that the most active data is always the most readily available.

In some embodiments, a cache invalidation mechanism is incorporated that is responsible for removing (or modifying) data within the dynamic cache so that the cache accurately and acceptably reflects changes made to the primary data repository.

IMPLEMENTATION DETAILS

An embodiment of this invention has been implemented. The DNS server **100** was designed on top of and tightly integrated with the database **102**. The database **102** was implemented using Oracle, however, care was taken to modularize the database interface so that the system could easily be integrated with a database from a different vendor, such as Sybase or Informix. The server was developed using Gnu C++ on a Linux platform. The server build process was later expanded to support both Linux and Solaris.

Implementations of the present invention can be written in any suitable high-level computer language. Further, while aspects of the present invention have been implemented in software running on a computer system as described above, all aspects of the present invention can also be implemented in hardware or in a combination of software and hardware. That is, although described with reference to a particular system, the present invention operates on any computer system and can be implemented in software, hardware or any combination thereof. When implemented fully or partially in software, the invention can reside, permanently or temporarily, on any memory or storage medium, including but not limited to a RAM, a ROM, a disk, an ASIC, a PROM and the like.

While the above embodiments relate to domain name processing, one skilled in the art will realize that domain names are merely one example of directory services, and that the present invention is applicable to other directory services.

Thus are provided methods, systems and devices for scalable domain name resolution. One skilled in the art will appreciate that the present invention can be practiced by other than the described embodiments, which are presented for purposes of illustration and not limitation, and the present invention is limited only by the claims that follow.

We claim:

1. A system for processing domain name requests, the system comprising:

a query mechanism constructed and adapted to:

(a) obtain a user request for response information corresponding to a particular domain name; and

(b) provide complete response information in a single response to the user request.

2. A system as in claim 1 wherein the user request is a domain name resolution request and wherein the query mechanism provides an Internet Protocol (IP) address corresponding to the domain name.

3. A system as in claim 1 wherein the a query mechanism is further constructed and adapted to:

provide the response depending on context information.

4. A system as in claim 3 wherein the context information includes at least one of (a) context information from the request; (b) context information from the system; and (c) global context information.

5. A system as in claim 4 wherein the context information includes address information indicating an address of the user.

6. A system as in claim 4 wherein the context information includes the local time.

7. A system as in claim 4 wherein the context information includes the location of the system.

8. A system as in claim 1 further comprising:

a data cache;

wherein the query mechanism is further constructed and adapted to:

upon receipt of a user request, first attempt to find an answer to the user request in the data cache.

9. A system as in claim 8 wherein the query mechanism is further constructed and adapted to:

(a) if the answer exists in the data cache and the answer is fresh, send the answer directly from the cached data; and

(b) if the answer exists in the data cache and the answer is stale, or if the answer does not exist in the data cache, then

(b1) acquire the answer from a database;

(b2) send the answer; and

(b3) update the data cache to reflect the acquired answer.

10. A system as in claim 8 wherein items in the data cache have a maximum lifetime which ranges from the time to live of the lowest resource record in

a complete answer to the maximum cache time value configured for the system as a whole.

11. A system as in claim 8 wherein the query mechanism is further constructed and adapted to:

implement negative caching such that if a request is made for a host that does not exist in an active domain, the negative response will be saved in the cache.

12. A method of providing an Internet Protocol (IP) address of one of a plurality of devices on the Internet, the method comprising:

obtaining a user request for an IP address corresponding to a particular domain name; and

providing the IP address in a single response to the user request.

13. A method as in claim 12 further comprising:

providing the IP address depending on context information.

14. A method as in claim 13 wherein the context information includes at least one of (a) context information from the user request; (b) local context information; and (c) global context information.

15. A method as in claim 14 wherein the context information includes address information indicating an address of the user.

16. A method as in claim 14 wherein the context information includes the local time.

17. A method as in claim 14 wherein the context information includes a geographic location.

18. A method as in claim 12 further comprising:

attempting to find an answer to the user request in a data cache.

19. A method as in claim 18 further comprising:

(a) if the answer exists in the data cache and the answer is fresh, sending the answer directly from the cached data; and

(b) if the answer exists in the data cache and the answer is stale, or if the answer does not exist in the data cache, then

(b1) acquiring the answer from a database;

(b2) sending the answer; and

(b3) updating the data cache to reflect the acquired answer.

20. A method as in claim 18 wherein items in the data cache have a maximum lifetime which ranges from the time to live of the lowest resource record in a complete answer to a maximum cache time value.

21. A method as in claim 18 further comprising:

if a request is made for a host that does not exist in an active domain, saving the negative response in the data cache.

22. A system comprising:

a network of distributed replicated Domain Name Servers (DNSs), each DNS comprising:

a database; and

a query mechanism constructed and adapted to:

(a) obtain from the database a user request for response information corresponding to a particular domain name; and

(b) provide complete response information in a single response to the user request,

wherein the databases in the network are replicated and wherein the DNSs share the same network address.

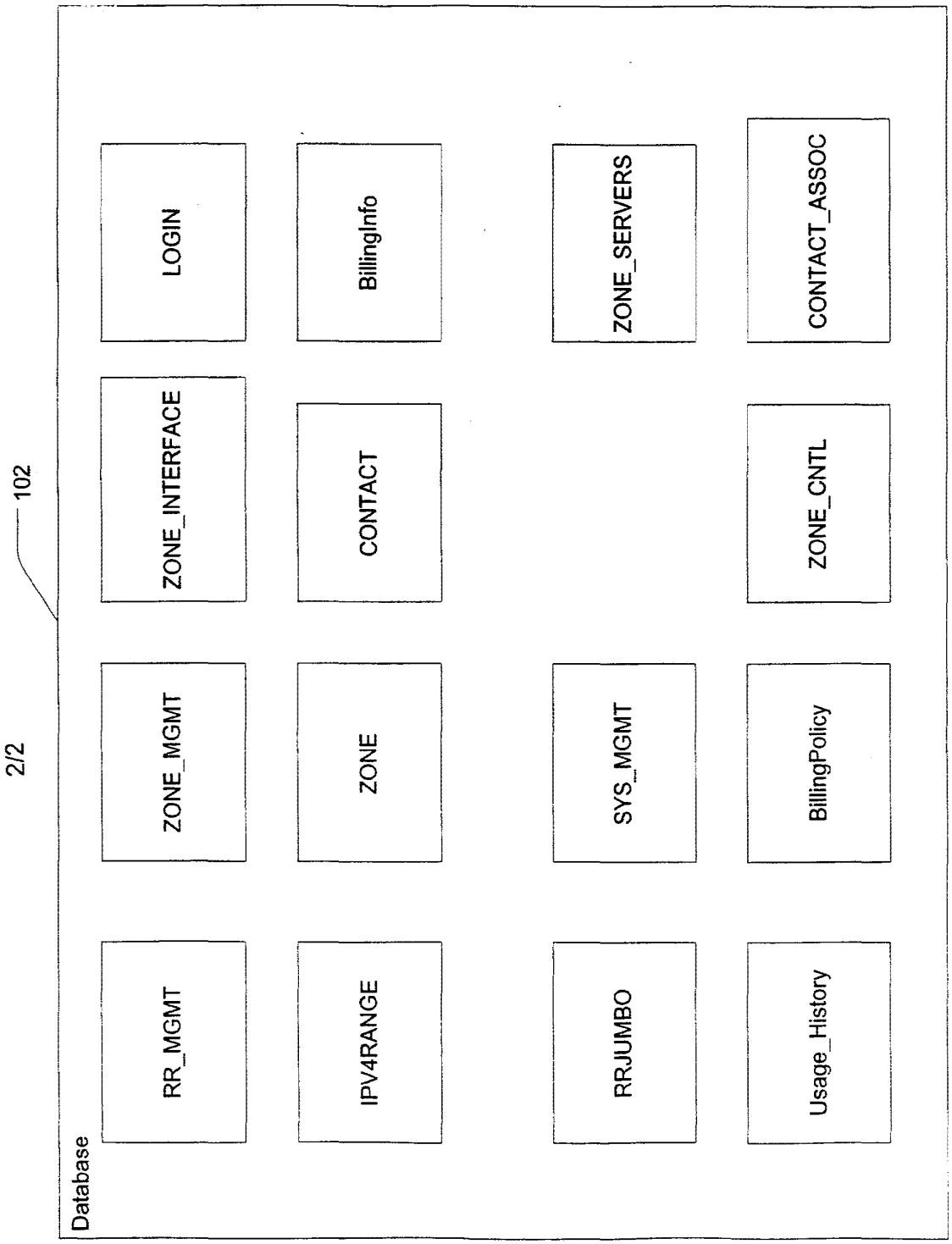

2/2
102
Database
RR_MGMT
ZONE_MGMT
ZONE_INTERFACE
LOGIN
IPV4RANGE
ZONE
CONTACT
BillingInfo
RRJUMBO
SYS_MGMT
ZONE_SERVERS
Usage_History
BillingPolicy
ZONE_CNTL
CONTACT_ASSOC

Fig. 2

1/2

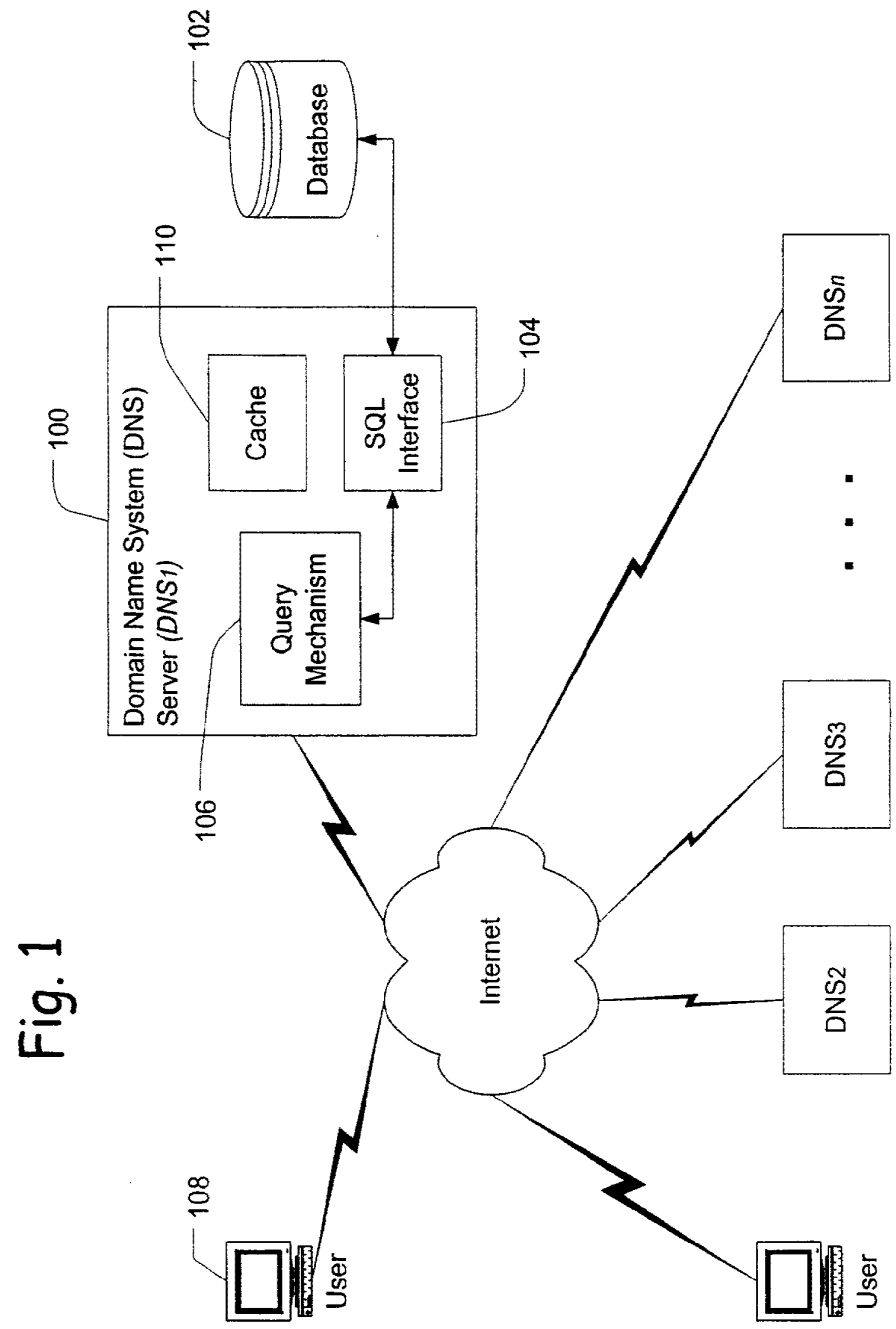

102
Database
110
100
Domain Name System (DNS) Server (DNS1)
Cache
SQL Interface
104
Query Mechanism
106
Internet
DNSn
DNS3
DNS2
108
User
User

Fig. 1

Electronic Acknowledgement Receipt

EFS ID:	11662757
Application Number:	12978537
International Application Number:	
Confirmation Number:	1389
Title of Invention:	Policy-Based Content Delivery Network Selection
First Named Inventor/Applicant Name:	Paul E. Stolorz
Customer Number:	83579
Filer:	David Dewey Wier/Kathleen McInnish
Filer Authorized By:	David Dewey Wier
Attorney Docket Number:	0093-US-I2
Receipt Date:	20-DEC-2011
Filing Date:	24-DEC-2010
Time Stamp:	13:06:10
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	Transmittal Letter	93_US_I2_SuppIDS.pdf	35789 5b4dcc3403202546634d2ff271b61e8d2e57fd87	no	5

Warnings:	
Information:	

2	Information Disclosure Statement (IDS) Form (SB08)	93_US_I2_SB08.pdf	27954 b292b190e1129a9a4438fd68dbc736aa82fd073e	no	1
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
3	Foreign Reference	WO0052594A2.pdf	1890801 70b9d4dd50714aee3eab404befd4b8ffb9454438	no	54
Warnings:					
Information:					
4	Non Patent Literature	EPO_2011_12_06_Extended_SR_0093_EP_01.pdf	207787 dd6fb42242fab24a1dcd0fc911fda841a3f86bd3	no	7
Warnings:					
Information:					
		Total Files Size (in bytes):	2162331		

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

Application No.	:	12/978,537	Confirmation No.	:	1389
First Applicant	:	STOLORZ et al.	Art Unit	:	2447
Filed	:	December 24, 2010	Examiner	:	Joon H. Hwang
Title	:	POLICY-BASED CONTENT DELIVERY NETWORK SELECTION			
Docket No.	:	0093-US-I2			

Submitted Via EFS-Web

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT PURSUANT TO 37 C.F.R. §§ 1.56, 1.97, AND 1.98

Sir:

The Examiner is respectfully requested to consider the patents, patent applications, publications, or other information cataloged on the enclosed Form (e.g., PTO-1449, PTO-892, PTO/SB/08, etc.) during examination of the above-identified patent application. The order of presentation of the references should not be construed as an indication of importance. These references are submitted for the Examiner's consideration and are submitted pursuant to an Applicant's duty of disclosure under 37 C.F.R. § 1.56.

Copies of all of the cited documents:

☐ are enclosed unless otherwise indicated on the enclosed Form PTO/SB/08a.

☐ have been previously furnished to the Office in prior application No. _____, filed _____, which the present application relies upon for an earlier effective filing date under 35 U.S.C. § 120. Therefore, no copies of the cited documents are included herewith pursuant to 37 C.F.R. § 1.98(d); MPEP § 609(III)(A)(2).

☒ are enclosed unless they are U.S. patents or U.S. patent application publications pursuant to 37 C.F.R. § 1.98(a).

I
BASIS

This information disclosure statement is filed pursuant to

☒ 37 C.F.R. § 1.97(b).
This information disclosure statement is filed either (1) within three months of the filing date of a national application other than a continued prosecution application under 37 C.F.R. § 1.53(d); (2) within three months of the date of entry of the national stage as set forth in 37 C.F.R. § 1.491 in an international application; (3) before the mailing date of a first Office action on the merits; (4) concurrently with the filing of a request for continued examination under 37 C.F.R. § 1.114; or (5) before the mailing of a first Office action after the filing of a request for continued examination under 37 C.F.R. § 1.114, whichever event occurs last.

Accordingly, this information disclosure statement requires no fee and no certification.

☐ 37 C.F.R. § 1.97(c).
This information disclosure statement is filed after the period specified in 37 C.F.R. § 1.97(b), but before the mailing date of any of (1) a final action under 37 C.F.R. § 1.113; (2) a notice of allowance under 37 C.F.R. § 1.311; or (3) an action that otherwise closes prosecution in the application.

Accordingly, this information disclosure statement requires either the fee specified in 37 C.F.R. § 1.17(p) for submission of an information disclosure statement under 37 C.F.R. § 1.97(c), or a statement under 37 C.F.R. § 1.97(e).

☐ 37 C.F.R. § 1.97(d).
This information disclosure statement is filed after the period specified in 37 C.F.R. § 1.97(c) since a:

☐ final action under 37 C.F.R. § 1.113

☐ notice of allowance under 37 C.F.R. § 1.311

was mailed to the Applicant on _____.

Accordingly, this information disclosure statement requires the fee set forth in 37 C.F.R. § 1.17(p) to consider an information disclosure statement under 37 C.F.R. § 1.97(d), and a statement under 37 C.F.R. § 1.97(e).

If this statement crosses in the mail with an Office action, or is otherwise not in the indicated category of 37 C.F.R. § 1.97, it is respectfully requested that this statement be treated in the next appropriate category and made of record. To the extent required, please treat this paper as a conditional petition for acceptance of the information disclosure statement.

II
FEES

Any required fee is being paid as indicated below:

☒ No fee is due.

☐ The fee specified in 37 C.F.R. § 1.17(p) for submission of an information disclosure statement under 37 C.F.R. § 1.97(c) or (d) is due.

☐ This fee is paid by credit card.

☐ Please charge the required fee to Deposit Account No. 505063.

☒ The Commissioner is hereby authorized to charge any additional required fees or credit any overpayments associated with this information disclosure statement to the account.

III

CERTIFICATION

Pursuant to 37 C.F.R. § 1.97(e), I state as follows:

☒ No statement is necessary.

☐ Each item of information contained in this information disclosure statement was first 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 information disclosure statement. 37 C.F.R. § 1.97(e)(1).

☐ No item of information contained in this information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to my knowledge after making reasonable inquiry, no item of information contained in this information disclosure statement was known to any individual designated in 37 C.F.R. § 1.56(c) more than three months prior to the filing of this information disclosure statement. 37 C.F.R. § 1.97(e)(2).

Pursuant to 37 C.F.R. § 1.704(d), I state as follows:

☐ Each item of information contained in this information disclosure 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 37 C.F.R. § 1.56(c) more than thirty days prior to the filing of this information disclosure statement.

IV
FOREIGN LANGUAGE REFERENCES

Pursuant to 37 C.F.R. § 1.98(a)(3)(i), any information disclosure statement filed under 37 C.F.R. § 1.97 shall include a concise explanation of the relevance, as it is presently understood by the individual designated in § 1.56(c) most knowledgeable about the content of the information, of each patent, publication, or other information listed that is not in the English language. The concise explanation may be either separate from the specification or incorporated therein. In compliance with the rules, the Applicant states as follows:

☐ No concise explanation is required since all cited references are in English.

☐ A concise explanation of the relevance of one or more foreign language references is attached.

☐ According to the procedural policy adopted by the PTO with regard to disclosure requirements, the Applicant is satisfying the disclosure requirement pursuant to MPEP § 609.04(a)(III) by submitting herewith the following:

- ☐ English language versions of any non-English language documents.
- ☐ English language versions of one or more search reports or other actions by one or more foreign patent offices in one or more counterpart foreign applications, which indicate the degree of relevance found by the foreign office(s).
- ☐ Pursuant to 37 C.F.R. § 1.98(a)(3)(ii), a copy of a translation is not submitted herewith because a written English-language translation of a non-English-language document, or portion thereof, is not within the possession, custody, or control of, or is readily available to any individual designated in § 1.56(c).

The Applicant has not analyzed these documents and, therefore, declines to comment on their relevance at this time.

☐ One or more English language abstracts for the non-English language references are also enclosed.

V
REMARKS

It is respectfully requested that:

(1) The Examiner sign the enclosed Form to evidence that the cited information has been fully considered by the Patent and Trademark Office during the examination of this application; and

(2) The citations for the cited information be printed on any patent that issues from this application.

The submission of this information disclosure statement by the Applicant shall not be construed as a representation that a search has been performed or that no other material information under 37 C.F.R. § 1.56 exists. See 37 C.F.R. § 1.97(g).

The submission of this information disclosure statement by the Applicant shall not be construed as an admission that any information cited or referred to herein is, or is considered to be, material to the patentability of one or more of the pending claims in this application pursuant to 37 C.F.R. § 1.56(b), unless specifically designated by the Applicant as such. See 37 C.F.R. § 1.97(h).

The submission of this information disclosure statement by the Applicant shall not be construed as an admission that any information cited or referred to herein is, or is considered to be, or even qualifies as "prior art" under 35 U.S.C. § 102 with respect to this invention, unless specifically designated by the Applicant as such.

Notwithstanding any statements by the Applicant, the Examiner is urged to form his or her own conclusion regarding the relevance of the cited information.

VI
CONCLUSION

The Examiner is encouraged to contact the undersigned attorney to discuss any questions concerning this information disclosure statement or any of the information cited or referred to herein.

Respectfully submitted,

Date: December 20, 2011

/JCS/

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Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Complete if Known	
Application Number	12/978,537
Filing Date	Dec 24, 2010
First Named Inventor	Paul E. Stolorz
Art Unit	2447
Examiner Name	Joon H. Hwang

Sheet	1	of	1	Attorney Docket No: 0093-US-I2

US PATENT DOCUMENTS

Examiner Initial *	Cite No	Document Number	Publication Date	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or RelevantFigures Appear
		20100312861A1	Dec 9, 2010	Kolhi, J et al.	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No	Foreign Patent Document	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or RelevantFigures Appear	T[2]

OTHER DOCUMENTS -- NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No [1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]

EXAMINER **DATE CONSIDERED**

Substitute Disclosure Statement Form (PTO-1449)
* 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. [1] Applicant's unique citation designation number (optional) [2] Applicant is to place a check mark here if English language Translation is attached

Electronic Acknowledgement Receipt

EFS ID:	11642909
Application Number:	12978537
International Application Number:	
Confirmation Number:	1389
Title of Invention:	Policy-Based Content Delivery Network Selection
First Named Inventor/Applicant Name:	Paul E. Stolorz
Customer Number:	83579
Filer:	David Dewey Wier/Kathleen McInnish
Filer Authorized By:	David Dewey Wier
Attorney Docket Number:	0093-US-I2
Receipt Date:	16-DEC-2011
Filing Date:	24-DEC-2010
Time Stamp:	16:56:03
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	Transmittal Letter	93_US_I2_SuppIDS.pdf	35799 0e70ee4360efabb1baf17ddb1ba41a841a042bd1	no	5

Warnings:	
Information:	

2	Information Disclosure Statement (IDS) Form (SB08)	93_US_I2_SB08.pdf	27308 d9ce015e54d444f0bdda3d32a86ecb7e68ad5316	no	1

Warnings:	
Information:	
This is not an USPTO supplied IDS fillable form	
Total Files Size (in bytes):	63107

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

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

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

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

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	:	12/978,537	Confirmation No.	:	1389
First Applicant	:	STOLORZ et al.	Art Unit	:	2447
Filed	:	December 24, 2010	Examiner	:	Joon H. Hwang
Title	:	POLICY-BASED CONTENT DELIVERY NETWORK SELECTION			
Docket No.	:	0093-US-I2			

Submitted Via EFS-Web

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT PURSUANT TO 37 C.F.R. §§ 1.56, 1.97, AND 1.98

Sir:

The Examiner is respectfully requested to consider the patents, patent applications, publications, or other information cataloged on the enclosed Form (e.g., PTO-1449, PTO-892, PTO/SB/08, etc.) during examination of the above-identified patent application. The order of presentation of the references should not be construed as an indication of importance. These references are submitted for the Examiner's consideration and are submitted pursuant to an Applicant's duty of disclosure under 37 C.F.R. § 1.56.

Copies of all of the cited documents:

☐ are enclosed unless otherwise indicated on the enclosed Form PTO/SB/08a.

☐ have been previously furnished to the Office in prior application No. _____, filed _____, which the present application relies upon for an earlier effective filing date under 35 U.S.C. § 120. Therefore, no copies of the cited documents are included herewith pursuant to 37 C.F.R. § 1.98(d); MPEP § 609(III)(A)(2).

☒ are enclosed unless they are U.S. patents or U.S. patent application publications pursuant to 37 C.F.R. § 1.98(a).

I
BASIS

This information disclosure statement is filed pursuant to

☒ 37 C.F.R. § 1.97(b).
This information disclosure statement is filed either (1) within three months of the filing date of a national application other than a continued prosecution application under 37 C.F.R. § 1.53(d); (2) within three months of the date of entry of the national stage as set forth in 37 C.F.R. § 1.491 in an international application; (3) before the mailing date of a first Office action on the merits; (4) concurrently with the filing of a request for continued examination under 37 C.F.R. § 1.114; or (5) before the mailing of a first Office action after the filing of a request for continued examination under 37 C.F.R. § 1.114, whichever event occurs last.

Accordingly, this information disclosure statement requires no fee and no certification.

☐ 37 C.F.R. § 1.97(c).
This information disclosure statement is filed after the period specified in 37 C.F.R. § 1.97(b), but before the mailing date of any of (1) a final action under 37 C.F.R. § 1.113; (2) a notice of allowance under 37 C.F.R. § 1.311; or (3) an action that otherwise closes prosecution in the application.

Accordingly, this information disclosure statement requires either the fee specified in 37 C.F.R. § 1.17(p) for submission of an information disclosure statement under 37 C.F.R. § 1.97(c), or a statement under 37 C.F.R. § 1.97(e).

☐ 37 C.F.R. § 1.97(d).
This information disclosure statement is filed after the period specified in 37 C.F.R. § 1.97(c) since a:

☐ final action under 37 C.F.R. § 1.113

☐ notice of allowance under 37 C.F.R. § 1.311

was mailed to the Applicant on _____.

Accordingly, this information disclosure statement requires the fee set forth in 37 C.F.R. § 1.17(p) to consider an information disclosure statement under 37 C.F.R. § 1.97(d), and a statement under 37 C.F.R. § 1.97(e).

If this statement crosses in the mail with an Office action, or is otherwise not in the indicated category of 37 C.F.R. § 1.97, it is respectfully requested that this statement be treated in the next appropriate category and made of record. To the extent required, please treat this paper as a conditional petition for acceptance of the information disclosure statement.

II
FEES

Any required fee is being paid as indicated below:

☒ No fee is due.

☐ The fee specified in 37 C.F.R. § 1.17(p) for submission of an information disclosure statement under 37 C.F.R. § 1.97(c) or (d) is due.

☐ This fee is paid by credit card.

☐ Please charge the required fee to Deposit Account No. 505063.

☒ The Commissioner is hereby authorized to charge any additional required fees or credit any overpayments associated with this information disclosure statement to the account.

III

CERTIFICATION

Pursuant to 37 C.F.R. § 1.97(e), I state as follows:

☒ No statement is necessary.

☐ Each item of information contained in this information disclosure statement was first 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 information disclosure statement. 37 C.F.R. § 1.97(e)(1).

☐ No item of information contained in this information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to my knowledge after making reasonable inquiry, no item of information contained in this information disclosure statement was known to any individual designated in 37 C.F.R. § 1.56(c) more than three months prior to the filing of this information disclosure statement. 37 C.F.R. § 1.97(e)(2).

Pursuant to 37 C.F.R. § 1.704(d), I state as follows:

☐ Each item of information contained in this information disclosure 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 37 C.F.R. § 1.56(c) more than thirty days prior to the filing of this information disclosure statement.

IV
FOREIGN LANGUAGE REFERENCES

Pursuant to 37 C.F.R. § 1.98(a)(3)(i), any information disclosure statement filed under 37 C.F.R. § 1.97 shall include a concise explanation of the relevance, as it is presently understood by the individual designated in § 1.56(c) most knowledgeable about the content of the information, of each patent, publication, or other information listed that is not in the English language. The concise explanation may be either separate from the specification or incorporated therein. In compliance with the rules, the Applicant states as follows:

☐ No concise explanation is required since all cited references are in English.

☐ A concise explanation of the relevance of one or more foreign language references is attached.

☐ According to the procedural policy adopted by the PTO with regard to disclosure requirements, the Applicant is satisfying the disclosure requirement pursuant to MPEP § 609.04(a)(III) by submitting herewith the following:

- ☐ English language versions of any non-English language documents.
- ☐ English language versions of one or more search reports or other actions by one or more foreign patent offices in one or more counterpart foreign applications, which indicate the degree of relevance found by the foreign office(s).
- ☐ Pursuant to 37 C.F.R. § 1.98(a)(3)(ii), a copy of a translation is not submitted herewith because a written English-language translation of a non-English-language document, or portion thereof, is not within the possession, custody, or control of, or is readily available to any individual designated in § 1.56(c).

The Applicant has not analyzed these documents and, therefore, declines to comment on their relevance at this time.

☐ One or more English language abstracts for the non-English language references are also enclosed.

V
REMARKS

It is respectfully requested that:

(1) The Examiner sign the enclosed Form to evidence that the cited information has been fully considered by the Patent and Trademark Office during the examination of this application; and

(2) The citations for the cited information be printed on any patent that issues from this application.

The submission of this information disclosure statement by the Applicant shall not be construed as a representation that a search has been performed or that no other material information under 37 C.F.R. § 1.56 exists. See 37 C.F.R. § 1.97(g).

The submission of this information disclosure statement by the Applicant shall not be construed as an admission that any information cited or referred to herein is, or is considered to be, material to the patentability of one or more of the pending claims in this application pursuant to 37 C.F.R. § 1.56(b), unless specifically designated by the Applicant as such. See 37 C.F.R. § 1.97(h).

The submission of this information disclosure statement by the Applicant shall not be construed as an admission that any information cited or referred to herein is, or is considered to be, or even qualifies as "prior art" under 35 U.S.C. § 102 with respect to this invention, unless specifically designated by the Applicant as such.

Notwithstanding any statements by the Applicant, the Examiner is urged to form his or her own conclusion regarding the relevance of the cited information.

VI
CONCLUSION

The Examiner is encouraged to contact the undersigned attorney to discuss any questions concerning this information disclosure statement or any of the information cited or referred to herein.

Respectfully submitted,

Date: December 16, 2011

/JCS/

Jonathan C. Siekmann
Registration No. 58,259
USPTO Customer No. 83579
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Broomfield, Colorado 80021
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Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Complete if Known	
Application Number	12/978,537
Filing Date	Dec 24, 2010
First Named Inventor	Paul E. Stolorz
Art Unit	2447
Examiner Name	Joon H. Hwang

Sheet	1	of	1	Attorney Docket No: 0093-US-I2

US PATENT DOCUMENTS

Examiner Initial *	Cite No	Document Number	Publication Date	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or RelevantFigures Appear
		20070055764A1	Mar 8, 2007	DILLEY, J. A., et al.	
		20090254661	Oct 8, 2009	Fullagar, David et al.	
		20100332595A1	Dec 30, 2010	Fullagar,, David et al.	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No	Foreign Patent Document	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or RelevantFigures Appear	T^2

OTHER DOCUMENTS -- NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No [1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T^2

EXAMINER **DATE CONSIDERED**

Substitute Disclosure Statement Form (PTO-1449)
* 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. [1] Applicant's unique citation designation number (optional) [2] Applicant is to place a check mark here if English language Translation is attached

Electronic Acknowledgement Receipt

EFS ID:	10766478
Application Number:	12978537
International Application Number:	
Confirmation Number:	1389
Title of Invention:	Policy-Based Content Delivery Network Selection
First Named Inventor/Applicant Name:	Paul E. Stolorz
Customer Number:	83579
Filer:	David Dewey Wier/Kathleen McInnish
Filer Authorized By:	David Dewey Wier
Attorney Docket Number:	0093-US-I2
Receipt Date:	18-AUG-2011
Filing Date:	24-DEC-2010
Time Stamp:	15:26:30
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	Transmittal Letter	93_US_I2_SuppIDS.pdf	37533 20e9e7e471517f131c84f1147b494d5d17b7f2b4	no	5

Warnings:	
Information:	

2	Information Disclosure Statement (IDS) Form (SB08)	93_US_I2_SB08.pdf	27660 aa08f2c612e5557c5ab9c5fd9311d1e0ef354f66	no	1

Warnings:	
Information:	
This is not an USPTO supplied IDS fillable form	
Total Files Size (in bytes):	65193

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

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

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

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

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	:	12/978,537	Confirmation No.	:	1389
First Applicant	:	STOLORZ et al.	Art Unit	:	2447
Filed	:	December 24, 2010	Examiner	:	Joon H. Hwang
Title	:	POLICY-BASED CONTENT DELIVERY NETWORK SELECTION			
Docket No.	:	0093-US-I2			

Submitted Via EFS-Web

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT PURSUANT TO 37 C.F.R. §§ 1.56, 1.97, AND 1.98

Sir:

The Examiner is respectfully requested to consider the patents, patent applications, publications, or other information cataloged on the enclosed Form (e.g., PTO-1449, PTO-892, PTO/SB/08, etc.) during examination of the above-identified patent application. The order of presentation of the references should not be construed as an indication of importance. These references are submitted for the Examiner's consideration and are submitted pursuant to an Applicant's duty of disclosure under 37 C.F.R. § 1.56.

Copies of all of the cited documents:

☐ are enclosed unless otherwise indicated on the enclosed Form PTO/SB/08a.

☐ have been previously furnished to the Office in prior application No. _____, filed _____, which the present application relies upon for an earlier effective filing date under 35 U.S.C. § 120. Therefore, no copies of the cited documents are included herewith pursuant to 37 C.F.R. § 1.98(d); MPEP § 609(III)(A)(2).

☒ are enclosed unless they are U.S. patents or U.S. patent application publications pursuant to 37 C.F.R. § 1.98(a).

I
BASIS

This information disclosure statement is filed pursuant to

☒ 37 C.F.R. § 1.97(b).
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Accordingly, this information disclosure statement requires no fee and no certification.

☐ 37 C.F.R. § 1.97(c).
This information disclosure statement is filed after the period specified in 37 C.F.R. § 1.97(b), but before the mailing date of any of (1) a final action under 37 C.F.R. § 1.113; (2) a notice of allowance under 37 C.F.R. § 1.311; or (3) an action that otherwise closes prosecution in the application.

Accordingly, this information disclosure statement requires either the fee specified in 37 C.F.R. § 1.17(p) for submission of an information disclosure statement under 37 C.F.R. § 1.97(c), or a statement under 37 C.F.R. § 1.97(e).

☐ 37 C.F.R. § 1.97(d).
This information disclosure statement is filed after the period specified in 37 C.F.R. § 1.97(c) since a:

☐ final action under 37 C.F.R. § 1.113

☐ notice of allowance under 37 C.F.R. § 1.311

was mailed to the Applicant on _____.

Accordingly, this information disclosure statement requires the fee set forth in 37 C.F.R. § 1.17(p) to consider an information disclosure statement under 37 C.F.R. § 1.97(d), and a statement under 37 C.F.R. § 1.97(e).

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II
FEES

Any required fee is being paid as indicated below:

☒ No fee is due.

☐ The fee specified in 37 C.F.R. § 1.17(p) for submission of an information disclosure statement under 37 C.F.R. § 1.97(c) or (d) is due.

☐ This fee is paid by credit card.

☐ Please charge the required fee to Deposit Account No. 505063.

☒ The Commissioner is hereby authorized to charge any additional required fees or credit any overpayments associated with this information disclosure statement to the account.

III

CERTIFICATION

Pursuant to 37 C.F.R. § 1.97(e), I state as follows:

☒ No statement is necessary.

☐ Each item of information contained in this information disclosure statement was first 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 information disclosure statement. 37 C.F.R. § 1.97(e)(1).

☐ No item of information contained in this information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to my knowledge after making reasonable inquiry, no item of information contained in this information disclosure statement was known to any individual designated in 37 C.F.R. § 1.56(c) more than three months prior to the filing of this information disclosure statement. 37 C.F.R. § 1.97(e)(2).

Pursuant to 37 C.F.R. § 1.704(d), I state as follows:

☐ Each item of information contained in this information disclosure 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 37 C.F.R. § 1.56(c) more than thirty days prior to the filing of this information disclosure statement.

IV
FOREIGN LANGUAGE REFERENCES

Pursuant to 37 C.F.R. § 1.98(a)(3)(i), any information disclosure statement filed under 37 C.F.R. § 1.97 shall include a concise explanation of the relevance, as it is presently understood by the individual designated in § 1.56(c) most knowledgeable about the content of the information, of each patent, publication, or other information listed that is not in the English language. The concise explanation may be either separate from the specification or incorporated therein. In compliance with the rules, the Applicant states as follows:

☐ No concise explanation is required since all cited references are in English.

☐ A concise explanation of the relevance of one or more foreign language references is attached.

☐ According to the procedural policy adopted by the PTO with regard to disclosure requirements, the Applicant is satisfying the disclosure requirement pursuant to MPEP § 609.04(a)(III) by submitting herewith the following:

- ☐ English language versions of any non-English language documents.
- ☐ English language versions of one or more search reports or other actions by one or more foreign patent offices in one or more counterpart foreign applications, which indicate the degree of relevance found by the foreign office(s).
- ☐ Pursuant to 37 C.F.R. § 1.98(a)(3)(ii), a copy of a translation is not submitted herewith because a written English-language translation of a non-English-language document, or portion thereof, is not within the possession, custody, or control of, or is readily available to any individual designated in § 1.56(c).

The Applicant has not analyzed these documents and, therefore, declines to comment on their relevance at this time.

☐ One or more English language abstracts for the non-English language references are also enclosed.

V
STATEMENT OF RELATEDNESS (Under M.P.E.P. § 2001.06(b))

In satisfaction of the duty of disclosure under 37 C.F.R. § 1.56, and in accordance with M.P.E.P. § 2001.06(b), the Examiner is respectfully requested to consider the pending applications (2009/0254661, filed March 21, 2009, and 2010/0332595, filed December 30, 2010, and listed in the attached IDS document) which is owned by the Applicant of the present application. The pending application may include subject matter similar to that of the present application.

VI
REMARKS

It is respectfully requested that:

(1) The Examiner sign the enclosed Form to evidence that the cited information has been fully considered by the Patent and Trademark Office during the examination of this application; and

(2) The citations for the cited information be printed on any patent that issues from this application.

The submission of this information disclosure statement by the Applicant shall not be construed as a representation that a search has been performed or that no other material information under 37 C.F.R. § 1.56 exists. See 37 C.F.R. § 1.97(g).

The submission of this information disclosure statement by the Applicant shall not be construed as an admission that any information cited or referred to herein is, or is considered to be, material to the patentability of one or more of the pending claims in this application pursuant to 37 C.F.R. § 1.56(b), unless specifically designated by the Applicant as such. See 37 C.F.R. § 1.97(h).

The submission of this information disclosure statement by the Applicant shall not be construed as an admission that any information cited or referred to herein is, or is considered to be, or even qualifies as "prior art" under 35 U.S.C. § 102 with respect to this invention, unless specifically designated by the Applicant as such.

Notwithstanding any statements by the Applicant, the Examiner is urged to form his or her own conclusion regarding the relevance of the cited information.

VII
CONCLUSION

The Examiner is encouraged to contact the undersigned attorney to discuss any questions concerning this information disclosure statement or any of the information cited or referred to herein.

Respectfully submitted,

Date: August 18, 2011

/JCS/

Jonathan C. Siekmann
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IN THE UNITED STATES PATENT & TRADEMARK OFFICE

In re PATENT APPLICATION OF:	Attorney Docket: 0093-US-I2
Paul E. STOLORZ et al.	Group Art Unit: 2447
Application Serial No.: 12/978,537	Examiner: HWANG, Joon H.
Application Filing Date: 12-24-2010	Confirmation No.: 1389
Title: **Policy-Based Content Delivery Network Selection**	Date: June 21, 2011

PRELIMINARY AMENDMENT

via EFS-WEB
Hon. Commissioner of Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Prior to examination on its merits, please amend this application as follows.

Amendments to the claims begin on page 2 hereof.

Remarks begin on page 8 hereof.

IN THE CLAIMS

Please amend the claims as follows.

1. (canceled)

2. (New) A method, operable in a framework in which an adaptive traffic control name server network implements policy-based traffic direction, the name server network comprising at least one domain name server comprising hardware in combination with software and constructed and adapted to provide adaptive policy-based domain name service, the method comprising:

(A) providing a graphical user interface (GUI);

(B) using said GUI to obtain at least one policy for direction of network traffic, wherein the GUI supports the setting of said at least one policy using a decision tree representing rules; and

(C) providing said at least one policy to the name server network,

wherein the decision tree comprises one or more resource nodes, and one or more branch nodes,

wherein the one or more resource nodes specify one or more answers to be provided in response to a Domain Name Service (DNS) request, and

wherein the one or more branch nodes specify one or more decision criteria to be applied, and

wherein the GUI supports the specification of:

(i) one or more answers for the one or more resource nodes, and

(ii) one or more decision criteria for the one or more branch nodes,

wherein the one or more criteria are selected from criteria related to: world zones, countries, states, time zones, and blocks of Internet Protocol (IP) addresses, and

wherein the one or more resource nodes are selected from: IP addresses, canonical name (CNAME) records, mail exchange (MX) records, name server (NS) records, and load sharing server sets; and

wherein the answers are selected from: IP addresses and CNAMEs.

3. (New) The method of claim 2 wherein the at least one policy relates to direction of network traffic based on sub-domains of a domain of a subscriber.

4. (New) The method of claim 3 wherein the at least one policy that relates to direction of network traffic based on sub-domains of a domain of the subscriber relates to one or more of the sub-domains: “ftp”, “download”, “www” , and “images”.

5. (New) The method of claim 2 further comprising:

(D) generating reports based on information gathered from the name server network; and

(E) providing said reports.

6. (New) The method of claim 5 wherein the information gathered from the name server network comprises: DNS log summaries from the at least one domain name server in the name server network.

7. (New) The method of claim 6 wherein the information includes a number of requests directed to particular servers in a given time period.

8. (New) The method of claim 5 wherein the reports are made available via a secure web-based GUI.

9. (New) The method of claim 2 wherein the act (C) comprises:

providing said at least one policy to the name server network as an XML file.

10. (New) An administrative agent, operable in a framework in which an adaptive traffic control name server network implements policy-based traffic direction, the name server network comprising at least one domain name server comprising hardware in combination with software and constructed and adapted to provide adaptive policy-based domain name service, said administrative agent comprising hardware in combination with software and constructed and adapted to:

(a) provide a graphical user interface (GUI);

(b) use said GUI to obtain at least one policy for direction of network traffic, wherein the GUI supports the setting of said at least one policy using a decision tree representing rules; and

(c) provide said at least one policy to the name server network,

wherein the decision tree comprises one or more resource nodes, and one or more branch nodes,

wherein the one or more resource nodes specify one or more answers to be provided in response to a Domain Name Service (DNS) request, and

wherein the one or more branch nodes specify one or more decision criteria to be applied, and

wherein the GUI supports the specification of:

(i) one or more answers for the one or more resource nodes, and

(ii) one or more decision criteria for the one or more branch nodes,

wherein the one or more criteria are selected from criteria related to: world zones, countries, states, time zones, and blocks of Internet Protocol (IP) addresses, and

wherein the one or more resource nodes are selected from: IP addresses, canonical name (CNAME) records, mail exchange (MX) records, name server (NS) records, and load sharing server sets; and

wherein the answers are selected from: IP addresses and CNAMEs.

11. (New) The administrative agent of claim 10 wherein the at least one policy relates to direction of network traffic based on sub-domains of a domain of a subscriber.

12. (New) The administrative agent of claim 11 wherein the at least one policy that relates to direction of network traffic based on sub-domains of a domain of the subscriber relates to one or more of the sub-domains: "ftp", "download", "www" , and "images".

13. (New) The administrative agent of claim 10 wherein said administrative agent comprises hardware in combination with software and constructed and adapted to:

(d) generate reports based on information gathered from the name server network; and

(e) provide said reports.

14. (New) The administrative agent of claim 13 wherein the information gathered from the name server network comprises: DNS log summaries from the at least one domain name server in the name server network.

15. (New) The administrative agent of claim 13 wherein the information includes a number of requests directed to particular servers in a given time period.

16. (New) The administrative agent of claim 13 wherein the reports are made available via a secure web-based GUI.

17. (New) The administrative agent of claim 10 wherein said at least one policy is provided to the name server network as an XML file.

18. (New) A system comprising:

(A) an adaptive traffic control name server network comprising at least one domain name server comprising hardware in combination with software and constructed and adapted to provide adaptive policy-based domain name service, and

(B) an administrative agent comprising hardware in combination with software and constructed and adapted to:

(a) provide a graphical user interface (GUI);

(b) use said GUI to obtain at least one policy for direction of network traffic, wherein the GUI supports the setting of said at least one policy using a decision tree representing rules; and

(c) provide said at least one policy to the name server network,

wherein the decision tree comprises one or more resource nodes, and one or more branch nodes,

wherein the one or more resource nodes specify one or more answers to be provided in response to a Domain Name Service (DNS) request, and

wherein the one or more branch nodes specify one or more decision criteria to be applied, and

wherein the GUI supports the specification of:

(i) one or more answers for the one or more resource nodes, and

(ii) one or more decision criteria for the one or more branch nodes,

wherein the one or more criteria are selected from criteria related to: world zones, countries, states, time zones, and blocks of Internet Protocol (IP) addresses, and

wherein the one or more resource nodes are selected from: IP addresses, canonical name (CNAME) records, mail exchange (MX) records, name server (NS) records, and load sharing server sets; and

wherein the answers are selected from: IP addresses and CNAMEs.

19. (New) The system of claim 18 wherein said administrative agent comprises hardware in combination with software and constructed and adapted to:

(d) generate reports based on information gathered from the name server network; and

(e) provide said reports.

20. (New) The system of claim 19 wherein the information gathered from the name server network comprises: DNS log summaries from the at least one domain name server in the name server network.

21. (New) The system of claim 19 wherein the information includes a number of requests directed to particular servers in a given time period.

REMARKS

By this Amendment, claim 1 is canceled without prejudice or disclaimer of its subject matter and new claims 2 – 21 are added. No new matter has been added by these amendments.

Claims 2 – 21 are pending in this application.

An early action on the merits is respectfully requested.

CHARGE STATEMENT: Deposit Account No. 501860, order no. **2711-0107**.
The Commissioner is hereby authorized to charge any fee specifically authorized hereafter, or any missing or insufficient fee(s) filed, or asserted to be filed, or which should have been filed herewith or concerning any paper filed hereafter, and which may be required under Rules 16-18 (missing or insufficiencies only) now or hereafter relative to this application and the resulting Official Document under Rule 20, or credit any overpayment, to our Accounting/Order Nos. shown above. **This CHARGE STATEMENT does not authorize charge of the issue fee until/unless an issue fee transmittal sheet is filed**.

CUSTOMER NUMBER
83579

Respectfully submitted,

/Brian Siritzky/Reg. No. 37,497

By:_____
Brian Siritzky, Ph.D.
Registration No.: 37,497

Electronic Acknowledgement Receipt

EFS ID:	10350517
Application Number:	12978537
International Application Number:	
Confirmation Number:	1389
Title of Invention:	Policy-Based Content Delivery Network Selection
First Named Inventor/Applicant Name:	Paul E. Stolorz
Customer Number:	83579
Filer:	Brian Siritzky
Filer Authorized By:	
Attorney Docket Number:	0093-US-I2
Receipt Date:	21-JUN-2011
Filing Date:	24-DEC-2010
Time Stamp:	13:42:06
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		0093-US-I2_PA_Preliminary_Amendment_filed_June_21_2011.pdf	183618 89714c1289b09f85b64beb0240806a71e6b1d5cc	yes	8

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Preliminary Amendment	1	1
	Claims	2	7
	Applicant Arguments/Remarks Made in an Amendment	8	8
Warnings:			
Information:			
	Total Files Size (in bytes):	183618	

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

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

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

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

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
12/978,537	12/24/2010	

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY ☐ RATE ($)	SMALL ENTITY FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	06/21/2011	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 20	Minus	** 20	= 0	X $ =		OR	X $52=	0
	Independent (37 CFR 1.16(h))	* 3	Minus	***3	= 0	X $ =		OR	X $220=	0
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

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

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

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

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

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

Legal Instrument Examiner:
/MARY HOLMES/

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.

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/978,537	12/24/2010	Paul E. Stolorz	0093-US-I2

CONFIRMATION NO. 1389

83579
LEVEL 3 COMMUNICATIONS, LLC
c/o CPA Global
P.O. Box 52050
Minneapolis, MN 55402

PUBLICATION NOTICE

OC000000048244625

Title: Policy-Based Content Delivery Network Selection

Publication No.US-2011-0145386-A1
Publication Date:06/16/2011

NOTICE OF PUBLICATION OF APPLICATION

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

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

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

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

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

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

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Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

	Complete if Known
Application Number	12/978,537
Filing Date	Dec 24, 2010
First Named Inventor	Paul E. Stolorz
Art Unit	2447
Examiner Name	Joon H. Hwang

Sheet	1	of	1	Attorney Docket No: 0093-US-I2

US PATENT DOCUMENTS					
Examiner Initial *	**Cite No**	**Document Number**	**Publication Date**	**Name of Patentee or Applicant of Cited Document**	Pages, Columns, Lines, Where Relevant Passages or RelevantFigures Appear
		20020116444A1	Aug 22, 2002	Chaudhri, Imran et al.	

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	**Cite No**	**Foreign Patent Document**	**Publication Date**	**Name of Patentee or Applicant of cited Document**	Pages, Columns, Lines, Where Relevant Passages or RelevantFigures Appear	T^2

OTHER DOCUMENTS -- NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	**Cite No [1]**	**Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.**	T^2

EXAMINER **DATE CONSIDERED**

Substitute Disclosure Statement Form (PTO-1449)
* 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. [1] Applicant's unique citation designation number (optional) [2] Applicant is to place a check mark here if English language Translation is attached

Electronic Acknowledgement Receipt

EFS ID:	9907890
Application Number:	12978537
International Application Number:	
Confirmation Number:	1389
Title of Invention:	Policy-Based Content Delivery Network Selection
First Named Inventor/Applicant Name:	Paul E. Stolorz
Customer Number:	83579
Filer:	David Dewey Wier/Kathleen McInnish
Filer Authorized By:	David Dewey Wier
Attorney Docket Number:	0093-US-I2
Receipt Date:	19-APR-2011
Filing Date:	24-DEC-2010
Time Stamp:	12:21:23
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	Transmittal Letter	93_US_I2_SuppIDS.pdf	35777 0d65e6cb15d8813cbcd6933ce4c3470c19d0efd4	no	5

Warnings:	
Information:	

2	Information Disclosure Statement (IDS) Filed (SB/08)	93_US_I2_SB08.pdf	27215 6234ab74c6de69da95cc0fc12d038210da3e66be	no	1

Warnings:	
Information:	
This is not an USPTO supplied IDS fillable form	
Total Files Size (in bytes):	62992

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

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

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

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

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	:	12/978,537	Confirmation No.	:	1389
First Applicant	:	STOLORZ et al.	Art Unit	:	2447
Filed	:	December 24, 2010	Examiner	:	Joon H. Hwang
Title	:	POLICY-BASED CONTENT DELIVERY NETWORK SELECTION			
Docket No.	:	0093-US-I2			

Submitted Via EFS-Web

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT PURSUANT TO 37 C.F.R. §§ 1.56, 1.97, AND 1.98

Sir:

The Examiner is respectfully requested to consider the patents, patent applications, publications, or other information cataloged on the enclosed Form (e.g., PTO-1449, PTO-892, PTO/SB/08, etc.) during examination of the above-identified patent application. The order of presentation of the references should not be construed as an indication of importance. These references are submitted for the Examiner's consideration and are submitted pursuant to an Applicant's duty of disclosure under 37 C.F.R. § 1.56.

Copies of all of the cited documents:

☐ are enclosed unless otherwise indicated on the enclosed Form PTO/SB/08a.

☐ have been previously furnished to the Office in prior application No. _____, filed _____, which the present application relies upon for an earlier effective filing date under 35 U.S.C. § 120. Therefore, no copies of the cited documents are included herewith pursuant to 37 C.F.R. § 1.98(d); MPEP § 609(III)(A)(2).

☒ are enclosed unless they are U.S. patents or U.S. patent application publications pursuant to 37 C.F.R. § 1.98(a).

I
BASIS

This information disclosure statement is filed pursuant to

☒ 37 C.F.R. § 1.97(b).
This information disclosure statement is filed either (1) within three months of the filing date of a national application other than a continued prosecution application under 37 C.F.R. § 1.53(d); (2) within three months of the date of entry of the national stage as set forth in 37 C.F.R. § 1.491 in an international application; (3) before the mailing date of a first Office action on the merits; (4) concurrently with the filing of a request for continued examination under 37 C.F.R. § 1.114; or (5) before the mailing of a first Office action after the filing of a request for continued examination under 37 C.F.R. § 1.114, whichever event occurs last.

Accordingly, this information disclosure statement requires no fee and no certification.

☐ 37 C.F.R. § 1.97(c).
This information disclosure statement is filed after the period specified in 37 C.F.R. § 1.97(b), but before the mailing date of any of (1) a final action under 37 C.F.R. § 1.113; (2) a notice of allowance under 37 C.F.R. § 1.311; or (3) an action that otherwise closes prosecution in the application.

Accordingly, this information disclosure statement requires either the fee specified in 37 C.F.R. § 1.17(p) for submission of an information disclosure statement under 37 C.F.R. § 1.97(c), or a statement under 37 C.F.R. § 1.97(e).

☐ 37 C.F.R. § 1.97(d).
This information disclosure statement is filed after the period specified in 37 C.F.R. § 1.97(c) since a:

☐ final action under 37 C.F.R. § 1.113

☐ notice of allowance under 37 C.F.R. § 1.311

was mailed to the Applicant on _____.

Accordingly, this information disclosure statement requires the fee set forth in 37 C.F.R. § 1.17(p) to consider an information disclosure statement under 37 C.F.R. § 1.97(d), and a statement under 37 C.F.R. § 1.97(e).

If this statement crosses in the mail with an Office action, or is otherwise not in the indicated category of 37 C.F.R. § 1.97, it is respectfully requested that this statement be treated in the next appropriate category and made of record. To the extent required, please treat this paper as a conditional petition for acceptance of the information disclosure statement.

II
FEES

Any required fee is being paid as indicated below:

☒ No fee is due.

☐ The fee specified in 37 C.F.R. § 1.17(p) for submission of an information disclosure statement under 37 C.F.R. § 1.97(c) or (d) is due.

☐ This fee is paid by credit card.

☐ Please charge the required fee to Deposit Account No. 505063.

☒ The Commissioner is hereby authorized to charge any additional required fees or credit any overpayments associated with this information disclosure statement to the account.

III

CERTIFICATION

Pursuant to 37 C.F.R. § 1.97(e), I state as follows:

☒ No statement is necessary.

☐ Each item of information contained in this information disclosure statement was first 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 information disclosure statement. 37 C.F.R. § 1.97(e)(1).

☐ No item of information contained in this information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to my knowledge after making reasonable inquiry, no item of information contained in this information disclosure statement was known to any individual designated in 37 C.F.R. § 1.56(c) more than three months prior to the filing of this information disclosure statement. 37 C.F.R. § 1.97(e)(2).

Pursuant to 37 C.F.R. § 1.704(d), I state as follows:

☐ Each item of information contained in this information disclosure 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 37 C.F.R. § 1.56(c) more than thirty days prior to the filing of this information disclosure statement.

IV
FOREIGN LANGUAGE REFERENCES

Pursuant to 37 C.F.R. § 1.98(a)(3)(i), any information disclosure statement filed under 37 C.F.R. § 1.97 shall include a concise explanation of the relevance, as it is presently understood by the individual designated in § 1.56(c) most knowledgeable about the content of the information, of each patent, publication, or other information listed that is not in the English language. The concise explanation may be either separate from the specification or incorporated therein. In compliance with the rules, the Applicant states as follows:

☐ No concise explanation is required since all cited references are in English.

☐ A concise explanation of the relevance of one or more foreign language references is attached.

☐ According to the procedural policy adopted by the PTO with regard to disclosure requirements, the Applicant is satisfying the disclosure requirement pursuant to MPEP § 609.04(a)(III) by submitting herewith the following:

- ☐ English language versions of any non-English language documents.
- ☐ English language versions of one or more search reports or other actions by one or more foreign patent offices in one or more counterpart foreign applications, which indicate the degree of relevance found by the foreign office(s).
- ☐ Pursuant to 37 C.F.R. § 1.98(a)(3)(ii), a copy of a translation is not submitted herewith because a written English-language translation of a non-English-language document, or portion thereof, is not within the possession, custody, or control of, or is readily available to any individual designated in § 1.56(c).

The Applicant has not analyzed these documents and, therefore, declines to comment on their relevance at this time.

☐ One or more English language abstracts for the non-English language references are also enclosed.

V
REMARKS

It is respectfully requested that:

(1) The Examiner sign the enclosed Form to evidence that the cited information has been fully considered by the Patent and Trademark Office during the examination of this application; and

(2) The citations for the cited information be printed on any patent that issues from this application.

The submission of this information disclosure statement by the Applicant shall not be construed as a representation that a search has been performed or that no other material information under 37 C.F.R. § 1.56 exists. See 37 C.F.R. § 1.97(g).

The submission of this information disclosure statement by the Applicant shall not be construed as an admission that any information cited or referred to herein is, or is considered to be, material to the patentability of one or more of the pending claims in this application pursuant to 37 C.F.R. § 1.56(b), unless specifically designated by the Applicant as such. See 37 C.F.R. § 1.97(h).

The submission of this information disclosure statement by the Applicant shall not be construed as an admission that any information cited or referred to herein is, or is considered to be, or even qualifies as "prior art" under 35 U.S.C. § 102 with respect to this invention, unless specifically designated by the Applicant as such.

Notwithstanding any statements by the Applicant, the Examiner is urged to form his or her own conclusion regarding the relevance of the cited information.

VI
CONCLUSION

The Examiner is encouraged to contact the undersigned attorney to discuss any questions concerning this information disclosure statement or any of the information cited or referred to herein.

Respectfully submitted,

Date: April 19, 2011

/JCS/

Jonathan C. Siekmann
Registration No. 58,259
USPTO Customer No. 83579
Level 3 Communications, LLC
1025 Eldorado Blvd.
Broomfield, Colorado 80021
Tel: 720-888-2140
Fax: 720-888-5619

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 12/978,537

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	330
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	540
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	220
TOTAL CLAIMS (37 CFR 1.16(i))	1 minus 20 =	*			OR	x 52 =	0.00
INDEPENDENT CLAIMS (37 CFR 1.16(h))	1 minus 3 =	*				x 220 =	0.00
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $270 ($135 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						0.00
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	1090

APPLICATION AS AMENDED - PART II

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

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

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
12/978,537	12/24/2010	2447	1220	0093-US-I2	1	1

CONFIRMATION NO. 1389

UPDATED FILING RECEIPT

83579
LEVEL 3 COMMUNICATIONS, LLC
c/o CPA Global
P.O. Box 52050
Minneapolis, MN 55402

OC000000046447899

Date Mailed: 03/11/2011

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

Applicant(s)

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Assignment For Published Patent Application

Level 3 Communications, LLC, Broomfield, CO

Power of Attorney: None

Domestic Priority data as claimed by applicant

This application is a CON of 11/976,648 10/26/2007 PAT 7,860,964
which is a CIP of 10/259,497 09/30/2002 PAT 7,822,871
which claims benefit of 60/325,177 09/28/2001
This application 12/978,537
is a CIP of 11/932,162 10/31/2007
which is a CON of 10/259,497 09/30/2002 PAT 7,822,871
which claims benefit of 60/325,177 09/28/2001

Foreign Applications (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.)

If Required, Foreign Filing License Granted: 01/12/2011

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/978,537**

Projected Publication Date: 06/16/2011

Non-Publication Request: No

Early Publication Request: No

Title

Policy-Based Content Delivery Network Selection

Preliminary Class

709

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT FORM PTO-1449 (modified) Sheet 1 of 32	Application No.	12/978,537
	Filing Date	Dec. 24, 2010
	First Named Inventor	Mark BRADY
	Group Art Unit	2447
	Examiner Name	TBD
	Attorney Docket No.	0093-US-I2
	Confirmation No.	1389

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.	Document No.	Publication/ Issue Date	Name of Patentee or Applicant of Cited Document
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT FORM PTO-1449 (modified) Sheet 2 of 32		
	Application No.	12/978,537
	Filing Date	Dec. 24, 2010
	First Named Inventor	Mark BRADY
	Group Art Unit	2447
	Examiner Name	TBD
	Attorney Docket No.	0093-US-I2
	Confirmation No.	1389

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT FORM PTO-1449 (modified) Sheet 3 of 32		
	Application No.	12/978,537
	Filing Date	Dec. 24, 2010
	First Named Inventor	Mark BRADY
	Group Art Unit	2447
	Examiner Name	TBD
	Attorney Docket No.	0093-US-I2
	Confirmation No.	1389

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT FORM PTO-1449 (modified) Sheet 4 of 32		
	Application No.	12/978,537
	Filing Date	Dec. 24, 2010
	First Named Inventor	Mark BRADY
	Group Art Unit	2447
	Examiner Name	TBD
	Attorney Docket No.	0093-US-I2
	Confirmation No.	1389

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Examiner Initials*	Cite No.	Document No.	Publication/ Issue Date	Name of Patentee or Applicant of Cited Document
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT FORM PTO-1449 (modified) Sheet 5 of 32		
	Application No.	12/978,537
	Filing Date	Dec. 24, 2010
	First Named Inventor	Mark BRADY
	Group Art Unit	2447
	Examiner Name	TBD
	Attorney Docket No.	0093-US-I2
	Confirmation No.	1389

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Examiner Initials*	Cite No.	Document No.	Publication/ Issue Date	Name of Patentee or Applicant of Cited Document
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT FORM PTO-1449 (modified) Sheet 6 of 32		
	Application No.	12/978,537
	Filing Date	Dec. 24, 2010
	First Named Inventor	Mark BRADY
	Group Art Unit	2447
	Examiner Name	TBD
	Attorney Docket No.	0093-US-I2
	Confirmation No.	1389

U.S. PATENT DOCUMENTS				
Examiner Initials*	Cite No.	Document No.	Publication/ Issue Date	Name of Patentee or Applicant of Cited Document
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT FORM PTO-1449 (modified) Sheet 7 of 32		
	Application No.	12/978,537
	Filing Date	Dec. 24, 2010
	First Named Inventor	Mark BRADY
	Group Art Unit	2447
	Examiner Name	TBD
	Attorney Docket No.	0093-US-I2
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U.S. PATENT DOCUMENTS				
Examiner Initials*	Cite No.	Document No.	Publication/ Issue Date	Name of Patentee or Applicant of Cited Document
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT FORM PTO-1449 (modified) Sheet 8 of 32		
	Application No.	12/978,537
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	Group Art Unit	2447
	Examiner Name	TBD
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Examiner Initials*	Cite No.	Document No.	Publication/ Issue Date	Name of Patentee or Applicant of Cited Document
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Examiner Signature		Date Considered	

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	Filing Date	Dec. 24, 2010
	First Named Inventor	Mark BRADY
	Group Art Unit	2447
	Examiner Name	TBD
	Attorney Docket No.	0093-US-I2
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	First Named Inventor	Mark BRADY
	Group Art Unit	2447
	Examiner Name	TBD
	Attorney Docket No.	0093-US-I2
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	First Named Inventor	Mark BRADY
	Group Art Unit	2447
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Examiner Initials*	Cite No.	Non-patent Reference bibliographic information, where available	Notes
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NON-PATENT REFERENCES

Examiner Initials*	Cite No.	Non-patent Reference bibliographic information, where available	Notes
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Application Number:	12978537
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Confirmation Number:	1389
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First Named Inventor/Applicant Name:	Mark Brady
Customer Number:	75948
Filer:	Brian Siritzky
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Receipt Date:	03-MAR-2011
Filing Date:	24-DEC-2010
Time Stamp:	10:33:14
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	Transmittal Letter	2711_0107_PA_IDS_03_03_2011.pdf	216924 5faae60d88e6bccb0df7c06c81e4e294b6de7923	no	3

Warnings:	
Information:	

2	Information Disclosure Statement (IDS) Filed (SB/08)	2711_0107_PA_1449_03_03_2011.pdf	481687 dc75c2bb164e3cc28cf1a6d5d8bd846807c5dc3f	no	32

Warnings:	
Information:	
This is not an USPTO supplied IDS fillable form	
Total Files Size (in bytes):	698611

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

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

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

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

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re PATENT APPLICATION OF:	Attorney Docket: 0093-US-I2
BRADY et al.	Group Art Unit: 2447
Application Serial No.: 12/978,537	Examiner: *TBD*
Application Filing Date: 12-24-2010	Confirmation No.: 1389
Title: **Policy-Based Content Delivery Network Selection**	Date: March 3, 2011

INFORMATION DISCLOSURE STATEMENT

via EFS-WEB
Hon. Commissioner of Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Pursuant to 37 C.F.R. § 1.56, the attention of the Patent and Trademark Office is hereby directed to the reference(s) listed on the attached PTO-1449. One copy of each non-U.S. Patent reference is attached. It is respectfully requested that the information be expressly considered during the prosecution of this application, and that the reference(s) be made of record therein and appear among the "References Cited" on any patent to issue therefrom.

The submission of any document herewith, which is not a statutory bar, is not intended that any such document constitutes prior art against any of the claims of the present application or is considered to be material to patentability as defined in 37 C.F.R. § 1.56(b). Applicants do not waive any rights to take any action which would be appropriate to antedate or otherwise remove as a competent reference against the claims of the present application.

This Information Disclosure Statement is being filed within three (3) months of the U.S. filing date OR before the mailing date of a first Office Action on the merits. No certification or fee is required.

RELATED APPLICATIONS

The Examiner's attention is directed to U.S. Patent Applications No. 10/259,497, filed 09-30-2002, (now U.S. Pat. No. 7,822,871), No. 11/976,648, filed 10/26/2007 (now U.S. Pat. No. 7,860,694), and 11/932,162, filed 10-31-2007 (pending), which are directed to related technical subject matter. The Examiner is respectfully requested to consider the cited application and the art cited therein during examination.

The Examiner's attention is also directed to the following non-U.S. Patents and patent applications which are directed to related technical subject matter:

Office Code	Reference / Application Number	Status
PCT	PCT/US02/30921	expired
CN	02821371.8	pending
EP	2002799672	pending, published: July 14, 2004
JP	2003531370	issued as JP 4160506, Granted July 25, 2008
KR	1020047004613	Published: 14.09.2004, Granted: 11.11.2009 Korean Patent No. 10-093190

Documents from these applications are being cited herewith.

If the Examiner has any questions about any of these applications or requires any additional information, he is respectfully requested to contact the undersigned.

Copies of the references were cited by or submitted to the Office in parent Application No. 11/976,648, filed 10/26/2007 (now U.S. Pat. No. 7,860,694), and/or in Application No. 10/259,497, filed 09/30/2002 (now U.S. Pat. No.

7,822,871) which are relied upon for an earlier filing date under 35 U.S.C. 120. Thus, Form PTO 1449 is attached without copies of these references. 37 C.F.R. § 1.98(d).

This IDS is intended to be in full compliance with the rules, but should the Examiner find any part of its requirement content to have been omitted, prompt notice to that effect is earnestly solicited, along with additional time under Rule 97(f), to enable Applicant to comply fully.

CHARGE STATEMENT: Deposit Account No. 501860, order no. **2711-0107**.

The Commissioner is hereby authorized to charge any fee specifically authorized hereafter, or any missing or insufficient fee(s) filed, or asserted to be filed, or which should have been filed herewith or concerning any paper filed hereafter, and which may be required under Rules 16-18 (missing or insufficiencies only) now or hereafter relative to this application and the resulting Official Document under Rule 20, or credit any overpayment, to our Accounting/Order Nos. shown above.

This CHARGE STATEMENT does not authorize charge of the issue fee until/unless an issue fee transmittal sheet is filed.

CUSTOMER NUMBER

83579

Davidson Berquist Jackson & Gowdey LLP
4300 Wilson Blvd., 7th Floor,
Arlington Virginia 22203
(703) 894-6400 ● FAX: (703) 894-6430

Respectfully submitted,

/Brian Siritzky/Reg. No. 37,497

By:_____

Brian Siritzky, Ph.D.
Registration No.: 37,497

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re PATENT APPLICATION OF:	Attorney Docket: 0093-US-I2
BRADY et al.	Group Art Unit: 2447
Application Serial No.: 12/978,537	Examiner: *TBD*
Application Filing Date: 12-24-2010	Confirmation No.: 1389
Title: **Policy-Based Content Delivery Network Selection**	Date: March 2, 2011

RESPONSE TO NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

via EFS-WEB
Hon. Commissioner of Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In response to the *Notice to File Parts of Nonprovisional Application* mailed January 14, 2011, attached please find the following documents which complete the filing of the above-identified patent application:

- ☒ Letter Submitting **Replacement Drawing Sheets** with 13 pages of Replacement Sheets Figs 9(a)-9(c), 10(a)-10(e), 10(j), 10(l), 10(n), 11(a)-11(c)
- ☒ **Declaration** signed by all *available* joint inventors (this is the same declaration as was filed in the parent application, no. 11/976,648.)
- ☒ A copy of the **decision granting a petition** in prior parent application no. 11/976,648 (the present application is a *continuation* of 11/976,648). No inventor who refused to joint the prior application has subsequently jointed the prior application or another application of which this application claims a benefit under 35 USC 120, 121, or 365(c).

CHARGE STATEMENT: Deposit Account No. 501860, order no. **2711-0107**.
The Commissioner is hereby authorized to charge any fee specifically authorized hereafter, or any missing or insufficient fee(s) filed, or asserted to be filed, or which should have been filed herewith or concerning any paper filed hereafter, and which may be required under Rules 16-18 (missing or insufficiencies only) now or hereafter relative to this application and the resulting Official Document under Rule 20, or credit any overpayment, to our Accounting/Order Nos. shown above. **This CHARGE STATEMENT does not authorize charge of the issue fee until/unless an issue fee transmittal sheet is filed**.

CUSTOMER NUMBER

83579

Davidson Berquist Jackson & Gowdey LLP
4300 Wilson Blvd., 7th Floor,
Arlington Virginia 22203
(703) 894-6400 ● FAX: (703) 894-6430

Respectfully submitted,

/Brian Siritzky/Reg. No. 37,497

By:_____

Brian Siritzky, Ph.D.
Registration No.: 37,497

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
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LEVEL 3 COMMUNICATIONS, LLC
C/O CPA GLOBAL
P.O. BOX 52050
MINNEAPOLIS MN 55402

MAILED
OCT 06 2010
OFFICE OF PETITIONS

In re Application of :
Stolorz et al. :
Application Number: 11/976,648 : ON PETITION
Filing Date: 10/26/2007 :
Attorney Docket Number: 0093-US-I1 :

This is a decision in reference to the petition filed on July 9, 2010 which are treated as (a) a petition under 37 CFR 1.48(a)(1) requesting a person be added as a named inventor and (b) a petition under 37 CFR 1.183 requesting waiver of 37 CFR 1.64 which requires that a named inventor execute a supplemental declaration.

The petition is **GRANTED**.

On October 26, 2007, the above-identified application was filed with a declaration naming Paul E. Stolorz, John K. Salmon, Michael S. Warren, Jeffrey Koller, Aric Hagberg, Maksim Yevmenkin, Mark Brady, and David Pfitzner as joint inventors.

On July 9, 2010, the subject petitions were filed. Petitioners request that Ted Middleton be added as a named inventor under 37 CFR 1.48(a)(1). Petitioners also request waiver under 37 CFR 1.183 of 1.64 in that two named inventors, Stolorz and Hagberg, refuse to execute the supplemental declaration naming them as joint inventors.

Specifically, petitioners have shown that the application and new declaration were sent on two occasions to inventors Stolorz and Hagberg, but they have failed to sign and return the declarations

naming the original inventors and Ted Middleton as joint inventors.

Petition Under 37 CFR 1.48(a).

37 CFR 1.48(a) requires that an amendment to the named inventive entity be accompanied by:

(1) a petition including a statement from each person being added and each person being deleted as an inventor that the error occurred without deceptive intention on his or her part;

(2) an oath or declaration by each actual inventor or inventors as required by 37 CFR 1.63 or as permitted by 37 CFR 1.42, 1.43 or 1.47;

(3) the fee set forth in 37 CFR 1.17(i), and

(4) the written consent of any existing assignee, if any of the originally named inventors has executed an assignment.

As such, the petition under 37 CFR 1.48 is granted with respect to the addition of Ted Middleton as a named inventor.

Petition Under 37 CFR 1.183 to waive 1.64.

In view of the efforts recounted in the petition to obtain the signatures of Paul E. Stolorz and Aric Hagberg, it is agreed that justice would be served by waiving the requirement for their signatures on the supplemental declaration.

The inventorship will be as stated in the attached corrected filing receipt.

The address in the petition is different than the correspondence address. A courtesy copy of this decision is being mailed to the address in the petition. All future correspondence will be mailed solely to the address of record. A change of correspondence address should be filed if the correspondence address needs to be updated.

The application is referred to Technology Center Art Unit 2451 for further processing.

Telephone inquiries related to this decision should be directed to the undersigned at 571-272-3231.

Douglas I. Wood
Senior Petitions Attorney
Office of Petitions

Encl: Corrected Filing Receipt

Cc: DAVIDSON BERQUIST JACKSON & GOWDEY LLP
4300 WILSON BLVD, 7TH FLOOR
ARLINGTON VA 22203

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
11/976,648	10/26/2007	2451	2000	0093-US-11	25	5

CONFIRMATION NO. 2828

CORRECTED FILING RECEIPT

83579
LEVEL 3 COMMUNICATIONS, LLC
c/o CPA Global
P.O. Box 52050
Minneapolis, MN 55402



Date Mailed: 10/06/2010

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

Applicant(s)

Paul E. Stolorz, Thousand Oaks, CA;
John K. Salmon, Altadena, CA;
Michael S. Warren, Santa Fe, NM;
Jeffrey Koller, Torrance, CA;
Aric Hagberg, Santa Fe, NM;
Maksim Yevmenkin, Thousand Oaks, CA;
Mark Brady, Thousand Oaks, CA;
David Pfitzner, Thousand Oaks, CA;
Ted Middleton; Moorpark, CA;

Assignment For Published Patent Application

Level 3 Communications, LLC, Broomfield, CO

Power of Attorney: The patent practitioners associated with Customer Number 42624

Domestic Priority data as claimed by applicant

This application is a CIP of 10/259,497 09/30/2002
which claims benefit of 60/325,177 09/28/2001

Foreign Applications

If Required, Foreign Filing License Granted: 11/23/2007

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 11/976,648**

Projected Publication Date: Not Applicable

Non-Publication Request: No

Early Publication Request: Yes
Title

POLICY-BASED CONTENT DELIVERY NETWORK SELECTION

Preliminary Class

709

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

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

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

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

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

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

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where

the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

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

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

NOT GRANTED

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

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
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C/O CPA GLOBAL
P.O. BOX 52050
MINNEAPOLIS, MN 55402

MAILED

AUG 26 2010

OFFICE OF PETITIONS

In re Application of :
Paul E. Stolorz et al :
Application No. 11/976,648 : ON PETITION
Filed: October 26, 2007 :
Attorney Docket No. 0093-US-I1

This is a decision on the petition, filed August 24, 2010 under 37 CFR 1.313(c)(2) to withdraw the above-identified application from issue after payment of the issue fee.

The petition is **GRANTED**.

The above-identified application is withdrawn from issue for consideration of a submission under 37 CFR 1.114 (request for continued examination). See 37 CFR 1.313(c)(2).

Petitioner is advised that the issue fee paid on July 9, 2010 in the above-identified application cannot be refunded. If, however, the above-identified application is again allowed, petitioner may request that it be applied towards the issue fee required by the new Notice of Allowance.[1]

The file does not indicate a change of address has been submitted, although the address given on the petition differs from the address of record. If appropriate, a change of address should be filed in accordance with MPEP 601.03. A courtesy copy of this decision is being mailed to the address given on the petition; however, the Office will mail all future correspondence solely to the address of record.

Telephone inquiries should be directed to Irvin Dingle at (571) 272-3210.

This matter is being referred to Technology Center AU 2451 for processing of the request for continued examination under 37 CFR 1.114 and for consideration of the concurrently-filed Information Disclosure Statement.

/Irvin Dingle/
Irvin Dingle
Petitions Examiner
Office of Petitions

cc: Brian Siritzky
Davidson, Berquist, Jackson & Gowdey LLP
4300 Wilson Blvd., 7th Floor
Arlington, VA 22203

[1] The request to apply the issue fee to the new Notice may be satisfied by completing and returning the new Issue Fee Transmittal Form PTOL-85(b), which includes the following language thereon: Commissioner for Patents is requested to apply the Issue Fee and Publication Fee (if any) or re-apply any previously paid issue fee to the application identified above. Petitioner is advised that, whether a fee is indicated as being due or not, the Issue Fee Transmittal Form **must** be completed and timely submitted to avoid abandonment. Note the language in bold text on the first page of the Notice of Allowance and Fee(s) Due (PTOL-85).

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re PATENT APPLICATION OF: BRADY et al.	Attorney Docket: 0093-US-I2
Application Serial No.: 12/978,537	Group Art Unit: 2447
Application Filing Date: 12-24-2010	Examiner: *TBD*
Title: **Policy-Based Content Delivery Network Selection**	Confirmation No.: 1389
	Date: March 2, 2011

LETTER SUBMITTING REPLACEMENT DRAWING SHEETS

via EFS-WEB
Hon. Commissioner of Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In response to the *Notice to File Parts of Nonprovisional Application* mailed January 14, 2011, the following drawing sheets are submitted herewith:

Thirteen (13) pages of Replacement Sheets Figs 9(a)-9(c), 10(a)-10(e), 10(j), 10(l), 10(n), 11(a) - 11(c). These drawings are free from erasures and alterations; have the correct font size; and are electronically reproducible.

CHARGE STATEMENT: Deposit Account No. 501860, order no. **2711-0107**.

The Commissioner is hereby authorized to charge any fee specifically authorized hereafter, or any missing or insufficient fee(s) filed, or asserted to be filed, or which should have been filed herewith or concerning any paper filed hereafter, and which may be required under Rules 16-18 (missing or insufficiencies only) now or hereafter relative to this application and the resulting Official Document under Rule 20, or credit any overpayment, to our Accounting/Order Nos. shown above.

This CHARGE STATEMENT does not authorize charge of the issue fee until/unless an issue fee transmittal sheet is filed.

CUSTOMER NUMBER

83579

Respectfully submitted,

/Brian Siritzky/Reg. No. 37,497

By:_____

Brian Siritzky, Ph.D.
Registration No.: 37,497

Davidson Berquist Jackson & Gowdey LLP
4300 Wilson Blvd., 7th Floor,
Arlington Virginia 22203
(703) 894-6400 • FAX: (703) 894-6430

Attorney Docket No.: 2711.0096 (0093-US-I1)

RULE 63 (37 C.F.R. 1.63)
INVENTORS DECLARATION FOR PATENT APPLICATION
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

As a below named inventor, I hereby declare that my residence, mailing address and citizenship are as stated below next to my name, and I believe I am an original, first and joint inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled:

POLICY-BASED CONTENT DELIVERY NETWORK SELECTION

the specification of which (check applicable box(es)):

☐ is attached hereto
☒ was filed on **10-26-2007** as U.S. Application Serial No. **11/976,648**
☐ was filed as PCT International application No. _____ on _____.
and (if applicable to U.S. or PCT application) was amended on _____.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above. I acknowledge the duty to disclose to the Patent Office all information known to me to be material to patentability as defined in 37 C.F.R. 1.56. I hereby claim foreign priority benefits under 35 U.S.C. 119/365 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 or, if no priority is claimed, before the filing date of this application:

Priority Foreign Application(s): **NONE**

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

Application Number	Day/Month/Year Filed
60/325,177	28/ Sept/2001

I hereby claim the benefit under 35 U.S.C. 120/365 of all prior United States and PCT international applications listed above or below.

Prior U.S./PCT Application(s) -- Application Serial No.	Day/Month/Year Filed	Status: Patented, Pending, Abandoned
10/259,497	30/Sept/2002	pending

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. And on behalf of the owner(s) hereof, I hereby ask that all communications in this matter be directed to: **DAVIDSON BERQUIST JACKSON & GOWDEY, LLP** at the address/phone numbers associated with customer number **75948**.

Inventor's Signature:			Date:
Inventor's Name:	**Paul** **E.** **STOLORZ**		
Citizenship:	Australia		
Residence:	City: Los Altos	State/Country:	CA / US
Mailing Address:	124 University Ave., Los Altos CA 94022		Zip Code: 94022

☒ Additional Inventors are being named on the 2 supplemental sheets attached hereto.

Declaration supplemental sheet (1 of 2)

Inventor's Signature:			Date: Jan 06, 2010
Inventor's Name:	John K. SALMON		
Citizenship:	US		
Residence:	City: Chappaqua	State/Country:	NY / US
Mailing Address:	820 Hardscrabble Rd., Chappaqua NY 10514, U.S.A.		Zip Code: 10514

Inventor's Signature:			Date:
Inventor's Name:	Michael S. WARREN		
Citizenship:	US		
Residence:	City: Los Alamos	State/Country:	NM / US
Mailing Address:	4611 Esperanza, Los Alamos, NM 87545, U.S.A.		Zip Code: 87545

Inventor's Signature:			Date:
Inventor's Name:	Jeffrey G. KOLLER		
Citizenship:	US		
Residence:	City: Oxnard	State/Country:	CA / US
Mailing Address:	3549 Glen Abbey Lane, Oxnard, CA 93036, U.S.A.		Zip Code: 93036

Inventor's Signature:			Date:
Inventor's Name:	Aric HAGBERG		
Citizenship:	US		
Residence:	City: Santa Fe	State/Country:	NM / US
Mailing Address:	36 Camino Chupadero Santa Fe, NM 87506, U.S.A.		Zip Code: 87506

Inventor's Signature:			Date:
Inventor's Name:	Maksim YEVMENKIN		
Citizenship:	Russia		
Residence:	City: Los Altos	State/Country:	CA / US
Mailing Address:	821 Warwick Ave. Thousand Oaks, CA 91360, U.S.A.		Zip Code: 91360

☒ Additional Inventors are named on the next sheet.

Declaration supplemental sheet (2 of 2)

Inventor's Signature:			Date:
Inventor's Name:	**Mark** **BRADY**		
Citizenship:	US		
Residence:	City: San Rafael	State/Country:	CA / US
Mailing Address:	615 Tarragon Dr. San Rafael, CA 94903, U.S.A.		Zip Code: 94903

Inventor's Signature:			Date:
Inventor's Name:	**David** **PFITZNER**		
Citizenship:	Australia		
Residence:	City: College Park	State/Country:	SA / Australia
Mailing Address:	1/40 Torrens Street College Park SA 5069 Australia		Zip Code: 5069

Inventor's Signature:			Date:
Inventor's Name:	**Ted** **MIDDLETON**		
Citizenship:	US		
Residence:	City: Moorpark	State/Country:	CA / US
Mailing Address:	4086 Bending Oak Ct. Moorpark, CA 93021, U.S.A.		Zip Code: 93021

RULE 63 (37 C.F.R. 1.63)
INVENTORS DECLARATION FOR PATENT APPLICATION
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

As a below named inventor, I hereby declare that my residence, mailing address and citizenship are as stated below next to my name, and I believe I am an original, first and joint inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled:

POLICY-BASED CONTENT DELIVERY NETWORK SELECTION

the specification of which (**check** applicable **box(es)**):

☐ is attached hereto
☒ was filed on **10-26-2007** as U.S. Application Serial No. **11/976,648**
☐ was filed as PCT International application No. _____ on _____.
and (if applicable to U.S. or PCT application) was amended on _____.

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Priority Foreign Application(s): **NONE**

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

Application Number	Day/Month/Year Filed
~~60/325,177~~	~~28/ Sept/2001~~

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10/259,497	30/Sept/2002	pending

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Inventor's Signature:			Date:
Inventor's Name:	**Paul E. Stolorz**		
Citizenship:	Australia		
Residence:	City: Los Altos	State/Country:	CA / US
Mailing Address:	124 University Ave., Los Altos CA 94022		Zip Code: 94022

☒ Additional inventors are being named on the 2 supplemental sheets attached hereto.

Declaration supplemental sheet (1 of 2)

Inventor's Signature:			Date:
Inventor's Name:	**John** **K.** **SALMON**		
Citizenship:	US		
Residence:	City: Chappaqua	State/Country:	NY / US
Mailing Address:	820 Hardscrabble Rd., Chappaqua NY 10514, U.S.A.		Zip Code: 10514

Inventor's Signature:			Date: 9/22/2008
Inventor's Name:	**Michael** **S.** **WARREN**		
Citizenship:	US		
Residence:	City: Los Alamos	State/Country:	NM / US
Mailing Address:	4611 Esperanza, Los Alamos, NM 87545, U.S.A.		Zip Code: 87545

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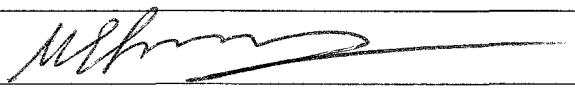
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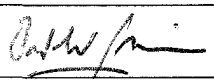
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As a below named inventor, I hereby declare that my residence, mailing address and citizenship are as stated below next to my name, and I believe I am an original, first and joint inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled:

POLICY-BASED CONTENT DELIVERY NETWORK SELECTION

the specification of which (**check** applicable **box(es)**):

☐ is attached hereto
☒ was filed on **10-26-2007** as U.S. Application Serial No. **11/976,648**
☐ was filed as PCT International application No. _____ on _____.
and (if applicable to U.S. or PCT application) was amended on _____.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above. I acknowledge the duty to disclose to the Patent Office all information known to me to be material to patentability as defined in 37 C.F.R. 1.56. I hereby claim foreign priority benefits under 35 U.S.C. 119/365 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 or, if no priority is claimed, before the filing date of this application:

Priority Foreign Application(s): **NONE**

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

Application Number	Day/Month/Year Filed
60/325,177	28/ Sept/2001

I hereby claim the benefit under 35 U.S.C. 120/365 of all prior United States and PCT international applications listed above or below.

Prior U.S./PCT Application(s) -- Application Serial No.	Day/Month/Year Filed	Status: Patented, Pending, Abandoned
10/259,497	30/Sept/2002	pending

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. And on behalf of the owner(s) hereof, I hereby ask that all communications in this matter be directed to: **DAVIDSON BERQUIST JACKSON & GOWDEY, LLP** at the address/phone numbers associated with customer number **75948**.

Inventor's Signature:			Date:
Inventor's Name:	**Paul E. Stolorz**		
Citizenship:	Australia		
Residence:	City: Los Altos	State/Country:	CA / US
Mailing Address:	124 University Ave., Los Altos CA 94022		Zip Code: 94022

☒ Additional inventors are being named on the 2 supplemental sheets attached hereto.

Declaration supplemental sheet (1 of 2)

Inventor's Signature:			Date:
Inventor's Name:	**John** **K.** **SALMON**		
Citizenship:	US		
Residence:	City: Chappaqua	State/Country:	NY / US
Mailing Address:	820 Hardscrabble Rd., Chappaqua NY 10514, U.S.A.		Zip Code: 10514

Inventor's Signature:			Date:
Inventor's Name:	**Michael** **S.** **WARREN**		
Citizenship:	US		
Residence:	City: Los Alamos	State/Country:	NM / US
Mailing Address:	4611 Esperanza, Los Alamos, NM 87545, U.S.A.		Zip Code: 87545

Inventor's Signature:			Date:
Inventor's Name:	**Jeffrey** **G.** **KOLLER**		
Citizenship:	US		
Residence:	City: Oxnard	State/Country:	CA / US
Mailing Address:	3549 Glen Abbey Lane, Oxnard, CA 93036, U.S.A.		Zip Code: 93036

Inventor's Signature:			Date:
Inventor's Name:	**Aric** **HAGBERG**		
Citizenship:	US		
Residence:	City: Santa Fe	State/Country:	NM / US
Mailing Address:	36 Camino Chupadero Santa Fe, NM 87506, U.S.A.		Zip Code: 87506

Inventor's Signature:			Date:
Inventor's Name:	**Maksim** **YEVMENKIN**		
Citizenship:	Russia		
Residence:	City: Los Altos	State/Country:	CA / US
Mailing Address:	821 Warwick Ave. Thousand Oaks, CA 91360, U.S.A.		Zip Code: 91360

☒ Additional inventors are named on the next sheet.

Declaration supplemental sheet (2 of 2)

Inventor's Signature:			Date:
Inventor's Name:	**Mark** **BRADY**		
Citizenship:	US		
Residence:	City: San Rafael	State/Country:	CA / US
Mailing Address:	615 Tarragon Dr. San Rafael, CA 94903, U.S.A.		Zip Code: 94903

Inventor's Signature:			Date:
Inventor's Name:	**David** **PFITZNER**		
Citizenship:	Australia		
Residence:	City: College Park	State/Country:	SA / Australia
Mailing Address:	1/40 Torrens Street College Park SA 5069 Australia		Zip Code: 5069

Inventor's Signature:			Date: 11/7/08
Inventor's Name:	**Ted** **MIDDLETON**		
Citizenship:	US		
Residence:	City: Moorpark	State/Country:	CA / US
Mailing Address:	4086 Bending Oak Ct. Moorpark, CA 93021, U.S.A.		Zip Code: 93021

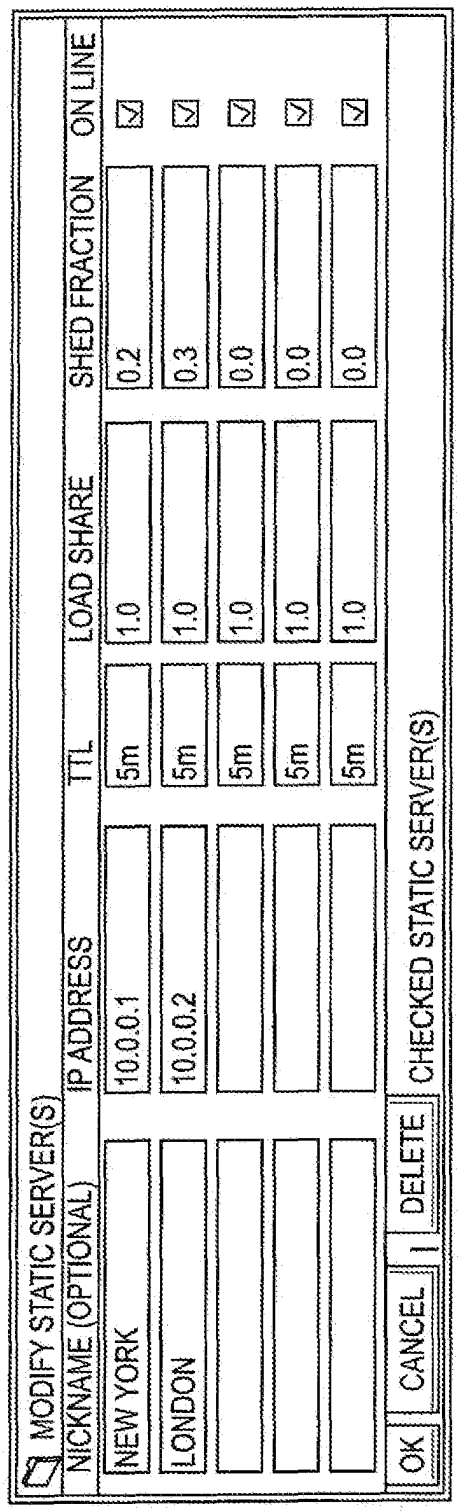

MODIFY STATIC SERVER(S)
NICKNAME (OPTIONAL)
IP ADDRESS
TTL
LOAD SHARE
SHED FRACTION
ON LINE
NEW YORK
10.0.0.1
5m
1.0
0.2
LONDON
10.0.0.2
5m
1.0
0.3
5m
1.0
0.0
5m
1.0
0.0
5m
1.0
0.0
OK
CANCEL
DELETE
CHECKED STATIC SERVER(S)

FIG. 9(a)

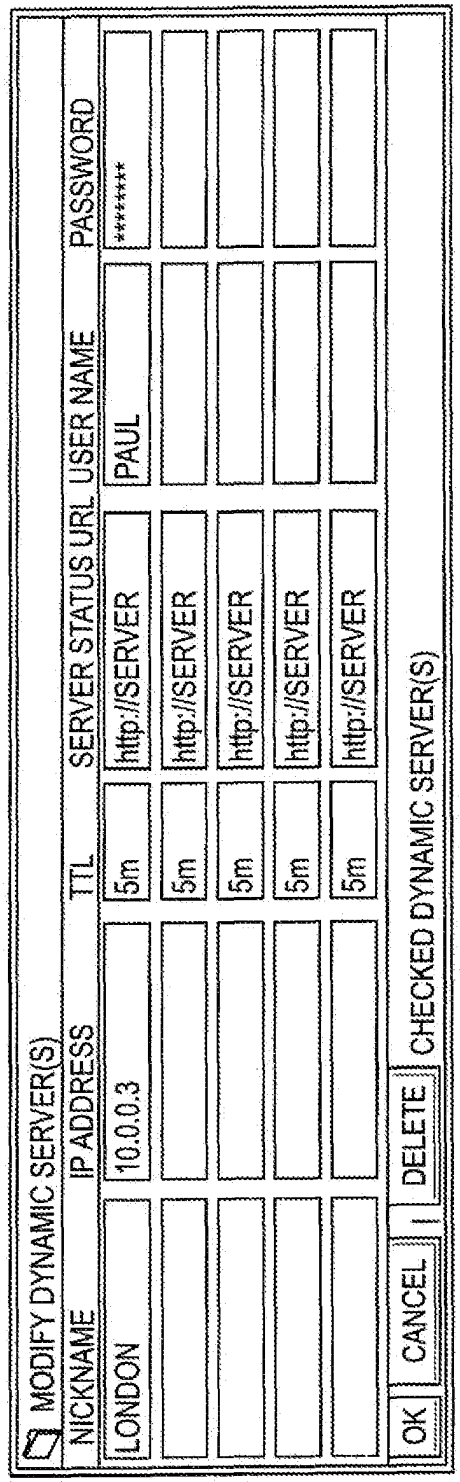

MODIFY DYNAMIC SERVER(S)
NICKNAME
IP ADDRESS
TTL
SERVER STATUS URL
USER NAME
PASSWORD
LONDON
10.0.0.3
5m
http://SERVER
PAUL
****
5m
http://SERVER
5m
http://SERVER
5m
http://SERVER
5m
http://SERVER
OK
CANCEL
DELETE
CHECKED DYNAMIC SERVER(S)

FIG. 9(b)

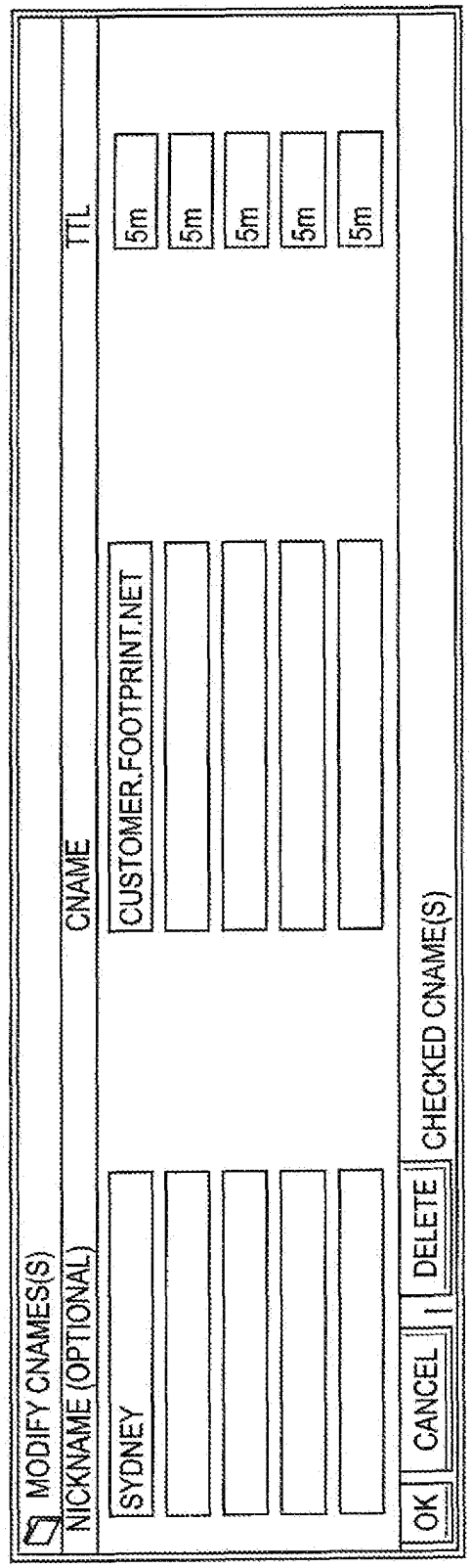

MODIFY CNAMES(S)
NICKNAME (OPTIONAL)
CNAME
TTL
SYDNEY
CUSTOMER.FOOTPRINT.NET
5m
5m
5m
5m
5m
OK
CANCEL
DELETE
CHECKED CNAME(S)

FIG. 9(c)

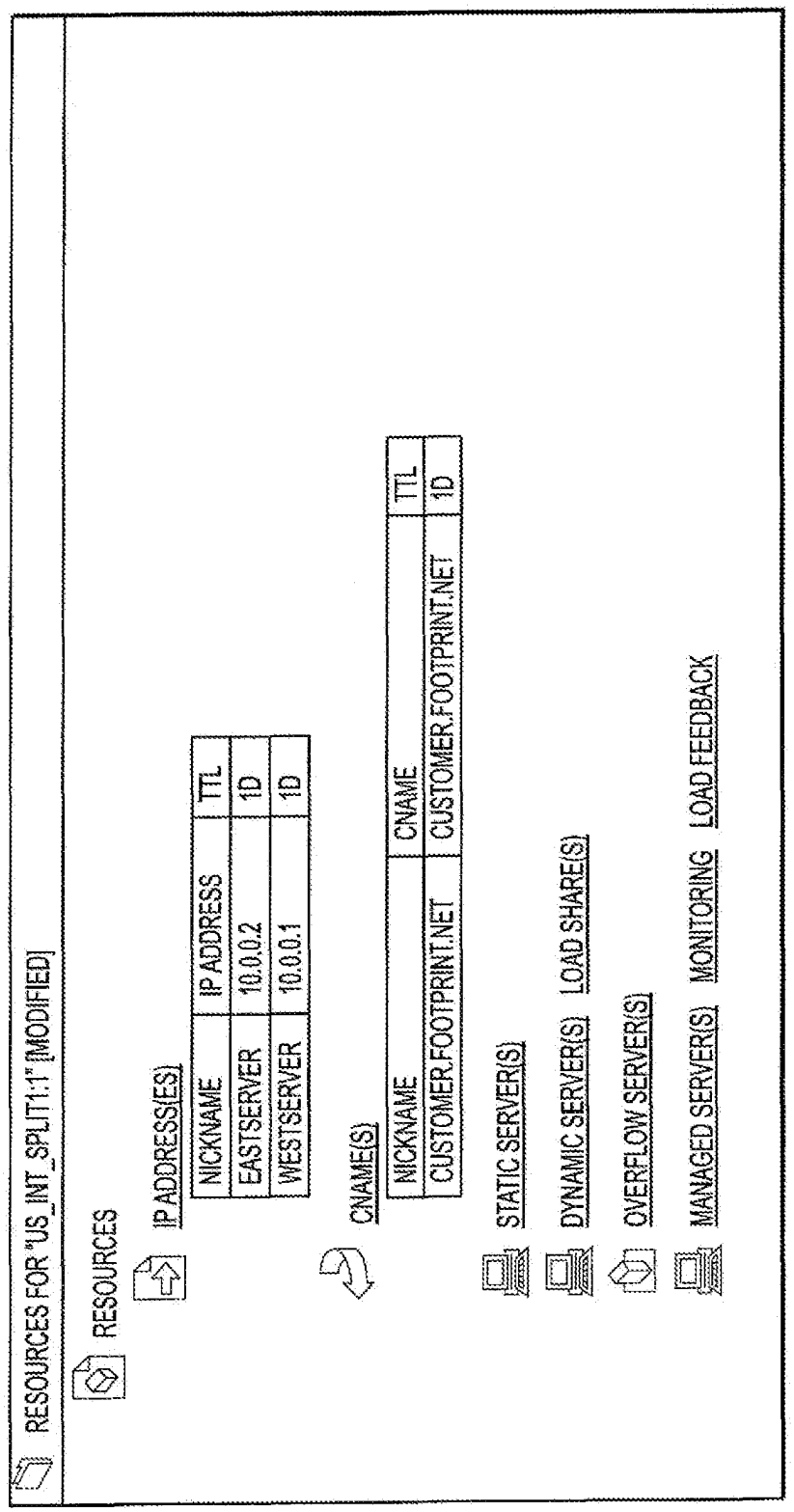

RESOURCES FOR "US_INT_SPLIT1:1" [MODIFIED]
RESOURCES
IP ADDRESS(ES)
NICKNAME
IP ADDRESS
TTL
EASTSERVER
10.0.0.2
1D
WESTSERVER
10.0.0.1
1D
CNAME(S)
NICKNAME
CNAME
TTL
CUSTOMER.FOOTPRINT.NET
CUSTOMER.FOOTPRINT.NET
1D
STATIC SERVER(S)
DYNAMIC SERVER(S)
LOAD SHARE(S)
OVERFLOW SERVER(S)
MANAGED SERVER(S)
MONITORING
LOAD FEEDBACK

FIG. 10(a)

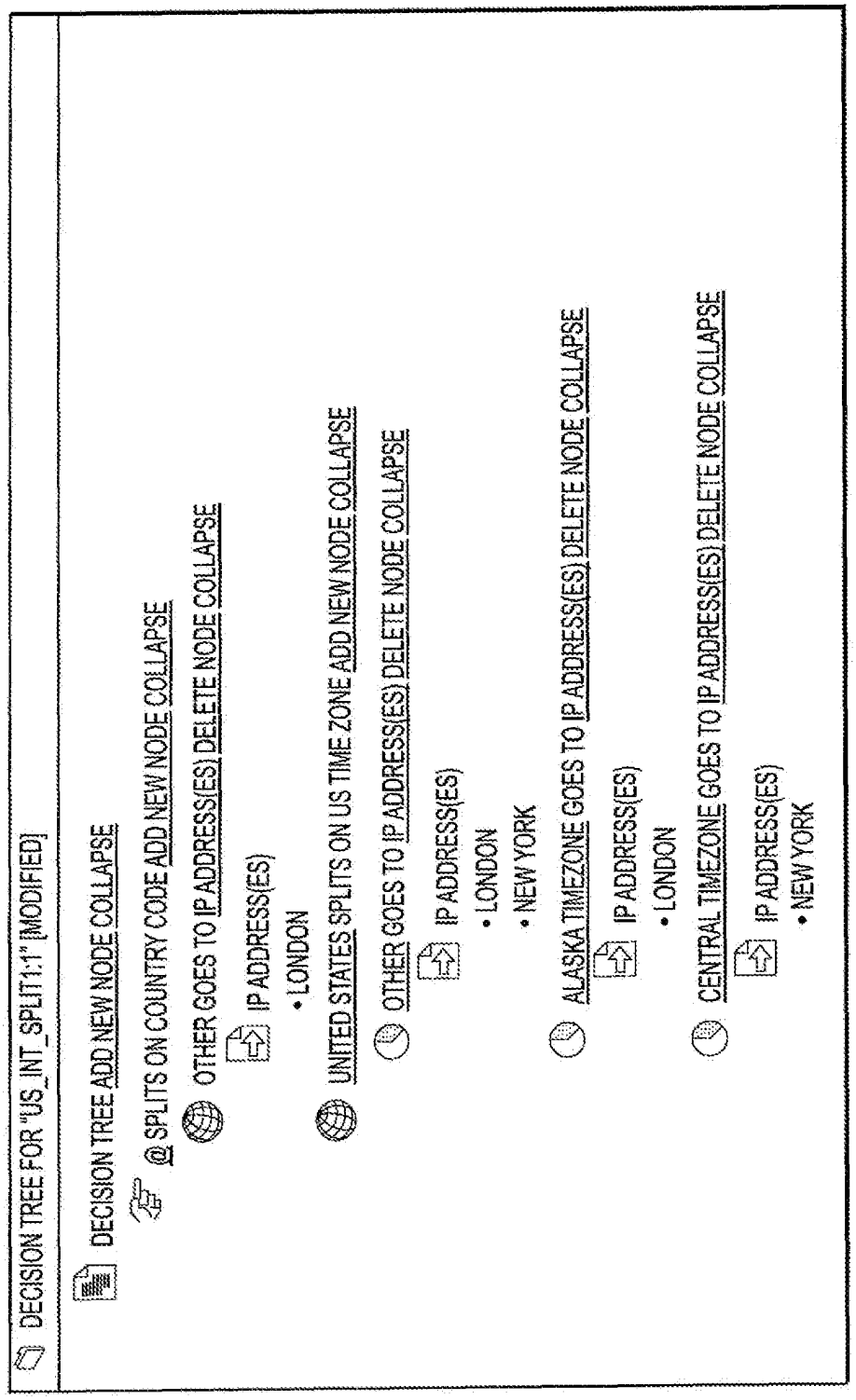

DECISION TREE FOR "US_INT_SPLIT1:1" [MODIFIED]
DECISION TREE ADD NEW NODE COLLAPSE
@ SPLITS ON COUNTRY CODE ADD NEW NODE COLLAPSE
OTHER GOES TO IP ADDRESS(ES) DELETE NODE COLLAPSE
IP ADDRESS(ES)
• LONDON
UNITED STATES SPLITS ON US TIME ZONE ADD NEW NODE COLLAPSE
OTHER GOES TO IP ADDRESS(ES) DELETE NODE COLLAPSE
IP ADDRESS(ES)
• LONDON
• NEW YORK
ALASKA TIMEZONE GOES TO IP ADDRESS(ES) DELETE NODE COLLAPSE
IP ADDRESS(ES)
• LONDON
CENTRAL TIMEZONE GOES TO IP ADDRESS(ES) DELETE NODE COLLAPSE
IP ADDRESS(ES)
• NEW YORK

FIG. 10(b)

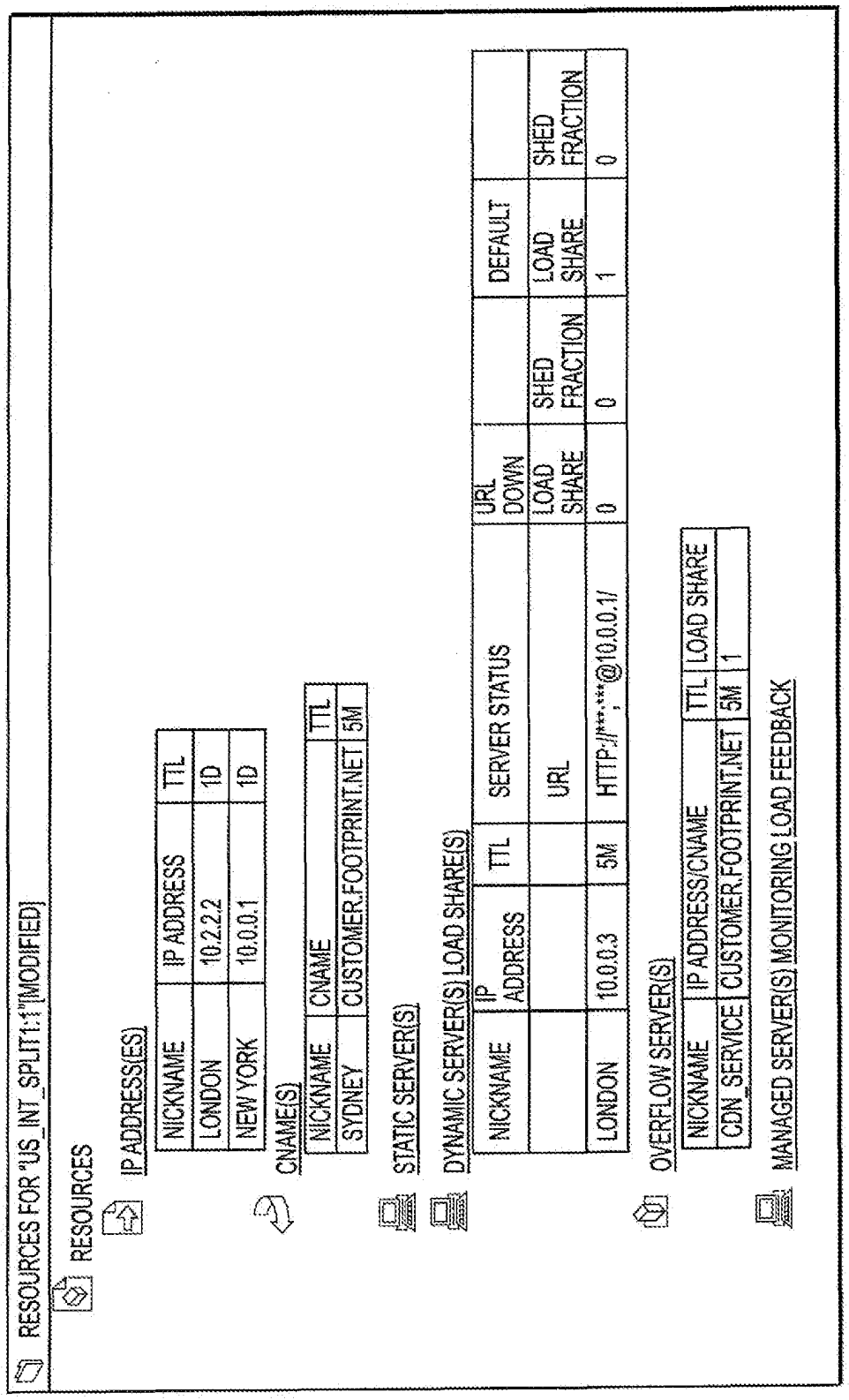

RESOURCES FOR "US_INT_SPLIT1:1"[MODIFIED]
RESOURCES
IP ADDRESS(ES)
NICKNAME | IP ADDRESS | TTL
LONDON | 10.2.2.2 | 1D
NEW YORK | 10.0.0.1 | 1D
CNAME(S)
NICKNAME | CNAME | TTL
SYDNEY | CUSTOMER.FOOTPRINT.NET | 5M
STATIC SERVER(S)
DYNAMIC SERVER(S) LOAD SHARE(S)
NICKNAME | IP ADDRESS | TTL | SERVER STATUS | URL DOWN | | DEFAULT | |
| | | URL | LOAD SHARE | SHED FRACTION | LOAD SHARE | SHED FRACTION
LONDON | 10.0.0.3 | 5M | HTTP://***:***@10.0.0.1/ | 0 | 0 | 1 | 0
OVERFLOW SERVER(S)
NICKNAME | IP ADDRESS/CNAME | TTL | LOAD SHARE
CDN_SERVICE | CUSTOMER.FOOTPRINT.NET | 5M | 1
MANAGED SERVER(S) MONITORING LOAD FEEDBACK

FIG. 10(c)

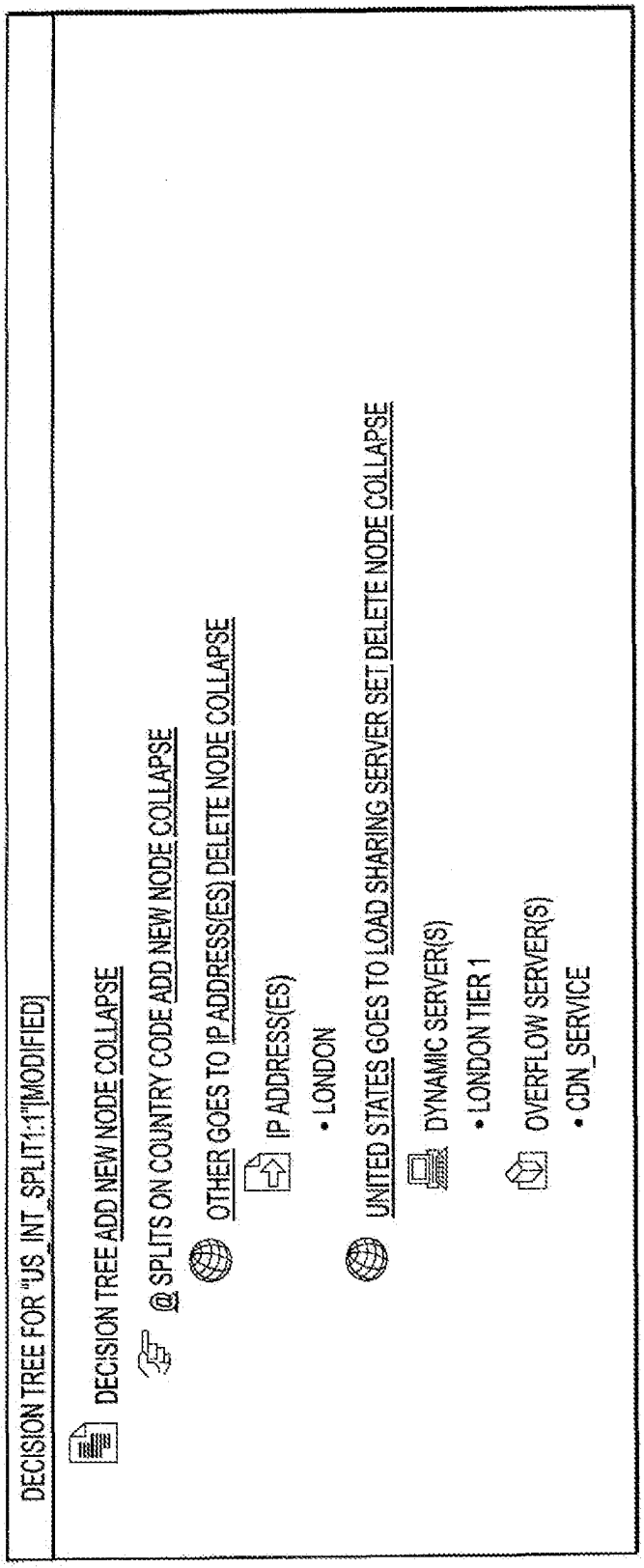

DECISION TREE FOR "US_INT_SPLIT1:1"[MODIFIED]
DECISION TREE ADD NEW NODE COLLAPSE
@ SPLITS ON COUNTRY CODE ADD NEW NODE COLLAPSE
OTHER GOES TO IP ADDRESS(ES) DELETE NODE COLLAPSE
IP ADDRESS(ES)
• LONDON
UNITED STATES GOES TO LOAD SHARING SERVER SET DELETE NODE COLLAPSE
DYNAMIC SERVER(S)
• LONDON TIER 1
OVERFLOW SERVER(S)
• CDN_SERVICE

FIG. 10(d)

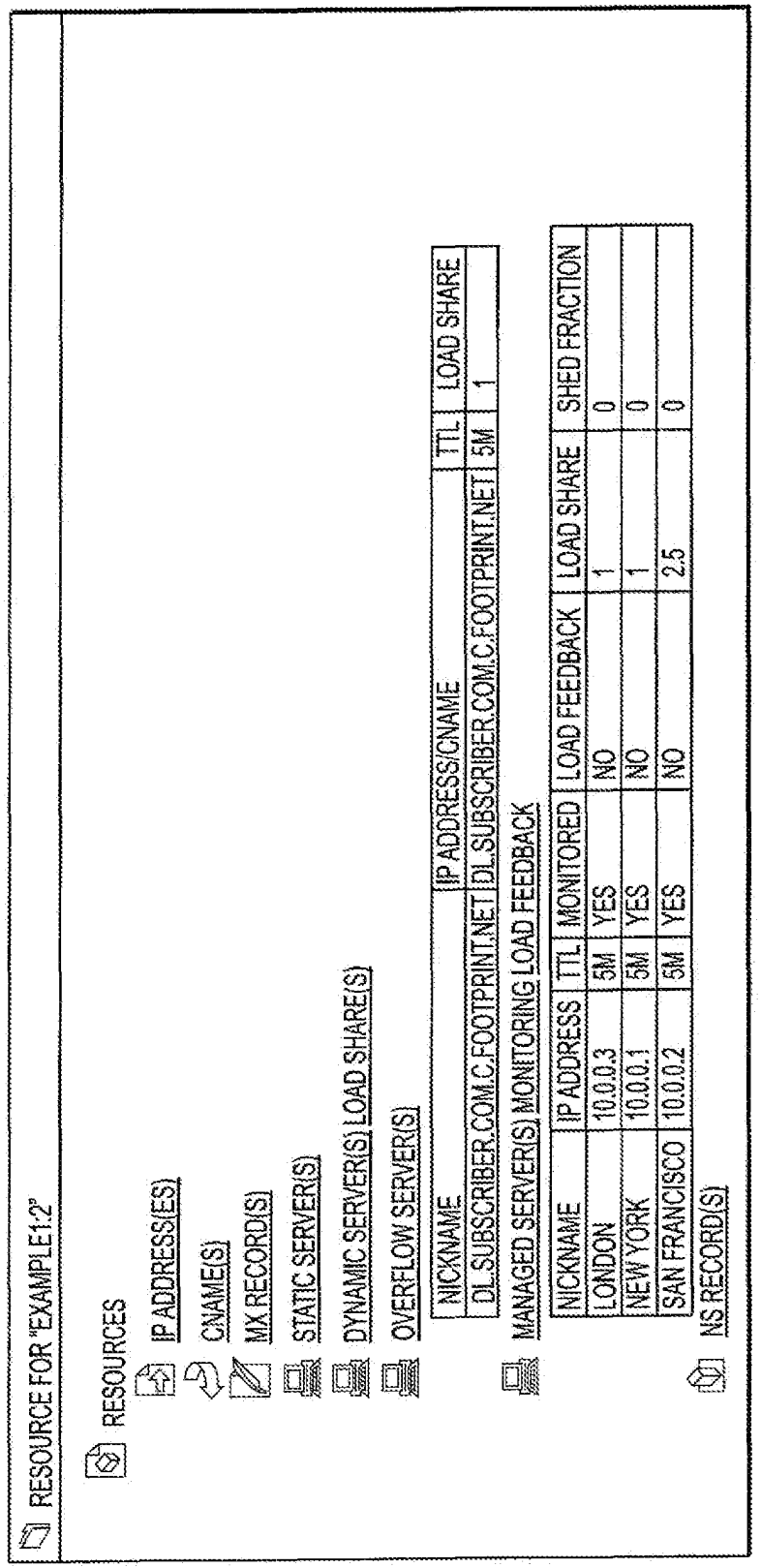

RESOURCE FOR "EXAMPLE1:2"
RESOURCES
IP ADDRESS(ES)
CNAME(S)
MX RECORD(S)
STATIC SERVER(S)
DYNAMIC SERVER(S) LOAD SHARE(S)
OVERFLOW SERVER(S)
NICKNAME
IP ADDRESS/CNAME
TTL
LOAD SHARE
DL.SUBSCRIBER.COM.C.FOOTPRINT.NET
DL.SUBSCRIBER.COM.C.FOOTPRINT.NET
5M
1
MANAGED SERVER(S) MONITORING LOAD FEEDBACK
NICKNAME
IP ADDRESS
TTL
MONITORED
LOAD FEEDBACK
LOAD SHARE
SHED FRACTION
LONDON
10.0.0.3
5M
YES
NO
1
0
NEW YORK
10.0.0.1
5M
YES
NO
1
0
SAN FRANCISCO
10.0.0.2
5M
YES
NO
2.5
0
NS RECORD(S)

FIG. 10(e)

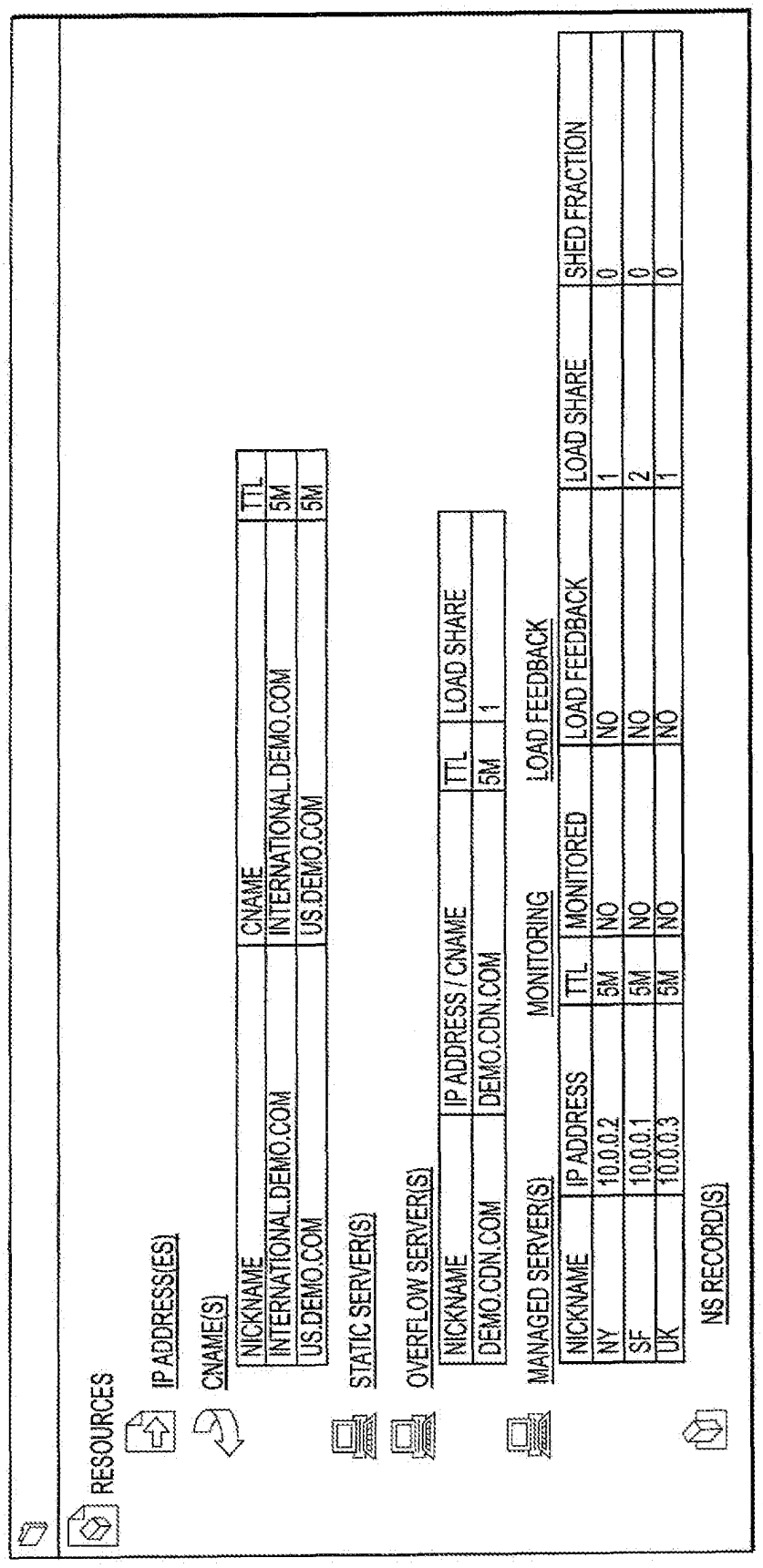

RESOURCES
IP ADDRESS(ES)
CNAME(S)
NICKNAME | CNAME | TTL
INTERNATIONAL.DEMO.COM | INTERNATIONAL.DEMO.COM | 5M
US.DEMO.COM | US.DEMO.COM | 5M
STATIC SERVER(S)
OVERFLOW SERVER(S)
NICKNAME | IP ADDRESS / CNAME | TTL | LOAD SHARE
DEMO.CDN.COM | DEMO.CDN.COM | 5M | 1
MANAGED SERVER(S)
MONITORING
LOAD FEEDBACK
NICKNAME | IP ADDRESS | TTL | MONITORED | LOAD FEEDBACK | LOAD SHARE | SHED FRACTION
NY | 10.0.0.2 | 5M | NO | NO | 1 | 0
SF | 10.0.0.1 | 5M | NO | NO | 2 | 0
UK | 10.0.0.3 | 5M | NO | NO | 1 | 0
NS RECORD(S)

FIG. 10(j)

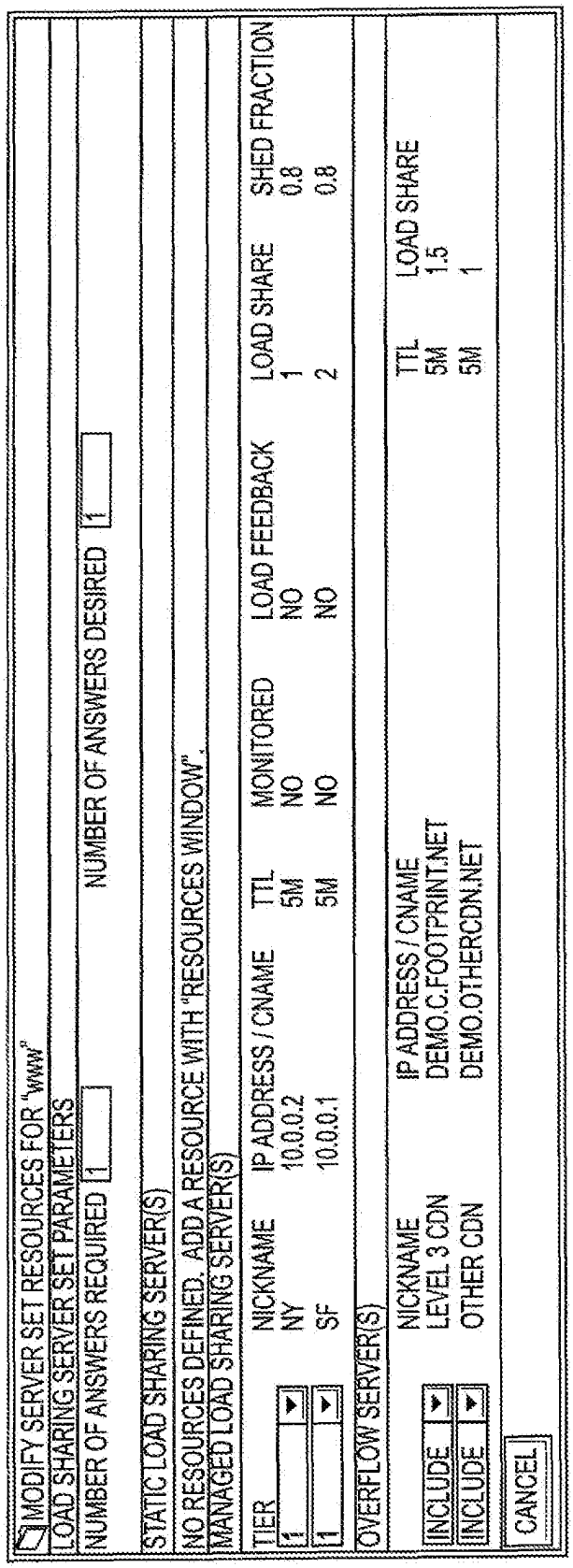

MODIFY SERVER SET RESOURCES FOR "www"
LOAD SHARING SERVER SET PARAMETERS
NUMBER OF ANSWERS REQUIRED 1
NUMBER OF ANSWERS DESIRED 1
STATIC LOAD SHARING SERVER(S)
NO RESOURCES DEFINED. ADD A RESOURCE WITH "RESOURCES WINDOW".
MANAGED LOAD SHARING SERVER(S)
TIER
NICKNAME
IP ADDRESS / CNAME
TTL
MONITORED
LOAD FEEDBACK
LOAD SHARE
SHED FRACTION
1
NY
10.0.0.2
5M
NO
NO
1
0.8
1
SF
10.0.0.1
5M
NO
NO
2
0.8
OVERFLOW SERVER(S)
NICKNAME
IP ADDRESS / CNAME
TTL
LOAD SHARE
INCLUDE
LEVEL 3 CDN
DEMO.C.FOOTPRINT.NET
5M
1.5
INCLUDE
OTHER CDN
DEMO.OTHERCDN.NET
5M
1
CANCEL

FIG. 10(I)

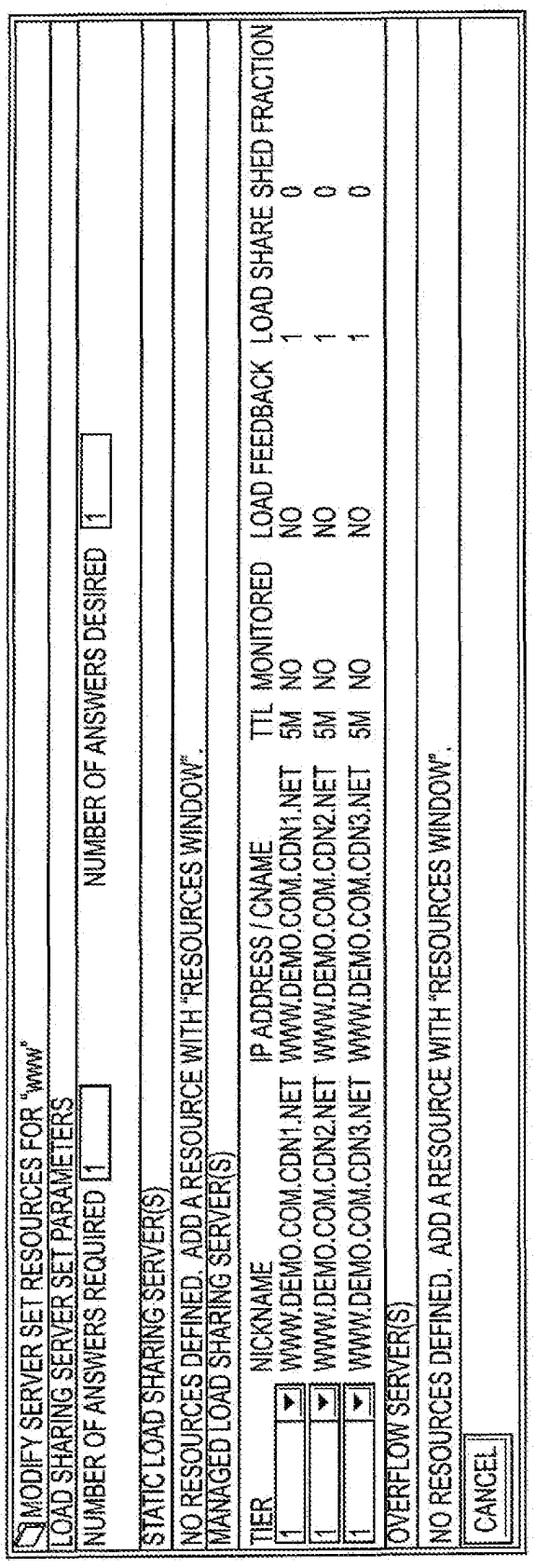

MODIFY SERVER SET RESOURCES FOR "www"
LOAD SHARING SERVER SET PARAMETERS
NUMBER OF ANSWERS REQUIRED 1
NUMBER OF ANSWERS DESIRED 1
STATIC LOAD SHARING SERVER(S)
NO RESOURCES DEFINED. ADD A RESOURCE WITH "RESOURCES WINDOW".
MANAGED LOAD SHARING SERVER(S)
TIER
NICKNAME
IP ADDRESS / CNAME
TTL
MONITORED
LOAD FEEDBACK
LOAD SHARE
SHED FRACTION
1
WWW.DEMO.COM.CDN1.NET
WWW.DEMO.COM.CDN1.NET
5M
NO
NO
1
0
1
WWW.DEMO.COM.CDN2.NET
WWW.DEMO.COM.CDN2.NET
5M
NO
NO
1
0
1
WWW.DEMO.COM.CDN3.NET
WWW.DEMO.COM.CDN3.NET
5M
NO
NO
1
0
OVERFLOW SERVER(S)
NO RESOURCES DEFINED. ADD A RESOURCE WITH "RESOURCES WINDOW".
CANCEL

FIG. 10(n)

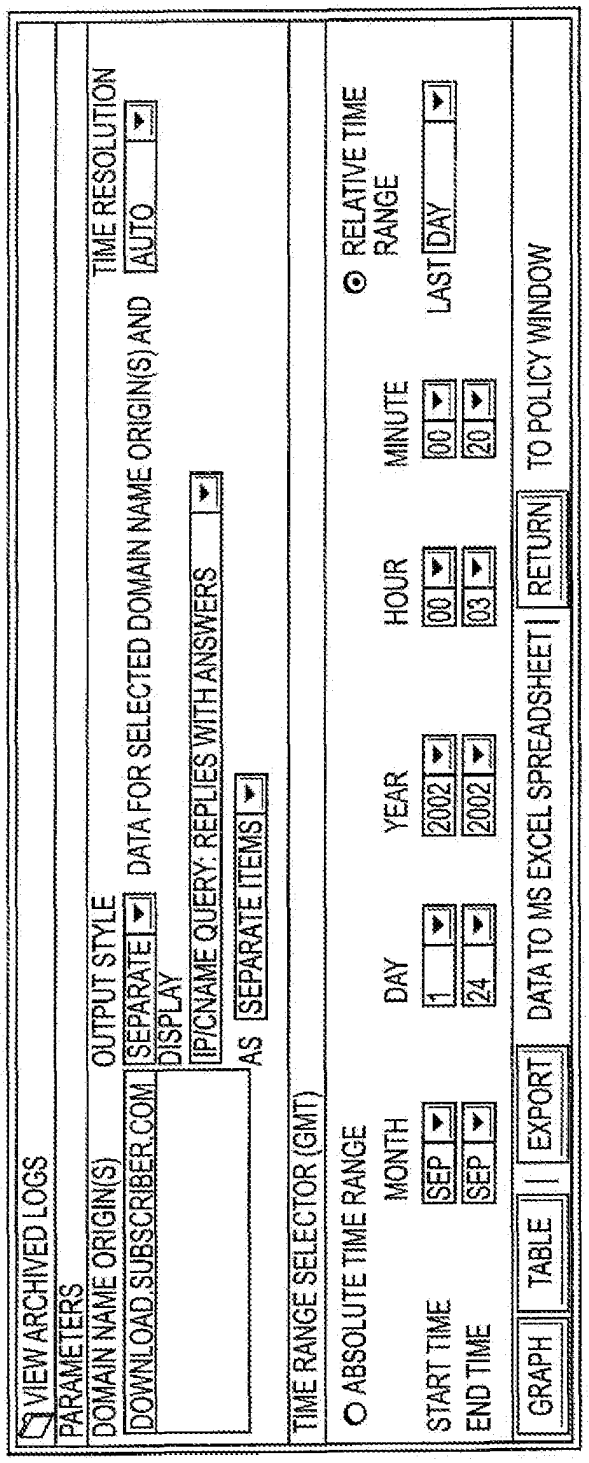

VIEW ARCHIVED LOGS
PARAMETERS
DOMAIN NAME ORIGIN(S)
OUTPUT STYLE
TIME RESOLUTION
DOWNLOAD.SUBSCRIBER.COM
SEPARATE
DATA FOR SELECTED DOMAIN NAME ORIGIN(S) AND
AUTO
DISPLAY
IP/CNAME QUERY: REPLIES WITH ANSWERS
AS
SEPARATE ITEMS
TIME RANGE SELECTOR (GMT)
ABSOLUTE TIME RANGE
RELATIVE TIME RANGE
MONTH
DAY
YEAR
HOUR
MINUTE
START TIME
SEP
1
2002
00
00
LAST
DAY
END TIME
SEP
24
2002
03
20
GRAPH
TABLE
EXPORT
DATA TO MS EXCEL SPREADSHEET
RETURN
TO POLICY WINDOW

FIG. 11(a)

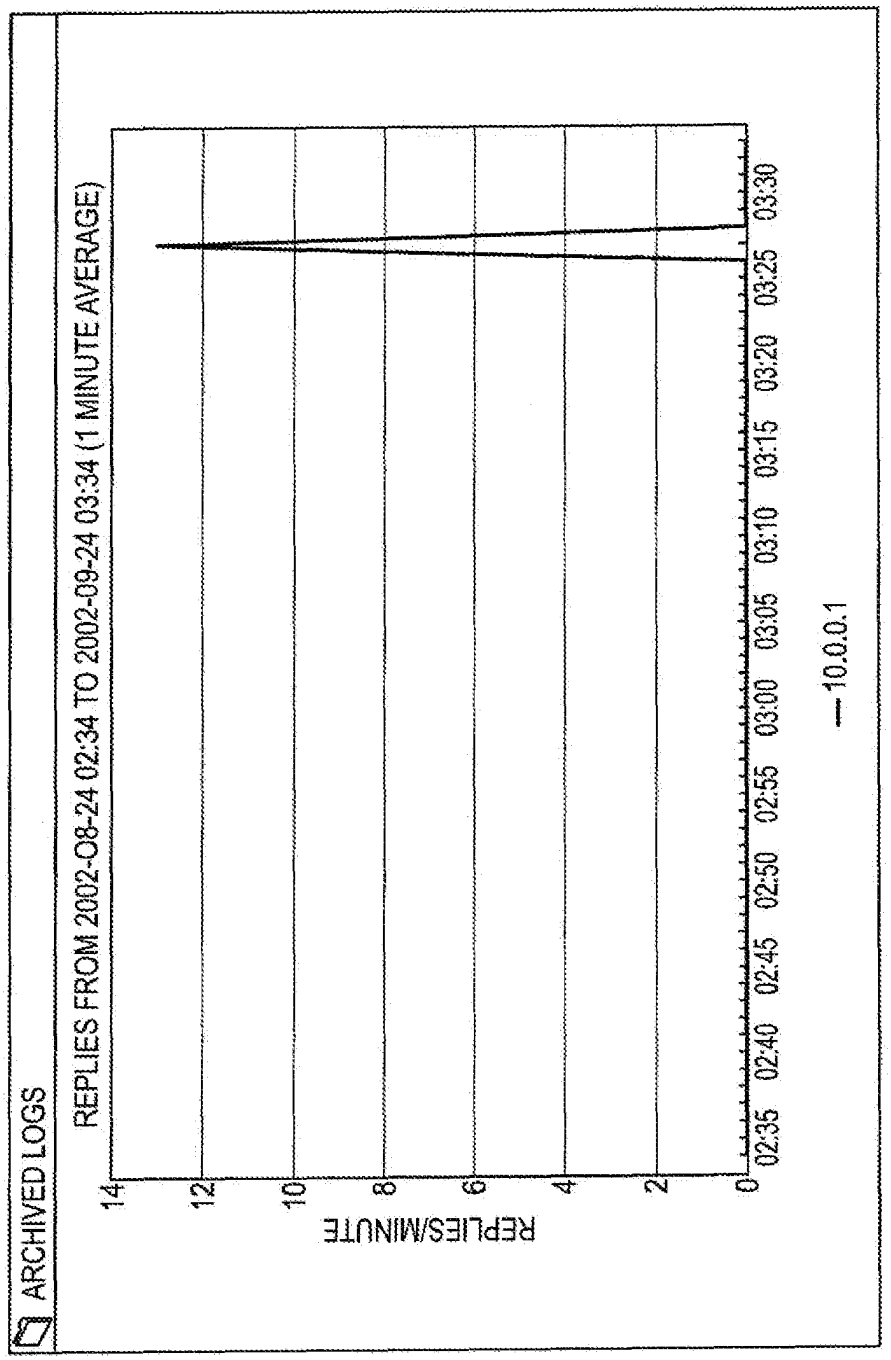

ARCHIVED LOGS
REPLIES FROM 2002-08-24 02:34 TO 2002-09-24 03:34 (1 MINUTE AVERAGE)
REPLIES/MINUTE
14
12
10
8
6
4
2
0
02:35
02:40
02:45
02:50
02:55
03:00
03:05
03:10
03:15
03:20
03:25
03:30
10.0.0.1

FIG. 11(b)

ARCHIVED LOGS			
DOMAIN NAME ORIGIN(S) "DOWNLOAD.SUBSCRIBER.COM"			
TIME (GMT)	IP/CNAME QUERY: REPLIES WITH ANSWERS	NUMBER OF REPLIES	REPLIES PER MINUTE
09/24/02 02:30:00 - 9/24/02 02:45:00	NO DATA FOUND		
09/24/02 02:45:00 - 9/24/02 03:00:00	NO DATA FOUND		
09/24/02 03:00:00 - 9/24/02 03:15:00	NO DATA FOUND		
09/24/02 03:15:00 - 9/24/02 03:30:00	10.0.0.1	13	0.87
09/24/02 03:30:00 - 9/24/02 03:45:00	NO DATA FOUND		

FIG. 11(c)

Electronic Patent Application Fee Transmittal

Application Number:	12978537
Filing Date:	24-Dec-2010
Title of Invention:	Policy-Based Content Delivery Network Selection
First Named Inventor/Applicant Name:	Mark Brady
Filer:	Brian Siritzky
Attorney Docket Number:	0093-US-I2

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Utility application filing	1011	1	330	330
Utility Search Fee	1111	1	540	540
Utility Examination Fee	1311	1	220	220
Pages:				
Claims:				
Miscellaneous-Filing:				
Late filing fee for oath or declaration	1051	1	130	130
Petition:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	1220

Electronic Acknowledgement Receipt

EFS ID:	9568209
Application Number:	12978537
International Application Number:	
Confirmation Number:	1389
Title of Invention:	Policy-Based Content Delivery Network Selection
First Named Inventor/Applicant Name:	Mark Brady
Customer Number:	75948
Filer:	Brian Siritzky
Filer Authorized By:	
Attorney Docket Number:	0093-US-I2
Receipt Date:	02-MAR-2011
Filing Date:	24-DEC-2010
Time Stamp:	13:44:56
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$1220
RAM confirmation Number	13
Deposit Account	501860
Authorized User	

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 1.19 (Document supply fees)

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

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Applicant Response to Pre-Exam Formalities Notice	2711_0107_PA_Response_to_Notice_to_file_Missing_Parts_03_02_2011.pdf	218494 6d76168735fa99cb4f707ba8530208e4c7693608	no	2
Warnings:					
Information:					
2	Applicant Response to Pre-Exam Formalities Notice	2711_0107_PA_Petition_Decision_from_parent.pdf	294933 92f4878dd045941c5af11baaccc4c33066034748	no	7
Warnings:					
Information:					
3	Applicant Response to Pre-Exam Formalities Notice	2711_0107_PA_Submission_of_Replacement_Drawings_03_02_2011.pdf	216462 e3b7b94ed07b8b609aed773490b9045c532b6a35	no	1
Warnings:					
Information:					
4	Oath or Declaration filed	0093_US_I1_Declarations_signed.pdf	2266189 ad8f1cd5511f151054d248855749cd6e31bbcb9a	no	21
Warnings:					
Information:					
5	Drawings-only black and white line drawings	2711-0107_PA_Replacement_drawings_x_03_02_2011.pdf	2347245 ad32104940358f94700c107bd9e2a3a60941f8c1	no	13
Warnings:					
Information:					
6	Fee Worksheet (PTO-875)	fee-info.pdf	36408 6275518189a68f1080ea0df2d4ffd52f33df3efd	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	5379731		

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.

Application Data Sheet

Correspondence Information

Correspondence Customer Number:: 83579 ~~75948~~

Representative Information

Representative Customer Number:: 83579 ~~75948~~

Application Information

Application Number::	12978537
Filing Date::	12/24/10
Application Type::	Regular
Subject Matter::	Utility
Title ::	POLICY-BASED CONTENT DELIVERY NETWORK SELECTION
Attorney Docket Number::	0093-US-I2
Suggested Drawing Figure::	1
Total Drawing Sheets::	31
Small Entity?::	No

Assignee Information

Assignee name::	Level 3 Communications, LLC
Street of mailing address::	1025 Eldorado Blvd.
City of mailing address::	Broomfield
State or Province of mailing address::	Colorado
Country of mailing address::	U.S.
Postal or Zip Code of mailing address::	80021

Domestic Priority Information

Application::	Continuation Type::	Parent Application::	Parent Filing Date::
This application	continuation	11/976,648	10/26/07
11/976,648	Continuation-in-part	10/259,497	09/30/02
10/259,497	An application claiming the benefit under 35 USC 1119(e)	60/325,177	09/28/01
This application	Continuation-in-part	11/932,162	10/31/07
11/932,162	continuation	10/259,497	09/30/02
10/259,497	An application claiming the benefit under 35 USC 1119(e)	60/325,177	09/28/01

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Electronic Acknowledgement Receipt

EFS ID:	9242646
Application Number:	12978537
International Application Number:	
Confirmation Number:	1389
Title of Invention:	Policy-Based Content Delivery Network Selection
First Named Inventor/Applicant Name:	Mark Brady
Customer Number:	75948
Filer:	Brian Siritzky
Filer Authorized By:	
Attorney Docket Number:	0093-US-I2
Receipt Date:	17-JAN-2011
Filing Date:	24-DEC-2010
Time Stamp:	11:25:39
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	Application Data Sheet	PA_APPLICATION_DATA_SHEET_01_17_2011_2711_0107.pdf	44424 30441a7e5fbf3b87130000270 40f82e7ce009360	no	6

Warnings:	
Information:	

This is not an USPTO supplied ADS fillable form	
Total Files Size (in bytes):	44424

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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.

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

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/978,537	12/24/2010	Mark Brady	0093-US-I2

CONFIRMATION NO. 1389

75948
DAVIDSON BERQUIST JACKSON & GOWDEY, LLP
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FORMALITIES LETTER

OC000000045445151

Date Mailed: 01/14/2011

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 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 $**330** 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 missing.
  A properly signed oath or declaration in compliance with 37 CFR 1.63, identifying the application by the above Application Number and Filing Date, is required.
  Note: If a petition under 37 CFR 1.47 is being filed, an oath or declaration in compliance with 37 CFR 1.63 signed by all available joint inventors, or if no inventor is available by a party with sufficient proprietary interest, is required.

The application is informal since it does not comply with the regulations for the reason(s) indicated below.

The required item(s) identified below must be timely submitted to avoid abandonment:

- Replacement drawings in compliance with 37 CFR 1.84 and 37 CFR 1.121(d) are required. The drawings submitted are not acceptable because:
  - Numbers, letters, and reference characters on the drawings must measure at least 0.32 cm (1/8 inch) in height. See Figure(s) 10B,11D,11B.
  - The drawings submitted to the Office are not electronically reproducible because portions of figures 9A-C,10A,10C,10J,10L,10N,11A,11C are missing and/or blurry.

Applicant is cautioned that correction of the above items may cause the specification and drawings page count to exceed 100 pages. If the specification and drawings exceed 100 pages, applicant will need to submit the required application size fee.

The applicant needs to satisfy supplemental fees problems indicated below.

The required item(s) identified below must be timely submitted to avoid abandonment:

- A surcharge (for late submission of filing fee, search fee, examination fee or oath or declaration) as set forth in 37 CFR 1.16(f) of $**130** for a non-small entity, must be submitted.

SUMMARY OF FEES DUE:

Total fee(s) required within **TWO MONTHS** from the date of this Notice is $**1220** for a non-small entity

- $**330** Statutory basic filing fee.
- $**130** Surcharge.
- The application search fee has not been paid. Applicant must submit $**540** to complete the search fee.
- The application examination fee has not been paid. Applicant must submit $**220** to complete the examination fee for a non-small entity.

Replies should be mailed to:

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P.O. Box 1450
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Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web.
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/fasrat/

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

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
12/978,537	12/24/2010	2447	0.00	0093-US-I2	1	1

CONFIRMATION NO. 1389

75948
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FILING RECEIPT



Date Mailed: 01/14/2011

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

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Assignment For Published Patent Application

Level 3 Communications, LLC, Broomfield, CO

Power of Attorney: None

Domestic Priority data as claimed by applicant

This application is a CON of 11/976,648 10/26/2007 PAT 7,860,964
which is a CIP of 10/259,497 09/30/2002 PAT 7,822,871
which claims benefit of 60/325,177 09/28/2001

Foreign Applications (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.)

If Required, Foreign Filing License Granted: 01/12/2011

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/978,537**

Projected Publication Date: To Be Determined - pending completion of Missing Parts

Non-Publication Request: No

Early Publication Request: No

Title

Policy-Based Content Delivery Network Selection

Preliminary Class

709

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

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

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

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

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

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Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 12/978,537

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	330
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	540
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	220
TOTAL CLAIMS (37 CFR 1.16(i))	1 minus 20 =	*			OR	x 52 =	0.00
INDEPENDENT CLAIMS (37 CFR 1.16(h))	1 minus 3 =	*				x 220 =	0.00
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $270 ($135 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						0.00
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	1090

APPLICATION AS AMENDED - PART II

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

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

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

POLICY-BASED CONTENT DELIVERY NETWORK SELECTION

Related Applications

[0001] This application is a continuation of co-pending U.S. Application No. 11/976,648, filed October 26, 2007, titled, "Policy-Based Content Delivery Network Selection," (which will issue on December 28, 2010 as U.S. Patent No. 7,860,964) and which is a continuation-in-part (CIP) of U.S. Application No. 10/259,497, titled "Configurable adaptive global traffic control and management," filed September 30, 2002, now U.S. Patent No. 7,822,871, the entire contents of which are hereby incorporated herein by reference for all purposes. Application No. 10/259,497 is related to and claims priority from provisional United States Patent Application No. 60/325,177, titled "Configurable Adaptive Global Traffic Control and Management," filed September 28, 2001, the entire contents of which are incorporated herein by reference for all purposes. This application is also related to and claims priority from U.S. Application No. 11/932,162, filed October 31, 2007, the entire contents of which are incorporated herein by reference for all purposes.

1. Reservation of Copyright

[0002] This patent document contains information subject to copyright protection. The copyright owner has no objection to the facsimile reproduction by anyone of the patent document or the patent, as it appears in the U.S. Patent and Trademark Office files or records but otherwise reserves all copyright rights whatsoever.

2. Field of the Invention

[0003] Aspects of the present invention relate to network traffic management. Other aspects of the present invention relate to configurable, adaptive, global traffic control and management in networks such as the Internet.

BACKGROUND & SUMMARY

[0004] As the volume of Internet traffic grows, providers of web content and applications increasingly need to deliver content from multiple servers at widely-separated locations in order to sustain a good end-user experience under high traffic loads. This need generates several difficult challenges, including, among others:

- how to guarantee the fault-tolerance of such a multiple-server system in the face of failure of one or more individual servers;
- how to control the way in which requests from end-users are distributed to each server according to important content provider policy constraints imposed for economic, contractual or other reasons; and
- how to guarantee high performance as experienced by end-users as network conditions change.

[0005] This invention solves these and other problems by providing a means to distribute network (e.g., Internet) traffic according to a configurable set of rules. The rules can be configured to take into account key factors such as:

- server availability.
- specific requirements of content providers who deploy the invention, e.g., distribution based upon geography, position in IP address space, load share, etc.
- state of the network (Internet) at any given moment, including measures of network latency.

[0006] These rules together provide an extremely fine-grained level of network Internet traffic control to providers of Internet content and applications, enabling them to dramatically improve the end-user experience (measured by speed of request resolution, associated download time, and the availability of servers) over that provided by conventional web servers and mirrored server farms.

[0007] There are many potential uses for the invention. One use is to provide a stand-alone service directing traffic exclusively to a set of designated servers managed by a single organization. The invention may also be used in more

general ways – for example, one or more of the designated destinations can refer to servers (or server collections) outside the organization's control. The latter case includes, for example, Content Delivery Networks (CDNs), as well as local load-balancing servers, as potential destinations. The invention can also be used, e.g., to provide the DNS (Domain Name Service) component of a Content Delivery Network itself. It can be deployed as a service on behalf of subscribers, or it can be deployed as software to be used directly by subscribers themselves.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] The present invention is further described in terms of exemplary embodiments, which will be described in detail with reference to the drawings. These embodiments are non-limiting exemplary embodiments, in which like reference numerals represent similar parts throughout the several views of the drawings, and wherein:

[0009] **FIG. 1** depicts a configurable adaptive global traffic control and management framework;

[0010] **FIG. 2** describes exemplary types of policies;

[0011] **FIG. 3** shows an exemplary hierarchy or a decision tree built based on subscriber policies;

[0012] **FIG. 4** shows an exemplary relationship between a subscriber's network hierarchy and subscriber policies;

[0013] **FIG. 5** depicts a high-level architecture of an adaptive traffic control framework;

[0014] **FIG. 6** depicts a high level functional block diagram of an administrative master agent (AMA);

[0015] **FIG. 7** depicts the internal functional block diagram of a monitoring mechanism;

[0016] **FIG. 8(a)** is an exemplary flowchart of a process, in which a content delivery framework provides adaptive policy-based domain name service;

[0017] **FIG. 8(b)** is an exemplary flowchart of a process, in which a domain name server resolves a hostname based on policies;

[0018] **FIG. 8(c)** is an exemplary flowchart of a process, in which a monitoring mechanism of a domain name server dynamically monitors the name service operations as well as the availability and the load share status of servers;

[0019] **FIG. 8(d)** is an exemplary flowchart of a process, in which an ATC administrative network maintains dynamic policies and monitors the operations of a content delivery framework;

[0020] **FIG. 8(e)** is an exemplary flowchart of a process, in which an ATC network monitoring mechanism traps events from different domain name servers and generates alerts when necessary;

[0021] **FIG. 9(a)** shows an exemplary secure web based graphical interface, through which a subscriber may define load share and shed fraction policies among static resources;

[0022] **FIG. 9(b)** shows an exemplary interface for defining policies for dynamic servers;

[0023] **FIG. 9(c)** shows an exemplary graphical user interface through which an overflow server may be defined using a canonical name;

[0024] **FIGS. 10(a) – 10(o)** show exemplary subscriber policies; and

[0025] **FIGS. 11(a) – 11(c)** show exemplary archived log information that can be displayed and viewed through a graphical user interface.

DETAILED DESCRIPTION

[0026] The invention is described below, with reference to detailed illustrative embodiments. It will be apparent that the invention can be embodied in a wide variety of forms, some of which may be quite different from those of the disclosed embodiments. Consequently, the specific structural and functional details disclosed herein are merely representative and do not limit the scope of the invention.

[0027] Although there are a number of different scenarios in which the invention might be deployed, this description will focus, for clarity and example only, on a scenario in which DNS service is provided by a third party on behalf of a content or applications provider.

[0028] **FIG. 1** depicts a high-level of a framework or system **100** according to embodiments of the present invention. A subscriber **102** provides content via a subscriber server network **104** which is made up of one or more server groups **106-1**, . . ., **106-*k*** (collectively **106**).

[0029] As used in this description, the framework according to embodiments of this invention contemplates three groups of users:

[0030] An **end-user** who wishes to access content and/or applications over the Internet.

[0031] An **operator** who offers and supports the service on a managed network of computers.

[0032] A **subscriber** (typically a content or applications provider) who subscribes to the operator's service to help to support the needs of the end user.

[0033] The terminology end-user, operator and subscriber are used throughout this description to distinguish these three roles, although there are many scenarios in which more than one role can be taken by a single entity. Such scenarios are contemplated by this invention.

[0034] Each server group **106** may correspond to a server hierarchy which includes one or more tiers of servers. For example, the first tier of a server hierarchy may comprise one or more primary servers and the second tier of the server hierarchy may comprise possibly one or more overflow servers that are used when the primary servers in the first tier fail to function properly. In general, for the *j-th* server group, the primary servers at the first tier of server group **106-*j*** are denoted **108-*j***, and the overflow servers at the second tier of server group **106-*j*** are denoted **110-*j***.

[0035] Each server in a server group is any process or collection of processes that provide resources in response to requests, e.g., from a client. A server can be any off-the-shelf Web server. In some embodiments, servers are typically a Web server such as the Apache server or Netscape Communications Corporation's Enterprise™ server.

[0036] Client **112** accesses the subscriber server network **104** in order to obtain content from the subscriber. Content includes any kind of data, including, without limitation, video and audio data and the like. To achieve this access, a user at client **112** enters a resource locator, e.g., a Universal Resource Locator ("URL"), into a browser **114** on client **112**. URLs specify the location of resources (information, data files, etc.) on the network. URLs are defined in detail in T. Berners-Lee et al, Uniform Resource Locators (URL), Network Working Group, Request for Comments: 1738, Category: Standards Track, December 1994, located at "*http://ds.internic.net/rfc/rfc1738.txt*", which is hereby incorporated herein by reference. URLs generally have the following form:

scheme://host[:port]/url-path

where "*scheme*" can be a symbol such as "*file*" (for a file on the local system), "*ftp*" (for a file on an anonymous FTP file server), "*http*" (for a file on a file on a Web server), and "*telnet*" (for a connection to a Telnet-based service). Other schemes can also be used and new schemes are added every now and then. The port number is optional, the system substituting a default port number (depending on the scheme) if none is provided. The "*host*" field (the hostname) maps to one or more particular network addresses for particular computer(s). The "*url-path*" is relative to the computer specified in the "*host*" field. A *url-path* is typically, but not necessarily, the pathname of a file in a web server directory. Those skilled in the art will realize and understand, upon reading this description, that the client may not actually enter a URL, but needs only ran an application that needs to look up a domain name (i.e., perform a DNS query). A browser does this when a client enters a URL, but other applications may perform DNS queries in other manners.

[0037] The framework or system **100** includes at least one Domain Name Service (DNS) name server **118-1**. In preferred embodiments, the system **100** also includes DNS name servers **118-1, 118-2**, . . ., **118-*n***, (collectively referred to as name servers **118**) all operated by a single particular entity. In the embodiment shown in **FIGURE 1**, one of the name servers **118-1** serves the U.S.A., another name server **118-2** serves the U.K., another name server **118-3** serves Japan, and so on.

The various name servers **118-1, 118-2, . . ., 118-*n*** can be configured (collectively or individually) to serve geographical regions, geopolitical regions, corporate structures or any other logical organizational structure. The structure and operation of each name server **118** is described below.

[0038] When the client's browser **114** obtains a request (e.g., in the form of a URL), the browser queries its resolver **116** for an address for the hostname specified in the requested URL. The resolver **116** eventually queries a particular name server (e.g., name server **118-1**). The name server **118-1** returns (provides or attempts to provide) the IP (Internet Protocol) address (or addresses) of a server (or servers) in the subscriber server network or a CNAME (a domain name). Other DNS answer types (e.g., MX record, NS record, etc.) are also possible, as described below. The determination of the particular IP address returned to the resolver **116** may be based on a number of factors, including the resolver's location (e.g., as determined from the resolver's IP address) and various policies (e.g., subscriber policies **120**, other policies **122**) in a policy database **124**. The client's browser **114** is then able to communicate with the selected server in the subscriber server network in order to obtain the desired resource.

[0039] Name servers **118-1, 118-2, . . ., 118-*n*,** according to embodiments of the present invention, include an adaptive traffic control (ATC) mechanism **126** which provides domain name service to a client based on policies in the policy database **124**. Each name server **118** includes or has access to a location determination mechanism **128** for associating the client's request with the client's location. Any program that can determine a requestor's location may be used.

[0040] The subscriber server network **104** represents a network of servers that provides, on behalf of an underlying subscriber, Internet content or services. For example, a subscriber may be a content provider, which has its own network of servers that deliver content to end users' browsers via the Internet. The subscriber server network **104** may be configured in such a way that the processing of the service requests may be reasonably distributed among all the servers in the server network **104**, according to some criteria. To achieve that distribution, the

subscriber server network **104** may be organized, for example, to have one or more server groups (e.g., server group 1 **106-1**,..., server group *k* **106-k**), each of which may be responsible for processing a portion of the service requests. For example, service requests coming from Finland may be routed to a server group that is physically located in Europe.

[0041] Each server group **106** in the subscriber server network **104** may comprise a plurality of servers to further share the load. For example, a service request from Finland may be subsequently routed to a server located in Scandinavia. Routing service requests to different server groups and subsequently to different servers may be based on various criteria. For example, such routing may be based on the distance between the origin of the request and the location of the server. For example, for a service request originated from Finland, it may be more effective and efficient to direct the request to a server located in Norway instead of directing it to a server located in the U.S. Server load may also be used to determine where to route a service request. For example, a service request originated from the U.S. may be routed to a server group in Mexico if the server group in the U.S. is overloaded while the server group in Mexico is relatively idle.

[0042] Servers in a server group may be organized into a hierarchy with one or more tiers of servers. Servers at different tiers may have different designated purposes. For instance, servers at the first tier of a server hierarchy may include servers that are primary functioning servers, servers at the second tier may include servers that are used as overflow servers which become active only when the primary servers at the first tier become unavailable or overloaded, and servers at the third tier that are used as second layer overflow servers that become active only when the primary servers and the overflow (or first layer overflow) servers at the second tier become unavailable or overloaded, etc.

[0043] The first tier of a server group hierarchy may include one or more primary servers. When multiple primary servers are present, they may be configured in such a way that they share the load. For example, if there are five primary servers at the first tier, they may be configured so that each takes 20% of

the total service requests routed to the server group. For each of such primary servers, it may be further configured so that when a particular server is overloaded or fails, the load share originally designated to this server may be shed or directed to other server(s). The load shed may also be configured when the server is not overloaded. The portion to be shed to other server(s) may be governed by certain pre-defined policies.

[0044] As discussed above, servers in a server group **106** may be classified into different categories based on specific functionality of the underlying servers. For example, a server in a server group **106** may be a primary server, a first layer overflow server, or a second layer overflow server, etc. A server may also be classified in terms of whether and how a server is to be dynamically monitored. For instance, in some embodiments, a server can be classified as either a monitored server or a managed server.

[0045] A classification of a monitored server indicates that the underlying server is to be monitored dynamically for its availability. In this case, the server may be probed for its availability according to some pre-determined schedule. Such a probe may be sent to the underlying server from different locations of the network so that the availability can be detected accurately. That is, if the underlying server failed to respond to one probe sent from one location, it does not necessarily indicate that the server is no longer available (could be due to that only part of the network is congested).

[0046] A probe can be realized in different fashion. It can be simply a signal sent to the server to request an acknowledgement. It can also be a poll operation in which a file stored at a designated location on the underlying server is polled. If the file can be successfully polled, the underlying server is considered to be available. The detected availability may be used to adjust or update policies associated with the server so that the network traffic management will respond to the dynamics related to the server.

[0047] A server that is classified as a managed server may be actively participating the adaptive policy-based management scheme. Similar to a

monitored server, a managed server may be regularly probed for its availability. In addition, a managed server may dynamically provide information related to its load share or load shed. A managed server may update its load share or load shed fraction according to its changed capacity or its current load. For example, when a managed server is upgraded, its capacity may be increased so that it may increase its load share or decrease its load shed fraction. On the other hand, when a managed server is overloaded, it may revise its load share to a lower level or increase its load shed fraction to prevent failure. A managed server may revise its load share or load shed by updating the corresponding load share or load shed information in a designated file stored on the server and this file may be polled by a name server so that the dynamically changed load share and load shed information can be used to direct traffic accordingly.

[0048] The distribution of service requests (from a client **112**) within the subscriber server network **104** may be controlled through a set of ATC policies (**120, 122**) stored in the policy database **124**. Various authorities may influence the ATC policies and may create policies in the policy database **124**. For example, the subscriber may set up policies to direct traffic with respect to considerations such as the geographical locations and the capacities of the underlying servers in the subscriber's network **104**. Other policy entities **138**, including, for example, the operator of the name servers **118** or various geo-political entities may also have policies regarding how the network traffic should be managed and directed. For example, governmental or some organizational agencies may regulate some aspects of network traffic policies. Such regulation policies may be required to be incorporated so that a service request from the client **112** can be routed in a manner that satisfies regulatory policies.

[0049] Thus, the ATC policies in the policy database **124** may be a combination of subscriber policies **120** and other policies **122** from different sources such as subscriber **102** and policy entity **138**. Policies from different sources may be accessed by the ATC mechanism **126** from the policy database **124**. From the point of view of the ATC mechanism **126**, the source of a policy may not

be relevant or even determinable. For example, policies may be defined in a textual file stored at a designated location, which may be downloaded to an ATC policy management mechanism **152** in an ATC administrative framework **142** and then broadcast to the database manager **132** located in each of the name servers in the ATC name server network **140**. The download may be via either a graphical user interface (GUI), a file transfer protocol (FTP), or some other mechanism. Policy makers may also enter policies directly via a web-based GUI. For example, the subscriber **102** may enter subscriber policies **120** via a browser interface **156** connected with the ATC administrative framework via, preferably a secure interface (e.g., implemented using the "*https*" protocol).

[0050] The policies from the policy database **124** used by the ATC mechanism **126** are collectively referred to as ATC policies, which may include, not is not limited to, the subscriber policies **120** as well as other policies **122**. The ATC policies may be organized in a manner that is appropriate to govern and/or control the traffic at different levels of the subscriber server network **104**. **FIG. 2** shows exemplary types of ATC policies **200** according to embodiments of the present invention.

[0051] The ATC policies (**200**) may be classified into different types such as geo-political policies **215**, load share policies **240**, failover policies **245**, tiered failover policies **250**, shedding policies **255**, regulatory policies **260**, and Classless Inter-Domain Routing (CIDR) block policies **210**.

[0052] These exemplary policies in the policy database **124** are described in greater detail below:

[0053] **Geographic Policy (215):** Decisions are based on location of the end-user or an approximate thereof, e.g., using the IP address of an end-user's resolver. For example, if the IP address is within the U.S., the request may be directed to a "domestic" group of servers in the subscriber server network **104**, otherwise it may be directed to "international" servers in the network. The request may be directed to a proprietary Content Delivery Network (CDN) or to another service specified by the subscriber.

[0054] **Load Share Policy (240)**: The subscriber can explicitly specify the amount of traffic (load share) to be directed to each of their servers within a defined server set in the subscriber server network **104**. Typically the load may be specified according to the capacity of each server. Based on such specification, the load share of each server may be derived as a percentage of the total load.

[0055] **Failover policy (245)**: The subscriber may specify policies regarding a failover situation where some of the primary servers fail to function. To take care of such a scenario, a failover policy may instruct the ATC mechanism in terms of, for example, how often to monitor the availability of the servers and what strategy to adopt when a partial set of the primary servers are detected to be unavailable. For instance, a failover policy may specify to distribute the load of a failing server to other primary servers. It may also alternatively instruct the ATC framework to direct traffic to servers other than the primary servers.

[0056] **Tiered Failover Policy (250)**: The subscriber may specify a strategy through tiered failover policies by which the load should be re-directed to servers at a next tier when one or more subscriber servers in a previous tier fail to function. For example, in defining the subscriber server network, each server group may be configured as a hierarchy, having the first tier of primary servers, the second tier of first layer overflow servers, and the third tier of second layer overflow servers, etc. In this case, a tiered failover policy may be defined to indicate when the load should be re-directed from the primary servers to the overflow servers. For instance, a tiered failover policy may indicate that when all the primary servers fail, the load should be directed to the second tier, and when servers at both the first tier and the second tier fail, the load should be directed to the overflow servers at the third tier. The traffic may also be re-directed to some other servers. For example, when a content delivery network (CDN) is available, the traffic may be re-directed to the entire CDN.

[0057] **Shedding Policy (255)**: In some circumstances, a fraction of the "load" originally designated to a server may be shed or re-directed to one or more different servers. This may occur when the amount of traffic directed to the

subscriber server exceeds a prescribed level. In these cases, a subscriber-specified fraction of traffic (shed fraction) that would otherwise be directed to the server may be shed to one or more other different servers. Such strategy may be adopted to prevent catastrophic failure due to overload. The servers that take the shed load may be an overflow server or some other servers such as a content delivery network. An overload situation may be detected according to the response time of the server. For example, if the response time from a server becomes long, it may indicate that the server is overloaded. In this case, shedding policies **255** may be invoked to re-direct the traffic elsewhere. For instance, if there are a total of 3 primary servers in a server group with load share of (0.3, 0.3, 0.4) and the primary server that is designated to take 40% of the total load is completely overloaded, a shedding policy may specify to shed the load of this server by re-directing 50% of its original load to, for example, the servers located in the CDN **105**. A shedding policy may also specify a condition upon which the traffic will be directed again to the shedding server. Such a condition may relate to a desirable level of performance of the shedding server.

[0058] **CIDR Policy (210)**: Policy decisions are supported based upon CIDR blocks of IP address space. CIDR denotes Classless Inter-Domain Routing, an IP addressing scheme that replaces the system based on classes A, B, and C. With CIDR, a single IP address can be used to designate many unique IP addresses.

[0059] **Regulatory policy (260)**: Certain policies may be specified by some policy entities to control network traffic. Such policies may be enforced in system **100**.

[0060] A policy may be static or dynamic. Selection of a server from the subscriber server network **104** may be based on an adaptive, regularly updated map of the state of the Internet as well as adaptively updated policies. The map may cluster IP addresses together according to their network latency to a selected set of network agents. This enables the subscriber servers to be selected according to their "network proximity" to an end user's browser, optimizing resulted download

time. The policies may be defined in such an adaptive manner that they reflect the dynamic status of the servers such as the availability and load.

[0061] Geo-political policies **215** may govern the selection of a server according to where the client is located. As shown in **FIG. 2**, the geo-political policies **215** may be further classified into continental based distribution policies **220**, country based distribution policies **225**, region based distribution policies **230** and time zone based distribution policies **235**. These policies may be set up to govern the process of selecting a particular server group according to different geographical or political criteria.

[0062] Geo-political policies differ from load based policies (described above). The former is designed to guide selections based on geographical criteria or time criteria. The latter concerns the selection process with respect to the dynamic capacity and load of the underlying servers. The load share policies **240** govern the selection according to the capacities of the servers. Partial failover or tiered failover policies (**245** and **250**) govern the traffic re-direction process when functioning servers in a server group are overloaded or failed.

[0063] The ATC policies **200** may be hierarchically constructed to form a decision tree. **FIG. 3** depicts an exemplary subscriber policy hierarchy or a decision tree built based on various types of subscriber policies, according to an embodiment of the present invention. In **FIG. 3**, the continental based distribution policies **220** are used to first direct a selection process limited to a particular continent. For example, if the requesting client **112** is located in Asia, the continental based distribution policies **220** may direct the further selection within servers that are located in Asia. Similarly, if the client **112** is located in either North America or Europe, the further selection process may be directed to the appropriate servers located in the corresponding continent.

[0064] As noted, a policy may be created by generating a decision tree representing the ATC rules that the user (content provider / subscriber) wants to apply. At the leaves of this tree (referred to as resource nodes) a user specifies the answers (IP addresses or CNAMEs) that the user wants ATC to provide in response

to a DNS request. At the branches of this tree (referred to as branch nodes) the user specifies the various decision criteria that the user wants to apply. Those skilled in the art will realize and understand that, in this discussion about policy setting and control of the ATC, the term "user" (as opposed to "end user") generally refers to the content provider / subscriber whose content is being delivered.

[0065] Branches within a policy decision tree enable ATC decisions based, e.g., upon the IP address of the requesting resolver. Branches can be selected based upon different criteria. In a presently preferred exemplary embodiment, branches can be selected based on five different criteria:

- Split on World zone
- Split on country
- Split on U.S. state
- Split on U.S. time zone
- Split on block of IP addresses– specified, e.g., using CIDR classless notation: e.g. 1.2.0.0/16, 1.2.3.4/32 (single IP), or 0.0.0.0/0 (any IP).

[0066] Those skilled in the art will understand, upon reading this description, that different and/or other criteria may be use to make branch selections. Examples of such criteria include, without limitation, time of day, day of week, etc.

[0067] Resources are selected to occupy the leaves of a policy decision tree. Resources are used to specify the ATC answers to DNS queries. ATC offers substantial decision making power during the resource selection process. It is here, for example, that traffic can be distributed according to load share and shed fraction criteria. In a presently preferred exemplary implementation there are five types of resource nodes that can be selected in the policy decision tree:

- IP addresses (Internet Protocol addresses)
- CNAME records (Canonical Name records)
- MX records (Mail Exchange records)
- NS records (Name Server records)
- Load sharing server sets (LSSS) - consisting of Managed, Dynamic, Static and Overflow servers.

[0068] Those skilled in the art will understand, upon reading this description, that different and/or other resource nodes may be used.

[0069] IP address(es) are used when the current decision tree leaf points to one or more fixed IP addresses. CNAME records are used when the current decision tree leaf points to a destination whose CNAME is known.

[0070] MX Records are used when the current decision tree leaf points to one or more MX (Mail Exchange) records. MX records may be combined with IP address or Load Sharing Server Set resources. To select this option, the user firsts enters the Exchange, Pref, and TTL (Time To Live) details for the mail exchange. The Exchange field holds the domain name of the host which will receive mail. If the Exchange name lies under the Domain Name Origin, then the policy must specify an IP address for the name by means of another node label and appropriate resource (IP address or Load Sharing Server Set). A *Pref* field holds the preference order of the host; lower numbers are preferred (used first) over large numbers.

[0071] NS Records are used when the current decision tree leaf points to one or more NS (Name Server) records. NS records are used to specify a delegation from the ATC name servers to another set of name servers.

[0072] Load Sharing Server Set (LSSS) option is used when the current decision tree leaf points to a number of destinations among which the user wants to share load (including failover) according to arbitrary criteria. In presently preferred exemplary implementations, this decision takes place only after any decisions that the user wants to make via branch nodes based on the IP address of the requesting resolver. There are presently four different types of load sharing server resources, namely static servers, managed servers, dynamic servers, and overflow servers.

[0073] In a present implementation, managed Servers are preferred over the other server types.

[0074] Load sharing server sets (LSSS) are necessary to utilize the load share, tiered/overflow and failover rules. When an ATC name server encounters a server set, one or more answers are chosen based on several criteria, including, e.g., the load share of each server, the tier in which each server sits, the shed fraction of each server, and the monitoring results of each server.

[0075] Static, dynamic and managed servers have load share, shed fraction and, when in a set, tier parameters. An overflow server is, by definition, at the lowest tier and cannot shed; thus it has only the load share parameter. Dynamic and managed servers each may have the load share and shed fraction values updated continuously and may be deemed on or off-line due to monitoring.

[0076] When answering a DNS query from a LSSS, ATC preferably selects answers (IP addresses or a CNAME) from servers included in the set. ATC examines servers in tier order (tier 1 first, tier 2 next, and so on, with overflow servers last), selecting servers based on load share, shed fraction and monitoring results. Online servers are selected within a tier according to their load share values relative to other servers in the same tier. If a candidate server is shedding, e.g., 10% (i.e., has a shed fraction of 0.1), ATC will keep that server in the DNS reply nine tenths of the time, and look in the next tier for a server one tenth of the time. If there is only one tier, the shed traffic returns to the same tier and another server is selected. If the LSSS specifies that multiple answers should be returned, ATC will look for each answer starting from the first tier. If any server selection falls to the overflow servers, one of these is selected as the sole answer to the DNS reply. Typically, the overflow server is a CNAME, and DNS answers of this type should not be combined with any other record type.

[0077] In a presently preferred implementation, the number of answers chosen from Load Sharing Server Sets depends on two more user-settable parameters, the "number of answers desired" (**NAD**) and the "number of answers required" (**NAR**). These parameters control how many answers are picked from non-overflow servers.

[0078] The user sets the NAD parameter to the typical number of answers to be selected by ATC and returned in DNS queries. The NAR parameter, which must be less than or equal to the NAD, comes into play when the normal ATC decision making process cannot select the desired number of servers specified in NAD. This server count shortfall situation can arise when one or more servers are shedding or offline. Setting NAD to one (1) or more guarantees that ATC will

never reply to a DNS query with no servers. When NAD is greater than one, ATC may deviate from the desired load share ratios, e.g., if there are three servers and NAD is three then DNS replies will typically have all three servers, irrespective of their load share values.

[0079] If the number of servers selected is less than NAD, but greater than or equal to NAR, then server selection is finished. However, if the number of servers selected is less than NAD and less than NAR, then ATC progressively ignores shed fraction and load share values until it is able to select NAR servers. As a special case, if ATC cannot select any servers because they are all offline, all servers are returned in the DNS reply (subject to size constraints of the DNS packet).

[0080] As an example, consider a LSSS with two servers in tier 1, two servers in tier 2, and two answers desired and required (i.e., NAD = 2, NAR = 2). If both servers in tier 1 are online and not shedding, those servers will be returned. If one of the tier 1 servers has 10% shed, then 10% of the answers contain one server from tier 1 and one server from tier 2. If both servers from tier 1 are offline, the two servers from tier 2 are returned. If all four servers are offline, then all four are returned (the special case).

[0081] In some implementations, the LSSS may also have a *Style* parameter which may be used to control where traffic goes when it is directed away from a shedding server, or from an offline server, according to the following table.

Style	**Shed Traffic**	**Off-line Traffic**
Constant Tier Load Ratio (default)	Next Tier	Same Tier
Constant Server Load Ratio	Next Tier	Next Tier
Maximal Tier Load	Same Tier	Next Tier

[0082] Consider, e.g., a LSSS which contains a few servers in Tier 1 and an overflow server sending traffic to a CDN. The three styles above relate to three underlying motivations for how to split traffic between the Tier 1 servers and the CDN.

[0083] If the Tier 1 servers should always take a specified percentage of traffic, as a whole, then the *Constant Tier Load Ratio* style is best. For example,

for the CDN to always take 50% of the traffic, each of the Tier 1 servers would have their shed fraction set to 0.5. This way, even if servers are added or removed from Tier 1, that tier and the CDN will always get 50% of the traffic. This, of course, means that the load on the Tier 1 servers will vary as servers are added or removed.

[0084] If, instead, it is not acceptable for the Tier 1 servers to increase their load upon the failure of another Tier 1 server, the *Constant Server Load Ratio* style is best. With this style, both shed traffic and traffic that would have gone to an off-line Tier 1 server are directed to the next tier (in the example above, the CDN). This is a preferable scenario if the Tier 1 servers are generally under high load. Lastly, if the Tier 1 servers are generally under low load and the CDN is to be considered a last resort, the *Maximal Tier Load* style should be used. With this style, both shed traffic and traffic that would have gone to an off-line Tier 1 server are instead directed to other servers in Tier 1. Traffic only gets to the CDN if all servers in Tier 1 are offline or shedding.

[0085] The *Static Server* option is used to share load at the current decision tree leaf among a set of servers that the user does not expect to change often over time. The load share for a given server represents the amount of traffic that will be sent to that server within the same tier of the server set. The fraction of traffic sent to that server is computed by summing the load share numbers for all servers in the same tier of the server set and dividing the load share by that total. The shed fraction for a given server represents the fraction (from 0 to 1) of traffic that should be redirected away from a given server, after the initial decision based upon load share. The online flag can be used to remove a server from the list of ATC answers if the user wishes to take a server off-line for maintenance. (If a server has been switched off-line, end users may continue to access it for the duration of the TTL, or perhaps longer if the end user's resolver or browser ignores the TTL.)

[0086] In addition to default values for load share and shed fraction, the managed server may optionally be monitored to determine the on/off-line status, and polled for load feedback information (updated values for the load share and

shed fraction). Furthermore, a managed server may hold either an IP address or a CNAME. A managed server holding an IP address without monitoring or load feedback becomes equivalent in functionality to the static server. Managed servers with monitoring only (load feedback not configured) are used when the user expects the load share and shed fraction of the servers to change infrequently, but want an instant reaction if the user's server becomes unavailable. In a presently preferred implementation, ATC monitors the user's server by polling a user-specified resource (denoted by a user-specified URL) at regular intervals (e.g., every 30 seconds) from each ATC name server. The URL scheme may be, e.g., HTTP, HTTPS or TCP. With HTTP(S), ATC name servers independently send a HEAD request, optionally with HTTP's basic authentication, and examine the response code. Response codes from 200 to 399, received within 15 seconds of the probe, put the server in an online state as viewed by the probing name server; all other conditions (connection refused, server 400 or 500 error, 15 second time, etc.) lead to an offline state for the server until the next probe.

[0087] Alternatively, ATC can monitor the user's server by checking the ability to connect to a specified port. In this case, the URL format is tcp://HOST[:port], and the ATC name servers simply attempt to establish a TCP connection to determine the online state of the user's server. The same probing rate and timeout durations apply.

[0088] Suppose, for example, that a user wishes to use ATC for name service for *download.example.com*. Suppose too that the user has two servers and wants ATC to monitor them both and only return the IP address of an available server. In this example, the user could define two Managed servers, each with a Monitored URL as shown in the following table:

Server nick name	IP Address	TTL	Monitored URL
SF server	10.0.0.1	2m	http://10.0.0.1
NY server	10.0.0.2	2m	http://10.0.0.2

[0089] The Monitored URL can point to any resource available to the web server, in this case the web server's root. When these servers are used in a server

set, ATC continuously polls the monitoring URLs to determine the on/off-line state of the user's servers.

[0090] A user may specify the load share and/or shed fraction of the user's servers dynamically, using a *Load Feedback URL* to specify an XML resource file (at a location of the subscriber's choice) in the following form (preferably plain text):

```
<ATCServerStatus
loadShare="LS"
shedFraction="SF"
onLine="OL"
expireTime="ET"/>
```

[0091] The file must be made accessible by the subscriber via http or https, optionally with basic authentication. In a presently preferred implementation, the *onLine* field is required, and all others are optional. *LS* is a number greater than (or equal to) zero, *SF* is a number from 0 to 1, *OL* is either True or False, and *ET* is a time (either absolute GMT or relative).

[0092] The *expireTime* parameter is the absolute time at which the current XML file expires, or the relative amount of time, post-probe, at which the current XML file expires. After a retrieved XML file expires, the *loadShare* and *shedFraction* return to their default values. In this manner a user (i.e., content provider) can temporarily (or permanently) override default load share and/or shed values.

[0093] The Managed Server specification with both Monitoring and Load Feedback may then look like the following table:

Server Name	IP	TTL	Monitoring URL	Load Feedback URL
SF Server	10.0.0.1	2m	http://10.0.0.1	http://10.0.0.1/atc-feedback.xml
NY Server	10.0.0.2	2m	http://10.0.0.2	http://10.0.0.2/atc-feedback.xml

[0094] The load feedback resource does not need to be on the server itself. The user may wish to use an independent server to control the load share and shed

fraction of some or all of the user's servers. The state of the user's managed servers is maintained by each ATC name server as follows:

[0095] If the user's server uses neither a monitored URL nor a load feedback URL, it is considered to be always on-line with default load share and shed fraction.

[0096] If the user's server uses a monitored URL but not a load feedback URL, it is considered to be on-line when the monitored URL is successfully retrieved (HTTP response code from 200 to 399 within 15 seconds), otherwise it is considered to be off-line.

[0097] If the user's server uses both a monitored URL and a load feedback URL, the server status is preferably given by the following table:

Load Feedback URL Contents	**Monitoring Down**	**Monitoring Up**
No XML	Off-line	On-line with defaults
No XML, last known still valid	Off-line	Last known
On-line	Off-line	On-line with defaults
On-line, LS and SF	Off-line	On-line with LS and SF
Off-line	Off-line	Off-line
Off-line, LS and SF	Off-line	Off-line

[0098] In the above table, "No XML" means that either the XML file could not be retrieved within the 15 second time-out period (e.g., due to network error), the XML file was retrieved but could not be parsed, or the XML file had expired. "Last known" refers to the full contents of the last successfully retrieved XML file. Last known values expire and cease to exist at the expire time if the expire time is specified in the XML file. The term "defaults" refers to the default load share and shed fraction values specified in the Managed resource server.

[0099] If the user's server uses the Load Feedback URL but no Monitored URL, the user can achieve an *N* minute delayed failover by putting in the XML snippet a relative *expireTime* of *N* minutes (*+Nm*) and a loadshare of one, while having in the policy a default Load Share of *0*.

Dynamic Server

[00100] The Dynamic Server option may be used to share load at the current decision tree leaf among a set of servers when the user expect that the load share, shed fraction, or server availability may change reasonably often. (The managed server option is preferred over the dynamic server option.) Load share and shed fraction are defined for this case as they are for Static Servers. However, the Dynamic Servers selection offers flexibility in exactly how they are specified. The Dynamic Server option supports specification of load share, shed fraction and the On line flag dynamically, allowing them to be defined by the subscriber via a short XML *status file* at a location of the subscriber's choice (as described above).

[00101] The subscriber specifies the location of this file to ATC, including any authentication requirements desired. ATC polls the file at predetermined fixed intervals, e.g., every 30 seconds, and updates the current ATC policy to reflect its contents. Subscribers can easily specify changes to load share, shed fraction and the On line flag by editing the file, either manually or by updating it using automated modules, without requiring updates to an entire ATC policy.

[00102] In order to maintain flexibility, values for the "URL Down load share" and the "URL Down shed fraction" parameters can be set in the ATC policy. They are used to control the behavior of ATC under the circumstance that the ATC polling mechanism is unable to retrieve the status file for a server, or is unable to parse its contents.

Case 1

[00103] Subscriber specifies all three *ATCServerStatus* attributes in the status file, with the "URL Down load share" parameter set to zero. In this case the subscriber's server will not be returned as an answer under any conditions until the polling mechanism retrieves a valid XML file.

Case 2

[00104] Subscriber specifies all three *ATCServerStatus* attributes in the status file, with the "URL Down load share" parameter set to one. In this case, ATC

treats a failure to return valid XML according to the "Down load share" and "Down shed fraction" specified in the policy.

Case 3

[00105] Subscriber specifies only the on line *ATCServerStatus* attribute in the status file. In this case, ATC uses the "**Default load share"** and "**Default shed fraction"** specified in the policy if the "**On line"** flag in the *ATCServerStatus* file is set to true.

[00106] Below is a table detailing all of the possible cases. In the table, a dash represents ATC taking the dynamic server out of consideration. **LS** and **SF** should be replaced by actual numbers.

Dynamic Server Cases

Form of retrieved ATCServerStatus file	LoadShare	ShedFraction
<ATCServerStatus onLine="True" loadShare="LS" shedFraction="SF"/>	LS	SF
<ATCServerStatus onLine="True"/>	Default load share	Default shed fraction
<ATCServerStatus onLine="False" loadShare="LS" shedFraction="SF"/>	—	—
<ATCServerStatus onLine="False"/>	—	—
Bad format or un-retrievable:	Down load share	Down shed fraction

Overflow Server

[00107] A user uses the *Overflow Server* option if the user would like to specify what should happen if, for some reason (e.g., server unavailability), no answers are selected by the *Static* or *Managed* (or *Dynamic*) Server selection process. Typically, the overflow server will be a CName to a service, such as Level 3 Communications' Content Delivery Network (CDN), that should be available in

the case that the user's individual *Static* or *Managed* (or *Dynamic*) servers are unavailable.

Managed and Dynamic Server Status Alerts

[00108] The global ATC network preferably maintains an overall state of a user's Managed and Dynamic servers using Monitored or Load feedback URLs. A Server Status page, available from the subscriber web interface, continuously updates with the status (up or down) of the user's URLs and, if down, the relevant error condition (time-out, connection failure, file not found, etc.). Additionally, the overall server state is displayed (either on-line or off-line) along with a relevant status message. If a server changes state, an email message is sent to the user detailing the event. Email messages are preferably not sent more frequently than once in 15 minutes per domain name origin.

[00109] Once a DNS request is directed to an appropriate continent, the country based distribution policies **225** may further constrain the selection to particular servers that are in the same or close-by countries where the client **112** is located. For example, if the client **112** is located in the U.S., the country based policies **225** may direct the selection from the servers located in the U.S. Similarly, the region based distribution policies **230** may further constrain the selection to, for example, the west coast or east coast depending on where the client **112** is located.

[00110] When a particular server group is selected (e.g., after a hierarchical decisions based on the continent-based policies **220** and the region-based policies **230**), the load share policies **240** govern the process whereby servers in a given server group should be selected. Such policies may be determined based on the servers' capacities or may be adaptively revised based on the dynamic performance or load of the underlying servers. The load share policies **240** may specify the percentage (share) of the total requests that each server in a server group should handle. For example, if a server group comprises a total of three primary servers (server 1, server 2, server 3), a load share policy for this server group may specify the load share as (0.3, 0.5, 0.2), indicating that server 1 should take 30% of the total

load, server 2 should take 50% of the load, and server 3 should take 20% of the total load.

[00111] The tiered failover policies **250** govern the selection of a server when a particular default set of servers is no longer functioning or available. For example, primary servers in a server group may be considered as a default set of servers that provide service when operation is normal. Unavailability of such primary servers may be detected according to the response time of the server. For example, if a server is simply not responding, the server may be considered as not available. When all the primary servers are down, the tiered failover policies **250** govern where the traffic should be directed. For instance, the tiered failover policies **250** may specify to direct all traffic to the overflow servers at the next tier.

[00112] **FIG. 4** depicts an exemplary relationship between the subscriber server network **104** and the subscriber policies **120**, according to embodiments of the present invention. The subscriber server network **104** is depicted in **FIG. 4** as a network hierarchy or a tree in which the subscriber server network **104** includes server group 1 **106-1** through server group *k* **106-*k***, and each server group may include its own primary server group **108** in the first tier and overflow server group **110** in the second tier (e.g., server group 1 **106-1** has primary server group **108-1** and overflow server group **110-1** associated therewith, while server group *k* **106-*k*** has primary server group **108-*k*** and overflow server group **110-*k*** associated therewith).

[00113] The subscriber policies **120** govern selection of one or more servers within the subscriber server network **104** (or in some other network of servers) so that their IP addresses may be returned in response to DNS requests from the client **112** (resolver **116**). To determine or to select appropriate servers in the subscriber server network **104**, the decisions may be hierarchical. For example, as shown in **FIG. 4**, at the level of the subscriber server network **104**, the ATC mechanism **126** may make geo-political distribution decisions **410** to determine which server group should be selected. Once a particular server group is selected, the ATC mechanism **126** may further determine which particular servers in the group should be selected

according to, for example, how the traffic load should be shared among the servers within the server group. Decisions at server group level may be based on the load share policies **240**. This decision making process illustrates that, at each branch node in the server hierarchy, appropriate ATC policies may be applied to govern the selection of an appropriate server or servers.

[00114] As illustrated in **FIG. 4**, the geo-political policies **215** may be applied to control the selection of a particular server group, the load share policies **240**, the tiered failover policies **245** and **250**, and the shedding policies **255** may be applied to re-direct traffic. That is, the subscriber server network **104** forms a tree and the ATC policies **200** govern the flow from the top of the tree to one or more leaves of the tree. The ATC mechanism **126** controls the flow by applying the ATC policies **200**.

[00115] **FIG. 5** depicts a high level architecture of an adaptive traffic control (ATC) framework according to embodiments of the present invention. The ATC framework comprises an ATC administrative framework **142** and an ATC name server network **140**. The ATC administrative framework **142** is responsible for various administrative tasks associated with subscribers or other policy making entities (**138**), include manipulating and storing the ATC policies **200**, propagating or broadcasting the ATC policies **200** to name servers in the ATC name server network **140**, monitoring name server behavior, generating status reports to display monitoring results on appropriate media, and sending alert to a network operation center (NOC) **148** (see **FIG. 1**) and the subscriber **102**.

[00116] The ATC name server network **140** is responsible for responding to DNS requests, including processing DNS requests, applying the ATC policies **200** to select one or more servers from the subscriber server network (or a different designated network), and replying with the IP address(es) of the selected server(s). The ATC name server network **140** dynamically maintains the ATC policies **200**, that are either received from the ATC administrative framework **142** or updated according to the dynamic operational status of the servers. The ATC name server network **140** provides domain name-IP address resolutions based on dynamically

updated ATC policies **200**. The ATC name server network **140** may also monitor the operational status of individual name servers within the network and supply logging and monitoring data to the ATC administrative framework **142**.

[00117] The ATC administrative framework **142** may be designed to have fault-tolerance. For example, as depicted in **FIGS. 1** and **5**, the ATC administrative framework **142** may include an administrative master agent (AMA) **144**, and one or more AMA backups **146-1, . . ., 146-*m*** (collectively **146**). All AMA agents, including the master agent **144** and the backups **146** may be capable of performing the exact functions except that one of them (e.g., master AMA **144**) may be a central or primary administrative master agent and others (e.g., AMA backups **146**) may be backup or secondary or redundant master agents. The central or primary AMA **144** may be responsible for regularly backing up the AMA backup agents **146**. When, for whatever reason, the primary AMA **144** is no longer functioning properly, one of the AMA backups **146** may take on the role of the central or master AMA **144**.

[00118] The ATC name server network **140** may comprise a plurality of name server agents **118-1, 118-2, . . ., 118-*k***, each of which may be designed to be responsible for the DNS requests of a particular geographical (or any other administrative or functional) region. For example, the name server agent **118-1** may be responsible for processing all the DNS requests from North America, the name server **118-2** may be responsible for Europe's DNS requests, and the name server **118-3** may be responsible for DNS requests from Japan. In addition, a name server agent may also serve as a back up name server agent for other name server agents in the network. For example, if the North America name server agent is not functioning properly, the Europe name server agent may be temporarily assigned to handle the DNS requests from North America. For that purpose, all ATC policies may be propagated to all of the name server agents in the ATC name server network **140**.

[00119] **FIG. 6** depicts a high level functional block diagram of an administrative master agent (AMA) **144** according to embodiments of the present

invention. The AMA **144** comprises a secure web-based graphical user interface **160**, a policy editing mechanism **162**, an ATC policy database **124**, an administrative policy update mechanism **164**, an ATC administrative browser **166**, an ATC policy management mechanism **152**, a report generation mechanism **168**, an ATC network monitoring mechanism **150**, and an administrative master backup mechanism **170**.

[00120] The ATC policy database **124** stores the ATC policies **200**. As discussed above, the ATC policies **200** may include policies from different sources (e.g., from subscribers and from other entities that control network traffic). Both the subscriber policies **120** and other policies **122** may be defined and provided to the AMA **144**. In the exemplary configuration shown in **FIG. 6**, the policies may be received at the AMA **144** through the secure web based GUI **160**. There may be other means through which the policies can be delivered to the AMA **144** and will be discussed later. The policy editing mechanism **162** organizes the received policies to form the ATC policies **200** and then stores them in the ATC policy database **124**.

[00121] The ATC policy management mechanism **152** may broadcast or propagate the ATC policies **200** to relevant name servers in the ATC name server network **140** so that the ATC policies **200** may be used to control the domain name translation service. The stored ATC policies may be dynamically updated via different means. For example, the policies may be updated through the ATC administrative browser **166**, or the administrative policy update mechanism **164** may revise existing ATC policies.

[00122] Alternatively, the AMA **144** may also be provided with policies from different sources through the ATC policy management mechanism **152,** which may regularly poll dynamically updated policies from different locations. Such locations may include designated network locations that are designated to provide dynamic policy related information or servers (either in the subscriber server network **104** or in the CDN **105**) that are classified as managed servers. For instance, a server may dynamically specify its load share via a designated file

stored on the server or at some other location (the file may reside on the server being monitored or at some other location, e.g., a central load controlling server). To retrieve such dynamically defined load share information from a managed server, the ATC policy management mechanism **152** may poll the designated file stored on the managed server to obtain relevant load share information. Dynamic policies may also be polled from other policy making entities.

[00123] Broadcasting ATC policies may take place periodically according to some pre-defined interval or may be triggered whenever the stored ATC policies are updated. The ATC policy management mechanism **152** may monitor changes made to the existing ATC policies. The ATC policy management mechanism **152** may poll the ATC policies stored in the ATC policy database and see whether there are changes. On the other hand, whenever the ATC policy management mechanism **152** polls dynamic policies from specified locations (such locations may be specified in existing ATC policies), it may determine whether the dynamically polled policies differ from existing ATC policies. In the event that updated policies are different from the existing ATC policies, the ATC policy management mechanism **152** may re-broadcast the updated ATC policies to the ATC name server network **140**.

[00124] The ATC network monitoring mechanism **150** may collect DNS log summaries from different name servers in the ATC name server network **140**. Such summary log data may be received in the form of events that provide information such as, for example, the number of requests directed to particular servers in a given time period. The ATC network monitoring mechanism **150** may collectively processes such DNS log summaries (or events) from the entire ATC system. The report generation mechanism **168** may generates monitoring status reports from these summaries and makes such reports available to the subscriber **102** via the secure web-based GUI **160**.

[00125] The administrative master backup mechanism **170** may periodically update the AMA backups **146-1, . . ., 146-*m*** to ensure that all the backup agents are current. This may include replicating the ATC policies, the operational status of

various control mechanisms (including the ATC policy management mechanism **152**), the policy editing mechanism **162**, and the administrative policy update mechanism **164**, and providing the up-to-date information to the AMA backups.

[00126] A major function of an administrative master agent is to manage the ATC policies, to make sure that updated ATC policies are supplied to the name server agents in the ATC name server network **140**, to monitor the various name servers' performance, to generate dynamic monitoring status report of system performance, and to maintain a connection through which policies may be updated dynamically and monitoring report can be examined.

[00127] Information flagging system errors and other anomalous conditions is collected by the ATC network monitoring mechanism or agent **150**. **FIG. 7** depicts an internal functional block diagram of an ATC network monitoring mechanism **150**, according to embodiments of the present invention. The ATC network monitoring mechanism **150** includes a trap handler **176**, a processing mechanism **182**, and an alert generation mechanism **184**. The trap handler **176** traps events from the name servers in the name server network **140**. The processing mechanism **182** analyzes both the collected trapped events, and, based on analyzed information, the alert generation mechanism **184** generates alerts when necessary, and reports such alerts to, for example, the ATC's network operation center (NOC) **148** and the subscriber **102** (**FIG. 1**).

[00128] The trap handler **176** further comprises an event receiver **178** that intercepts trap events from the name servers and an event consolidation mechanism **180** which may classify the trapped events and organize them in a reasonable and appropriate fashion. The processing mechanism **182** may process the consolidated events to identify useful or informative patterns which may be further used, by the alert generation mechanism **184** to identify problematic patterns which may significantly affect the system performance.

[00129] The Adaptive Traffic Control (ATC) framework according to the present invention may be deployed as a stand-alone service directing traffic solely

to the subscriber's servers, in conjunction with another content delivery network (CDN) provider, or in conjunction with any other service.

[00130] Each domain name server in the ATC name server network **140** may include (**FIG. 1**) a location determiner **128**, an adaptive traffic control (ATC) mechanism **126**, a monitoring agent or mechanism **130**, a database manager **132**, and a report generator **134**. When a name server (e.g., **118-1**) receives a request from the resolver **116** of the client **112**, the location determiner **128** determines the location of the resolver and sends such location information to the ATC mechanism **126**. Based on the location information, the ATC mechanism **126** retrieves relevant ATC policies from the policy database **124** (e.g., the subscriber policies **120** or the other policies **122**) and selects one or more servers in the subscriber server network **104** according to the retrieved relevant policies. The corresponding IP address(es) or the CNAME of the selected servers are then returned to the resolver **116**.

[00131] The database manager **132** maintains the policy database **124**. It received policies broadcast from the ATC policy management mechanism **152** in the ATC administrative framework **142** and populates the policies in the policy database **124**. The ATC policies received from the ATC administrative framework **142** may also include information that defines or classifies servers in the subscriber server network **104** (or in the CDN **105**). For example, some servers may be defined as monitored servers and some may correspond to managed servers.

[00132] When the database manager receives such information, it may inform the monitoring mechanism **130** of the classification of the underlying servers so that the monitoring mechanism **130** can monitor each server according to its status. When the ATC policy management mechanism **152** broadcasts updated policies, the database manager **132** accordingly updates the relevant policies stored in the policy database **124**.

[00133] The monitoring mechanism **130** monitors the operational status of the name server **118-1** and one or more servers in the subscriber server network. It may collect events occurred in the name server **118-1** during operations and send such events to the ATC network monitoring mechanism **150** in the ATC

administrative framework **142**. On the other hand, it may also monitor the operations of various servers in the subscriber server group **104** (or in the CDN **105**) according to how each server is defined (monitored or managed server).

[00134] If a server is defined as a monitored server, the monitoring mechanism **130** may dynamically probe the server (as discussed earlier) to determine its availability. If a server is defined as a managed server, the monitoring mechanism **130** may monitor its availability during operation. The monitoring mechanism **130** may also poll dynamic load share information from the server. When the monitoring mechanism **130** detects that a server is no longer available, it may inform the database manager **132** to create a local policy that indicate that the server is no longer available so that the ATC mechanism **126** can take into account when resolving a hostname.

[00135] When the monitoring mechanism **130** polls the dynamic load share information from the server, it may inform the database manager **132** to update the load share policies in the policy database **124** that are affected by the dynamics of the polled load share. For example, if three primary servers in a server group originally have load share (0.3, 0.3, 0.4) and the third primary server now changes its load share to 0.2, the database manager **132** may accordingly update the load share among these three primary servers into (0.4, 0.4, 0.2).

[00136] The report generator **134** generates reports related to the operations of the underlying name server based on log information **136** recorded. Such generated reports may be sent to a report consolidator **154** in the ATC administrative framework **142** so that reports from different name servers may be consolidated.

[00137] A subscriber may activate (turn up) the ATC system (DNS servers) in one of two ways: using a DNS CNAME or using NS delegation. Instead of using ATC to direct traffic for a single DNS hostname, the subscriber may have many different subdomains that it would like to direct to ATC. For example, the subscriber might want all downloads from *dl.customer.com* handled by ATC, together with all of its subdomains, but have all other domains that it controls, such as *www.customer.com,* resolved by its own name server:

dl.customer.com. => ATC
any.thing.dl.customer.com. => ATC
www.customer.com. => not ATC
customer.com. => not ATC

[00138] In this case, instead of adding the CNAME record in the subscriber's DNS zone file, it simply delegates the *dl.customer.com*. name to ATC via NS records in its zone file.

[00139] The delegation (using NS-records) method is presently preferred as it is more flexible and offers all of the reliability, scalability and flexibility of ATC. After the initial contact for delegation, a properly operating resolver making occasional queries will not contact the subscriber's own name server or name servers again. The result provides much better name resolution performance since the unnecessary overhead of routing each fresh DNS request through the subscriber's name server is eliminated. The CNAME method keeps the subscriber's own name server in the loop. That is, whenever the CNAME TTL expires, client resolvers will return to the subscriber's name servers to refresh the record.

[00140] For both CNAME and NS delegation methods, the procedure to turn off the ATC switch is the same – the subscriber edits its DNS zone files to remove the delegation authority to ATC. DNS requests will continue to be served in accordance with the subscriber's defined ATC policies until the TTLs have expired on the appropriate delegations.

The System in Operation

[00141] **FIG. 8(a)** is an exemplary flowchart of a process, in which a name server resolves a DNS request based on ATC policies, according to an embodiment of the present invention. First, a user enters a URL into the user's browser **114** (or into any application that accepts URLs as input and obtains the corresponding resource for the client) (at **802**). The client's resolver **116** attempts to resolve the hostname of the URL in order to obtain an IP address of a server from which the resource identified by the URL can be obtained (at **804**). The resolver **116** will be directed by the client's DNS (not shown) to a DNS Name Server **118** in the ATC

name server network **134** (at **806**). The resolver **116** provides the name server **118** with the hostname it is attempting to resolve.

[00142] The name server **118** receives the request to resolve the hostname (at **808**) and determines one or more servers in the subscriber server network **104** or in the CDN **105** that can process the client's request according to the location of the resolver **116** as well as relevant ATC policies retrieved from the policy database **124** (at **810**). Details of this operation are described with reference to **FIG. 8(b)**. The IP address(es) of the selected server(s) are returned to the requesting resolver **116** (at **812**). The browser **114** then connects to one of the servers (at **814**) in order to obtain the requested resource.

[00143] **FIG. 8(b)** is a flowchart of an exemplary process, in which a domain name server selects one or more servers according to location of the client and relevant ATC policies. The location of the resolver **116** (or client) is first determined (at **816**). Relevant ATC policies are then retrieved (at **818**) from the policy database **124**. One or more servers in either the subscriber server network **104** or the CDN **105** are selected according to the determined location of the client and the relevant ATC policies (at **820**).

[00144] **FIG. 8(c)** is a flowchart of an exemplary process, in which the monitoring mechanism **130** in a domain name server monitors the operations of the name server as well as one or more servers in the subscriber server network **104** or the CDN **105**. Events occurring during domain name service are monitored (at **822**). Such events are sent to the ATC network monitoring mechanism **152** (at **824**). In addition, the availability of the one or more servers are also monitored (at **826**). Furthermore, if any of the one or more servers is defined as a managed server (determined at **828**), dynamic load share information is polled (at **830**). Both the availability information and the dynamic load share information (if any) are used to update some ATC policies that are local to the name server (at **832**).

[00145] **FIG. 8(d)** is a flowchart of an exemplary process, in which the ATC policy management mechanism **152** dynamically maintains and broadcasts the ATC policies. Initially, policies from different sources are received (at **834**) and

broadcast to the name servers **118** (at **836**). If backup is necessary (determined at **838**), the ATC policy management mechanism **152** sends current policies to the master backup agents **146** (at **840**).

[00146] The ATC policy management mechanism **152** also performs dynamic policy maintenance. It polls dynamic policy information (at **842**) at certain defined intervals and uses such polled dynamic policy information to update existing policy (at **844**). The updated policies are then broadcast to the name servers (at **846**). If the updated policies need to be propagated to the backup agents (determined at **848**), they are sent to the master backup agents (at **850**).

[00147] **FIG. 8(e)** is a flowchart of an exemplary process, in which the ATC network monitoring mechanism **150** monitors operations of the name servers and sends alert to the NOC **148** and the subscriber **102**. Events sent from monitoring mechanisms of different name servers are trapped (at **852**). Such trapped events from different sources are then consolidated (at **854**) and processed (at **856**). If there is any alarming situation (determined at **858**), the ATC network monitoring mechanism **150** generates an alert (at **860**). The generated alert is then sent to both the NOC **148** and the subscriber **102** (at **862**).

Policy Administration

[00148] The ATC policies may be initially set up and later adaptively updated according to servers' dynamic operational status. The ATC policies may be formed via various means. The described approaches may also be applied to form other policies. A GUI approach or a file-based approach (or both) may be employed to set up subscriber policies. Through the GUI approach, different means to form subscriber policies may be adopted. For example, a browser may be used so that a subscriber can enter policies directly. An XML file containing descriptions of the subscriber policies may also be loaded using GUI approach so that the policies may be parsed and stored. As another alternative, a file containing descriptions of the subscriber policies may also be loaded in a similar fashion and parsed accordingly. When a file based method is used, a file containing descriptions of the subscriber

policies, either constructed based on XML or some other structure, may be accessed via other means such as FTP.

[00149] In some preferred embodiments, a subscriber accesses a secure web-based GUI **160** (**FIG. 6**) using subscriber's secure browser interface **156**.

[00150] **FIGS. 9(a)-9(c)** show exemplary secure web based graphical interfaces, through which a subscriber may define load share policies and overflow policies with respect to specified network resources, according to embodiments of the present invention. There may be different types of load sharing servers: (1) static servers, (2) dynamic servers, and (3) overflow servers. A dynamic server is one that is specified as either a monitored or a managed server whose dynamic availability may be monitored and whose load may be re-directed when it becomes unavailable. In the case of a monitored server, both of its load share and load shed fraction may also be made dynamic.

[00151] Correspondingly, the policies governing routing requests to different types of servers may also be defined accordingly. First, the policies that govern static servers are applied when servers are relatively static and do not change often over time. This may mean that the availability of the servers is fairly stable and load sharing among different servers is also relatively stable. The policies that control dynamic servers are applied when servers are expected to change frequently. Such policies include failover policies, shedding policies, and tiered failover policies (described earlier). The overflow policies control the change of flow of the requests when, for some reason, primary servers, either static or dynamic, become unavailable or overloaded. In this case, relevant overflow policies determine to which overflow server a request for name service should be directed.

[00152] The load share with respect to a given server represents the amount of traffic that will be sent to that server within a static server setting. An exemplary method to compute the load share of the traffic sent to the server is to sum the load share amount of all servers in a current static server setting and divide the load share for that server by the summed total to derive the load share.

[00153] The shed fraction for a given server represents the percentage of traffic that should be redirected away from the server. The redirection may be carried out after load share is made based upon load share policies. **FIG. 9(a)** gives an example interface, in which each of the servers listed is assigned various selection related parameters. For example, for each server, a TTL is specified. In addition, a load share and a shed fraction may also be specified. For example, both servers *New York* and *London* have load share of 1.0. The shed fraction assigned to server *New York* is 0.2, meaning that 20% of its load is re-directed to some other server, and the shed fraction assigned to server *London* is 0.3, meaning that 30% of its load is re-directed to some other server.

[00154] Shedding fractions may also be computed automatically on the fly. For example, when a server is detected to have slow response, indicating that it may be overloaded, a shedding fraction may be computed according to the discrepancy between its expected response time and the actual response time. Such an automatically computed shedding fraction can then be applied to re-direct the newly computed fraction of the traffic to a different server to unload some of the traffic originally intended to be directed to the overloaded server.

[00155] For each resource server, an on-line flag may also be set to indicate whether the server is currently available. This flag is shown in **FIG. 9(a)** in the rightmost column. With this flag, a server may be temporarily removed from the service, if, for instance, a server needs to be taken down for maintenance.

[00156] Since managed and dynamic servers are expected to change relatively frequently, policies that govern their selection may be defined in two stages. The policies for managed and dynamic servers may be initially specified in a similar fashion as for static servers. For instance, load share and shed fraction can be defined for dynamic servers *New York* and *London*, as shown in **FIG. 9(a)**. During operation, however, the policies that govern the selection of managed and dynamic servers may be established dynamically. For example, initially defined policies (e.g., load share, shed fraction, and on-line flag) may be adaptively revised based on, for instance, an on-line status report retrieved from one or more specified

locations on the network. Dynamic policies provide considerable flexibility in how the selection may be conducted in a manner that is adaptive to the network health or any other network performance related factors (e.g., maintenance).

[00157] The on-line status report may be provided at one or more network locations specified by the subscriber. The locations may be specified as a Uniform Resource Locator (URL) and may be accessed through an HTTP request. A location of the status report may be specified in the initial policy, providing a constant link to the location. **FIG. 9(b)** shows an exemplary GUI for specifying an URL link to a status report. An URL link for the location of the status report is specified as "*http://server*" which corresponds to a server named London with an IP address of 10.0.0.3. The access may be authenticated and such authentication requirements may also be specified in the initial policies. The on-line accessed status report may be constructed based on information gathered during monitoring the servers' performance. For instance, each server in the subscriber server network may provide a status report containing information related to its performance. Name servers in the ATC name server network may poll such information from such servers and such information may be used to update policies.

[00158] The frequency with which the status report is accessed may also be specified explicitly. For example, it may require the relevant mechanisms (specifically, the ATC policy management mechanism or the monitoring mechanism of each name server) to poll the status report at a regular time, e.g., every thirty seconds.

[00159] A status report may be constructed using some standard language such as extendible Markup Language (XML). Such a status report may contain revised policies, which may be determined by the subscriber manually based on network performance, devised by an automated process based on network performance, or may be generated by an individual managed server. In such cases, the status report includes updated policies and when it is polled, the updated policies are used in future traffic control. For example, a managed server may re-

define its load share of according to its dynamic capacity. When such dynamically defined load share information is accessed and used in enforcement, the traffic is controlled in a manner that is adaptive to the network dynamics.

[00160] When a status report is accessed, the relevant mechanisms (e.g., the ATC policy management mechanism in the ATC administrative framework or the ATC mechanism in corresponding name server) updates the associated policies based on the information contained in the status report. For example, a status report may indicate that the current load share for server New York should be 0.4 (down from 1.0 previously) with the same shed fraction (0.2) and the current load share for server London should be 0.5 (down from previous 1.0) with 0.4 shed fraction (40% shed fraction). An alternative scenario may be that the status report provides network performance data about each dynamic server and the ATC mechanism, after accessing the status report, determines how the current policies may be revised accordingly.

[00161] When the status report provides dynamic policies, it may, in general include, for each dynamic server, the following information:

<ServerStatus loadShare="LS" shedFraction="SF" online="Boolean"/>

where LS and SF represent numerical numbers and "Boolean" represents a logical value of either "true" or "false".

[00162] With respect to dynamic servers, with the mechanism of dynamic policies described above, a subscriber or a server can easily specify changes to existing policies (e.g., changes to load share, shed fraction policies and the On-line flag) without having to update an entire ATC policy hierarchy. In addition, a parameter (called "Down on line" in some embodiments) can be set in an ATC policy to control the behavior of the ATC mechanism under the circumstance that the ATC policy management mechanism is unable to properly access the status report due to reasons such as a failed polling or retrieval or failing to parse the status report's content. According to some embodiments of the present invention, three different exemplary approaches may be applied to handle the situation.

[00163] With the first approach, a subscriber may instruct an ATC mechanism in a name server not to select a particular server if the status report for that server can not be properly obtained. The subscriber may specify this policy by setting parameter "Down on line" to false. In this case, the ATC mechanism will not consider the underlying server as a candidate for selection process until the polling mechanism retrieves a valid status report.

[00164] The second approach to deal with a polling failure is to allow the ATC mechanism to select the underlying dynamic server according to its default policies (or original policies). To specify this solution, the subscriber may set the "Down on line" parameter true.

[00165] The third approach to handle the situation where the status report can not be properly retrieved is to allow the ATC mechanism to select the underlying server if its "on line" flag is on (it is available). To achieve this, a subscriber may specify only the "on line" ServerStatus in the status report, with parameter "Down on line" set to either true or false. In this case, the ATC mechanism will use a load share and a shed fraction specified in the policy when the "On line" flag is set to true. The load share and the load shed fraction may both be dynamically determined (either broadcasted from the ATC policy management mechanism or polled by the ATC mechanism **130** from the underlying server.

[00166] Static, dynamic and managed servers are primary servers, although their selection may be controlled by operationally different policies. The third type of servers are called overflow servers. They provide alternatives when primary servers, for some reason, can not be selected. Typically, an overflow server corresponds to a Canonical name or *CName*, pointing to a service providing a CDN (such as, e.g., the CDN service offered by Level 3 Communications). The choice of overflow servers may be determined based on the belief that they are in general always available. An overflow server may be defined through a window illustrated in **FIG. 9(c).** In **Fig. 9(c)**, overflow servers are defined by a CName, which points to the CDN server address "*customer.footprint.net*" (e.g., the CDN **105**, shown in **FIG. 1**).

EXAMPLES

Example A

[00167] **FIGS. 10(a) – 10(b)** show example subscriber policies, defined based on a set of resource servers, that govern the selection of the servers according to different criteria such as geographical location of an incoming request and the time zone of each of the locations. In **FIG. 10(a)**, three different resource servers are defined, including an "eastserver" with IP address 10.0.0.2, a "westserver" with IP address 10.0.0.1, and a service network with CName "*customer.footprint.net*". Here, the service network may include more than one server.

[00168] **FIG. 10(b)** shows an exemplary decision tree embedded in a set of geographical policies that guide how the traffic should be directed to a set of servers. In the decision tree depicted in **FIG. 10(b)**, the selection is first directed to different resources at the top level according to a split between the United States and rest of the world. A resource may correspond to either a single server (or CDN) or a group of servers (or CDNs). A request initiated from non-U.S. geographical regions is directed to a resource named "London". Within the United States, time zone based policies are further applied. A request initiated from a region within the central time zone is directed to a resource named "New Work". A request initiated from a region within Alaska time zone is directed to the resource "London". Finally, a request initiated from a region within the United States that does not fall in any of these time zones (i.e., Alaska or Central) can be directed to either "London" or "New York".

Example B

[00169] **FIGS. 10(c) – 10(d)** show another example decision tree constructed based on a set of resources (servers or CDNs) and subscriber policies that are defined based on geographical locations of an incoming request with overflow policies that allow the ATC mechanism to direct traffic to pre-defined overflow servers when primary servers are not available. In the Resource window shown in **FIG. 10(c)**, three resources are defined: static resources "London" and "New York", each defined based on its IP address, a service network named "Sydney" with

CName "*customer.sandpiper.net*". Each resource may correspond to a set of servers such as a server group with certain hierarchy. Resource "London" is further defined as a dynamic resource and resource "Sydney" is further defined as an overflow server network nicknamed "cdn_service". **FIG. 10(d)** illustrates an example decision tree built based on these resources.

[00170] The decision tree in **FIG. 10(d)** first splits two ways at the top level based on whether a request is from the United States. When a request is initiated from the United States, it is directed, according to the policies illustrated in **FIG. 10(d)**, to the dynamic servers at the first tier of resource "London". A request from the United States may also directed to one of the overflow servers in resource "cdn_service". This may happen when either all the primary servers at the first tier of resource "London" fail to function or when such primary servers are overloaded.

[00171] The next four examples (Examples 3-6) are based on an example subscriber which has ATC handling traffic for *www.subscriber.com* with a CNAME hand-off to *www.subscriber.com.nsatc.net*. The example subscriber has three datacenters, one in San Francisco, New York and London. The set of resources used by these four examples is shown in **Fig. 10(e)**. Managed servers are used with monitoring since the example provides failover from one server to another. The default load share values vary: the San Francisco server can handle 2.5 times the traffic of the London or New York servers. The overflow server is utilized in only two of the example policies. It is a CNAME specification to a CDN – the Level 3 CDN.

Example C

[00172] With this policy (**Fig. 10(f)**), the example subscriber does not utilize any geographic ATC rules, and the London server is not in use. End users are simply directed to one of the two servers, provided the ATC monitoring of that server indicates the server is up and functioning. Unlike standard DNS round-robin techniques, ATC directs end users to the two servers in exactly the ratios specified by the load share values in the **Resources** Window (**Fig. 10(e)**). ATC will return the IP address of the San Francisco server 2.5 times as often as the New York

server. If ATC monitoring detects that the New York server is offline, ATC name servers will immediately stop returning the IP address of the New York server and only return the San Francisco server IP address until the monitoring indicates the New York server has returned. If the example subscriber determines that any one of the servers has too much traffic, the load share of that server should be adjusted in one of two ways:

- the subscriber can login to the ATC Admin GUI and change the load share value manually, or
- the subscriber can configure ATC to poll a load feedback URL for the load share value, and change that value on the fly

[00173] Changing the shed fraction for any one server is not appropriate in this example because there is no defined lower tier or overflow server to receive shed traffic. Both servers are in the same tier.

[00174] A variation of this example is to put the New York server in Tier 2, i.e., have New York function as a backup. In this configuration, all traffic would be directed to the San Francisco server unless it was monitored as down or shedding in which case traffic would then go to New York. That is, if the San Francisco server had a shed fraction of, e.g., 10%, then ATC would return the New York server 10% of the time. When there is only one server in a Tier, there is no load share balancing for ATC to do, and the load share value becomes unimportant (unless zero).

[00175] This example demonstrates load share variation and server failover handling within a load sharing server set consisting only of managed servers.

Example D

[00176] This policy (**Fig. 10(g)**) adds an overflow server to the server set of the previous policy example. The example subscriber has two methods to inform ATC that any one server should shed some of its traffic to the overflow server, in this case the Level 3 CDN. The overflow server is intended to be an effective large supply of bandwidth, to be used when the subscriber's servers are at capacity or when the lowest latency is required.

[00177] The shed fractions can be modified in one of two ways:

- the subscriber can login to the ATC Admin GUI and change the shed fraction value manually; or
- the subscriber can configure ATC to poll a load feedback URL for the shed fraction value, and change that value on the fly

[00178] The subscriber may maintain an even load across all subscriber servers by setting the load share. This value typically does not need continuous adjustment. Then, if traffic levels increase and all servers are nearing their capacity, all servers begin shedding traffic to the Overflow server(s) (in this example, "dl.subscriber.com.c.footprint.net", a CName for a CDN).

Example E

[00179] This example policy (**Fig. 10(h)**) utilizes geographic control to direct end users to the subscriber servers nearby, on a continental scale, improving end-user response time (latency). A variation in tiers is used to specify preferential and failover server selection. Within a load sharing server set, all servers in **Tier 1** are considered first. Only if a server cannot be selected from **Tier 1** (due to shedding or because it is off-line) is **Tier 2** considered, and so on for **Tier 3**. Requests with end-user resolvers in Europe (and Africa and the Middle East) are directed to the London server, unless it is down or shedding, in which case traffic is sent to New York, and then San Francisco. Similarly, requests from Asia and Australia are directed to San Francisco, unless that server is down or shedding, in which case the lower tiers are used.

[00180] In this case, the subscriber does not have an overflow server defined. If the load on any server becomes too high, the shed fraction can be increased on that server and traffic will be sent to the lower tiers defined within each geographic region.

[00181] If both the San Francisco and New York servers are offline, all traffic is directed to the London server until the U.S. servers return. If all three servers are offline, ATC is unable to determine which servers are preferred and thus selects all

three servers, with the hope that the end user may be able to connect to one of them.

Example F

[00182] This policy (**Fig. 10(i)**) demonstrates finer geographic control. End users with resolvers on the West coast are directed to San Francisco rather than New York. Likewise, end users with resolvers in the Eastern U.S. are directed to New York rather than San Francisco. The overflow server, in this case "dl.subscriber.com.c.footprint.net", a CName for a CDN, is again in use. If all servers are offline or shedding (which is considered unlikely), traffic will be directed to the CDN.

[00183] ***Note:*** The **Other** label is used, as before, to catch all non-specified world zones, and again within the U.S. time zone split to catch all remaining regions (in this case the western time zones of the U.S. and the rest of the Americas).

[00184] The following three examples (Examples 7-9) are based on an example subscriber which has ATC handling traffic for an origin server *demo.nsatc.net* and for the domain *nsatc.net*. The subscriber has three data centers in New York, San Francisco, and London, UK, with managed servers at each center. As shown in **Fig. 10(j)**, the load shares for the managed servers are (NY: 1, SF: 2, and London: 1).

Example G (origin plus CDN)

[00185] **Fig. 10(k)** shows a policy for the two sub-domains "images.nsatc.net" and "www.nsatc.net". For the "images" sub-domain, end users are directed to servers in New York or San Francisco, in the ratio 1:2. That is, the ATC mechanism will return the IP address of a San Francisco server twice as often as that of a NY server. If the ATC mechanism detects that, e.g., the San Francisco server is down, it will stop return the IP address for the SF server and will only return the IP address for the NY server (until monitoring indicates that the SF server has returned). The subscriber may adjust the load share of the servers as in the earlier examples (either by logging in to the ATC to change the load share

values manually, or by configuring ATC to poll a particular location for a configuration file). In case of overflow, the requests go to the CDN (with the CName "demo.c.footprint.net").

[00186] The "www" sub-domain is handled somewhat differently in that the overflow for "www" will go to either of two CDNs. In this example, as shown in **Fig. 10(l)**, "Level 3 CDN" is a CNAME for a CDN at "demo.c.footprint.net", and "Other CDN" is a CNAME for another CDN at "demo.othercdn.net". The ATC is configured to share the load between the two CDNs in the ratio 1.5 to 1. In other words, as configured in **Fig. 10(l)**, ATC will return the CNAME of the Level 3 CDN 1.5 times as often as it returns the CNAME of the "Other CDN".

[00187] As with the load share values for the other servers, the load share for the CDNs can also be adjusted by the subscriber on the fly or by logging in to the ATC.

[00188] Those skilled in the art will realize and understand, upon reading this description, that a subscriber may wish to adjust load share values for a CDN for performance and/or business reasons. E.g., a subscriber may have to pay a higher rate for one CDN than for another.

[00189] Those skilled in the art will realize and understand, upon reading this description, that the two CDNs may be owned and operated by different entities and may be in different domains.

[00190] Using this example, a subscriber can have its traffic handled initially by its origin servers (in NY or SF), with overflow being handled by a CDN. Overflow for the "images" sub-domain is handled by a single CDN, whereas overflow for the "www" sub-domain is handled by two CDNs.

Example H

[00191] **Figs. 10(m)-10(n)** show a policy in which traffic to the sub-domain "www" is split equally between three CDNs. Each CDN has a load share of 1 and so an end-user will be returned a CNAME of one of the three CDNs, with each CDN having one third of the load. Again, the subscriber can modify the load share on the fly or by logging in to the ATC.

Example I

[00192] **Fig. 10(o)** shows an exemplary policy with different rules for the sub-domains "ftp", "download", "www" and "images."

[00193] End-user requests for the "download" sub-domain (download.nsatc.net) are handled by the subscriber's origin servers in NY and SF (in the ratio 1:2 (per **Fig. 10(l)**). Overflow from the "download" sub-domain is handled by the CDN "demo.cdn.com" (a CNAME for the CDN). In other words, overflow from the "download" sub-domain will be directed via a CNAME demo.cdn.com to the CDN (i.e., ATC will return the CNAME demo.cdn.com for overflow cases to the sub-domain "download").

[00194] The "ftp" sub-domain is split based on country (i.e., on the country in which the end-user's request is believed to originate). End-user requests from the US are handled by the domain "us.demo.com" (a CNAME), and all other requests are handled by "international.demo.com" (also a CNAME). In this manner, ftp requests can be directed to different networks based on their country of origin.

[00195] The "images" sub-domain is split initially on three geographic zones:

I. Europe

II. Asia and Australia

III U.S. and other

[00196] Within each zone, end-user requests are further directed based on server load. E.g., in zone I (for Europe), end-user requests are handled by the tier 1 server(s) in the UK. If these fail (or are overloaded and need to shed load), requests then go to the tier 2 server(s) in NY. And if these fail (or are overloaded and must shed), requests are directed to the tier 3 server(s) in SF. Thus, in response to an end-user request for the sub-domain "images", the request originating in Europe, the ATC will return the IP address of a server in the U.K. But if that server in the UK is overloaded, the ATC will return the IP address of a server in N.Y. And if that server is also overloaded, the ATC will return the IP address of a server in S.F.

[00197] The Asia/Australia zone operates similarly, except that the servers are put into different tiers, favoring the order SF, NY, UK. All other zones favor the order NY, SF, UK.

[00198] The "www" sub-domain is not split based on geographic location of the end-user. Traffic is handled by SF first, with NY as an overflow.

[00199] In addition to the various web-based interfaces described herein, there are also other means through which subscriber policies may be defined. As discussed earlier, for example, subscriber policies may also be constructed or specified in an XML file which can be downloaded by an ATC mechanism and used to control the traffic.

[00200] Policies defined via different means (e.g., through web based GUI or XML file) may be converted into some pre-defined format within the ATC mechanism. Such pre-defined format may be designed for efficiency in manage and handling the ATC policies. For example, the internal format for ATC policies may be designed so that, internally, the AMAs can conveniently store, access, and broadcast the ATC policies to the name server agents and the name server agents can efficiently apply the policies.

[00201] As mentioned earlier, in addition to management of the ATC policies, the AMA may also monitor the performance of name servers and generates viewable DNS log reports. The monitoring mechanism may gather performance information from either the DNS logs of the name servers or the events trapped from the name servers. Such gathered information may be used by the report generation mechanism to construct informative reports. The report generation mechanism may also make such reports available to the subscribers via the secure web-based GUI. **FIGS. 11 (a) – 11(c)** show exemplary types of report information that is accessible via the secure web-based GUI. **FIG. 11(a)** depicts a web interface that allows a subscriber to view DNS log data of a specified resource server. A subscriber can specify the name of the server under review (e.g., "*download.subscriber.com*"), the form in which the log data is to be organized (e.g., specify output style of "Separate", meaning to display IP and CName queries

and replies with answers as separate items in the output), the time period under review (e.g., from September 1, 2002 to September 24, 2002), and the time resolution used in displaying the log data (e.g., automatically select time resolution).

[00202] **FIG. 11 (b)** shows a plot of log data related to a specified server. The log data is presented in a plot, generated based on the log entries of a particular server against a specified period of time (X-axis) with certain resolution. The exemplary plot reflects the volume of the traffic directed to the underlying server during a period time between 2:30 pm and 3:30 pm on September 24, 2002. The traffic volume is described in terms of number of replies generated by the underlying server per minute (Y-axis). It can be seen in this example plot that there is a surge in traffic volume between 2:36 pm and 2:38 pm. **FIG. 11(c)** shows a graphical display for the same log data in **FIG. 11(b)** in a table form, in which the log data is listed in a chronicle order from top to the bottom of the table. For instance, each row in the left column lists a period of time. In the exemplary table, the log data within the one hour period (2:30 pm to 3:30 pm) is divided into a plurality of sub-periods, each of which is 15 minutes. For each sub-period, the third column provides the number of replies from the corresponding sub-period. For instance, during the sub-period of 3:15 pm to 3:30 pm, there are 13 replies and there is no reply in other sub-periods (consistent with the plot illustrated in **FIG. 11(b)**).

[00203] In some implementations, end-user resolvers may use a preferred subset of the ATC nameservers. This may be implemented by providing an initial pool of ATC name servers which respond to new requests from new end-user resolvers. When an end-user resolver first requires name resolution from an ATC nameserver, that resolver is directed (e.g., by the DNS system) to one of the pool of ATC nameservers. When that ATC nameserver provides an answer to the end-user resolver, it also gives that resolver a list of preferred ATC nameservers for that resolver, i.e., one or more ATC nameserver that are better suited to handle name resolution for that end-user resolver. An ATC nameserver may be better suited to

handle requests from an end-user resolver for a number of reasons, e.g., because it is electronically closer to the resolver, because it is geographically appropriate for that resolver, etc. Those skilled in the art will realize, upon reading this description, that different and/or other measures of suitability may be used to provide an end-user resolver with a list of preferred ATC nameservers. Once an end-user resolver has a list of preferred ATC nameservers, that resolver will make future requests of nameservers in its list (until the entries for those nameservers expire or are replaced).

[00204] The various mechanisms described herein, including, without limitation, the adaptive traffic control (ATC) mechanism, the location determination mechanism, policy editing mechanism, administrative policy update mechanism, ATC policy management mechanism, report generation mechanism, a monitoring mechanism, and an administrative master backup mechanism may be implemented in hardware, software or a combination thereof. When implemented in software, they may be implemented in any type of appropriate interpreted or compiled programming language. When implemented fully or partially in software, aspects of the invention can reside on any memory or storage medium, including but not limited to a ROM, a disk, an ASIC, a PROM and the like. While the invention has been described with reference to particular mechanisms (algorithms, processes and functions) and architectures, one skilled in the art would realize that other mechanisms and/or architectures could be used while still achieving the invention.

[00205] When the various mechanisms of the present invention are running on a particular machine (e.g., at a client or on a server), they may reside in the memory of the machine or on a storage device or in a combination. Further, while many of the operations have been shown as being performed in a particular order, one skilled in the art would realize that other orders, including some parallelization of operations, are possible and are considered to be within the scope of the invention.

[00206] The present invention has been described above in connection with a preferred embodiment thereof; however, this has been done for purposes of

illustration only, and the invention is not so limited. Indeed, variations of the invention will be readily apparent to those skilled in the art. Such variations also fall within the scope of the invention. Thus, while the invention has been described with reference to the certain illustrated embodiments, the words that have been used herein are words of description, rather than words of limitation. Changes may be made, within the purview of the appended claims, without departing from the scope and spirit of the invention in its aspects. Although the invention has been described herein with reference to particular structures, acts, and materials, the invention is not to be limited to the particulars disclosed, but rather extends to all equivalent structures, acts, and, materials, such as are within the scope of the appended claims.

[00207] The processing described may be performed by a properly programmed general-purpose computer alone or in connection with a special purpose computer. Such processing may be performed by a single platform or by a distributed processing platform. In addition, such processing and functionality can be implemented in the form of special purpose hardware or in the form of software being run by a general-purpose computer. Any data handled in such processing or created as a result of such processing can be stored in any memory as is conventional in the art. By way of example, such data may be stored in a temporary memory, such as in the RAM of a given computer system or subsystem. In addition, or in the alternative, such data may be stored in longer-term storage devices, for example, magnetic disks, rewritable optical disks, and so on. For purposes of the disclosure herein, a computer-readable media may comprise any form of data storage mechanism, including such existing memory technologies as well as hardware or circuit representations of such structures and of such data.

What is claimed is:

1. A method, operable in a framework wherein resources of a content provider are delivered to clients from a plurality of domains, said plurality of domains comprising at least two distinct content delivery network (CDN) domains, the method comprising:

responsive to a request, selecting one of said plurality of domains, said selecting being based at least in part on one or more policies set by the content provider; and

providing information associated with the selected domain.

ABSTRACT OF THE DISCLOSURE

POLICY-BASED CONTENT DELIVERY NETWORK SELECTION

In a framework wherein resources of a content provider may be delivered to clients from different domains, a method distributes the requests based on content-provider policies. In some cases, the domains include at least two distinct content delivery network (CDN) domains. The domains may include a content provider domain. Responsive to a request, either the content provider domain or one of the two CDN domains is selected, the selection being based at least in part on one or more policies set by the content provider.

Application Data Sheet

Correspondence Information

Correspondence Customer Number:: 75948

Representative Information

Representative Customer Number:: 75948

Application Information

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Attorney Docket Number::	0093-US-I2
Suggested Drawing Figure::	1
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Small Entity?::	No

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Domestic Priority Information

Application::	Continuation Type::	Parent Application::	Parent Filing Date::
This application	continuation	11/976,648	10/26/07
11/976,648	Continuation-in-part	10/259,497	09/30/02
10/259,497	An application claiming the benefit under 35 USC 1119(e)	60/325,177	09/28/01
This application	Continuation-in-part	11/932,162	10/31/07
11/932,162	continuation	10/259,497	09/30/02
10/259,497	An application claiming the benefit under 35 USC 1119(e)	60/325,177	09/28/01

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Applicant Authority Type:: Inventor
Primary Citizenship Country:: US
Status:: Full capacity
Given Name:: Michael
Middle Name:: S.
Family Name:: Warren
City of Residence:: Los Alamos
State or Province of Residence:: NM
Country of Residence:: US
Street of mailing address:: 4611 Esperanza
City of mailing address:: Los Alamos
State or Province of Mailing Address:: NM
Country of mailing address:: US
Postal or Zip Code of mailing address:: 87545

Applicant Authority Type:: Inventor
Primary Citizenship Country:: US
Status:: Full capacity
Given Name:: Jeffrey
Family Name:: Koller
City of Residence:: Oxnard
State or Province of Residence:: CA
Country of Residence:: US
Street of mailing address:: 3549 Glen Abbey Lane
City of mailing address:: Oxnard
State or Province of Mailing Address:: CA
Country of mailing address:: US
Postal or Zip Code of mailing address:: 93036

Applicant Authority Type:: Inventor
Primary Citizenship Country:: US
Status:: Full capacity
Given Name:: Aric
Family Name:: Hagberg
City of Residence:: Santa Fe
State or Province of Residence:: NM
Country of Residence:: US
Street of mailing address:: 36 Camino Chupadero
City of mailing address:: Santa Fe
State or Province of Mailing Address:: CA
Country of mailing address:: US
Postal or Zip Code of mailing address:: 87506

Applicant Authority Type:: Inventor
Primary Citizenship Country:: Australia
Status:: Full capacity
Given Name:: David

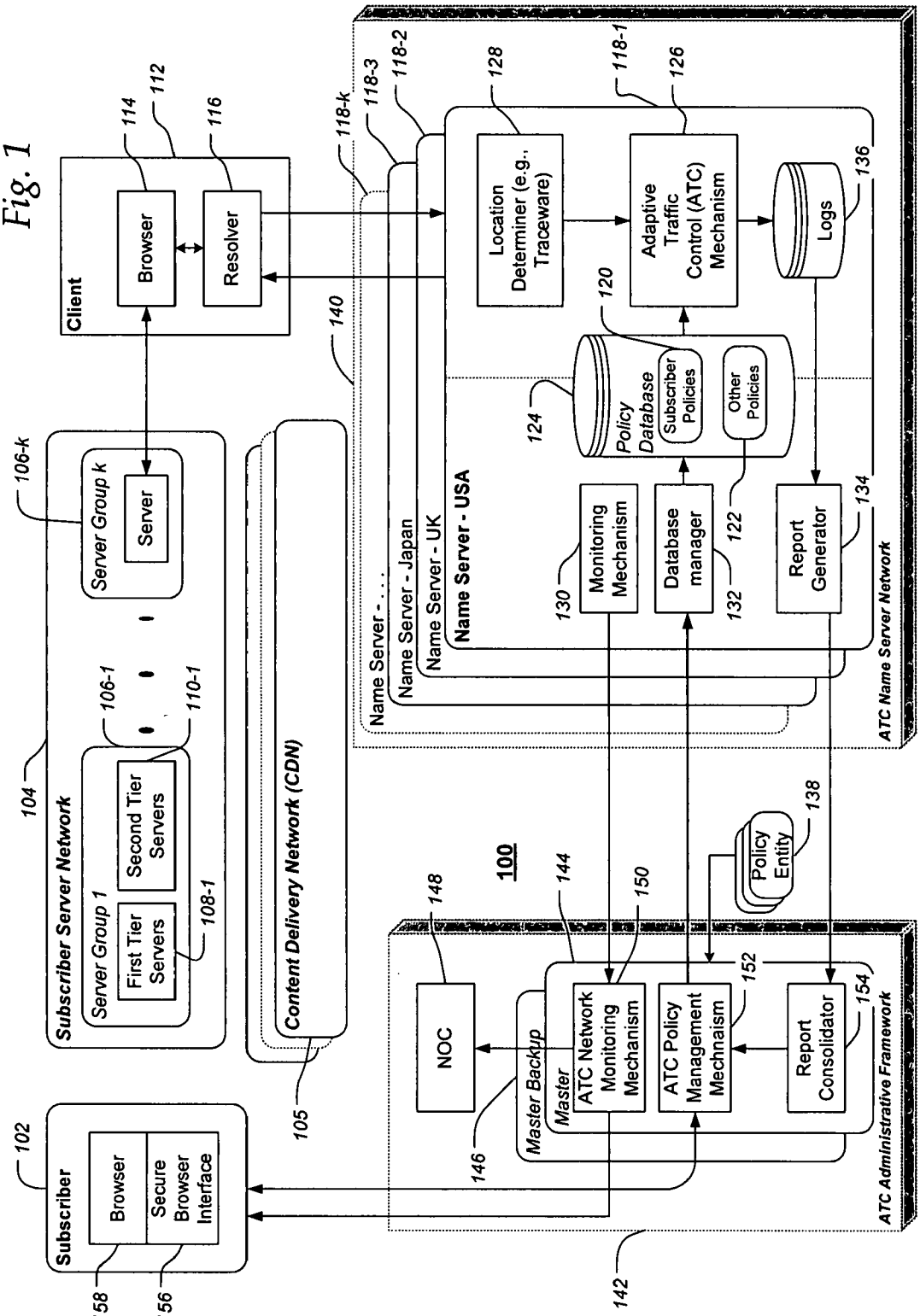
Family Name:: Pfitzner
City of Residence:: College Park
Country of Residence:: Australia
Street of mailing address:: 1/40 Torrens Street
City of mailing address:: College Park
State or Province of Mailing Address:: SA
Country of mailing address:: Australia
Postal or Zip Code of mailing address:: 5069

Applicant Authority Type:: Inventor
Primary Citizenship Country:: US
Status:: Full capacity
Given Name:: Ted
Family Name:: Middleton
City of Residence:: Moorpark
State or Province of Residence:: CA
Country of Residence:: US
Street of mailing address:: 4086 Bending Oak Ct.
City of mailing address:: Moorpark
State or Province of Mailing Address:: CA
Country of mailing address:: US
Postal or Zip Code of mailing address:: 93021

POLICY-BASED CDN SELECTION

2711-0096

Fig. 1



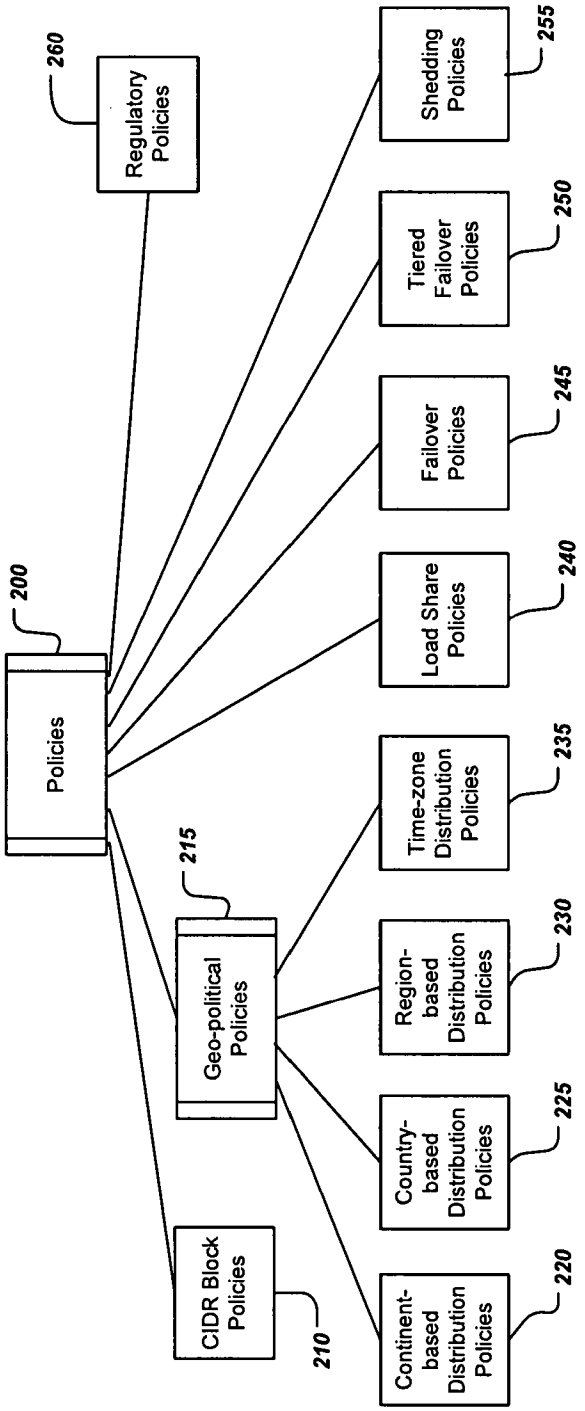

Policies
200
Regulatory Policies
260
Shedding Policies
255
Tiered Failover Policies
250
Failover Policies
245
Load Share Policies
240
Time-zone Distribution Policies
235
Region-based Distribution Policies
230
Country-based Distribution Policies
225
Continent-based Distribution Policies
220
Geo-political Policies
215
CIDR Block Policies
210

Fig. 2

POLICY-BASED CDN SELECTION

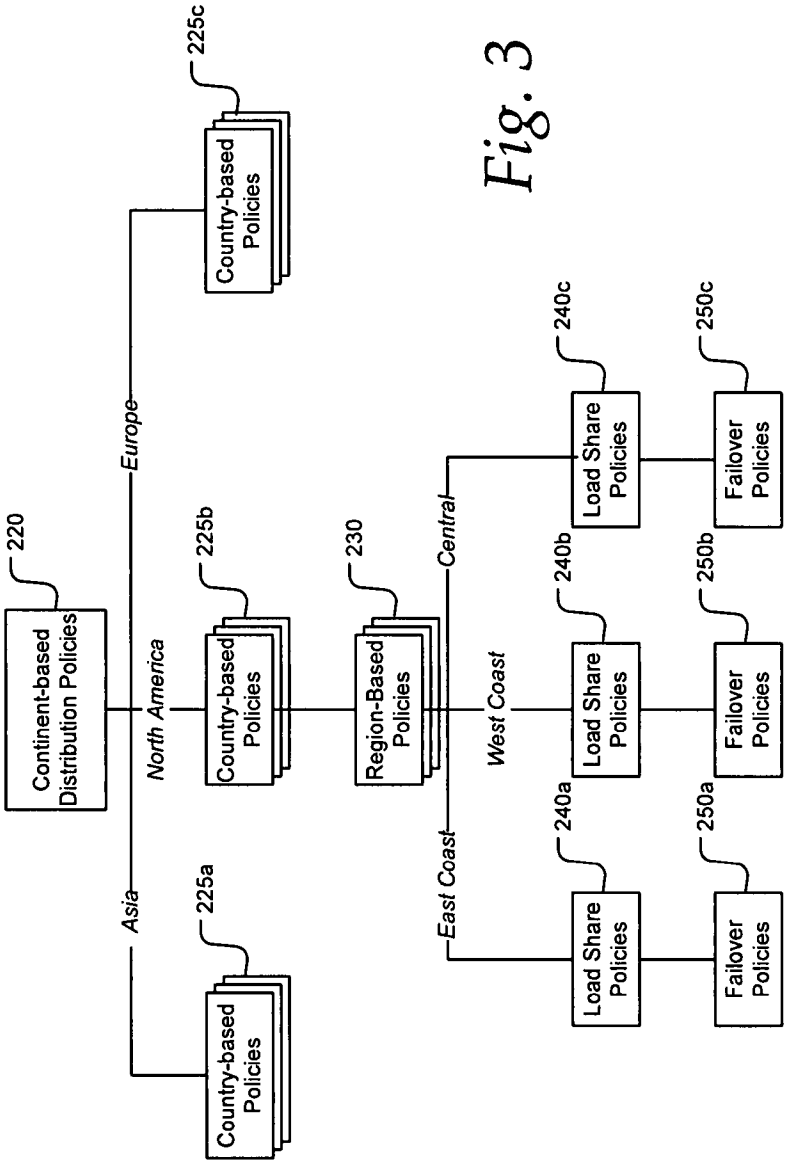


Fig. 3

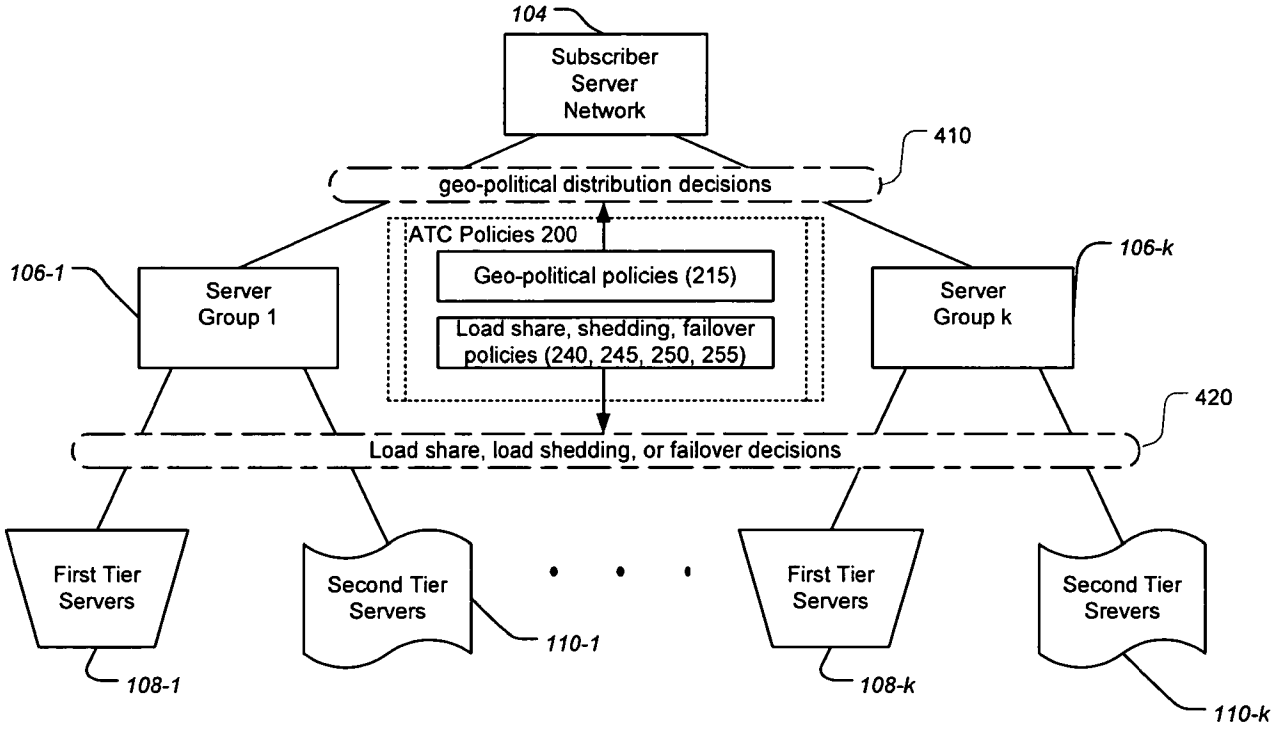

104
Subscriber Server Network
410
geo-political distribution decisions
ATC Policies 200
Geo-political policies (215)
Load share, shedding, failover policies (240, 245, 250, 255)
106-1
Server Group 1
106-k
Server Group k
420
Load share, load shedding, or failover decisions
First Tier Servers
Second Tier Servers
110-1
First Tier Servers
Second Tier Srevers
108-1
108-k
110-k

Fig. 4

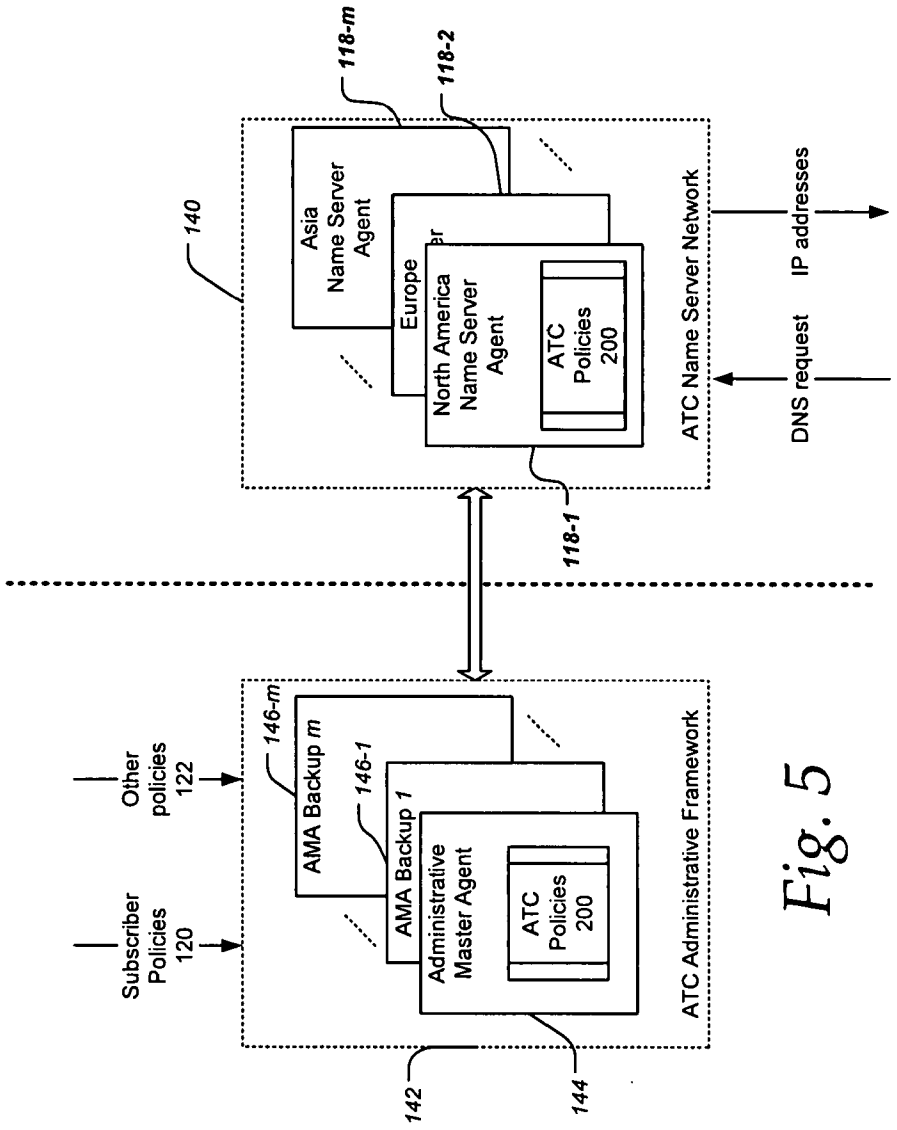

140
118-m
118-2
Asia Name Server Agent
Europe
North America Name Server Agent
ATC Policies 200
ATC Name Server Network
DNS request
IP addresses
118-1
Other policies 122
Subscriber Policies 120
146-m
AMA Backup m
146-1
AMA Backup 1
Administrative Master Agent
ATC Policies 200
ATC Administrative Framework
142
144

Fig. 5

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2711-0096

POLICY-BASED CDN SELECTION

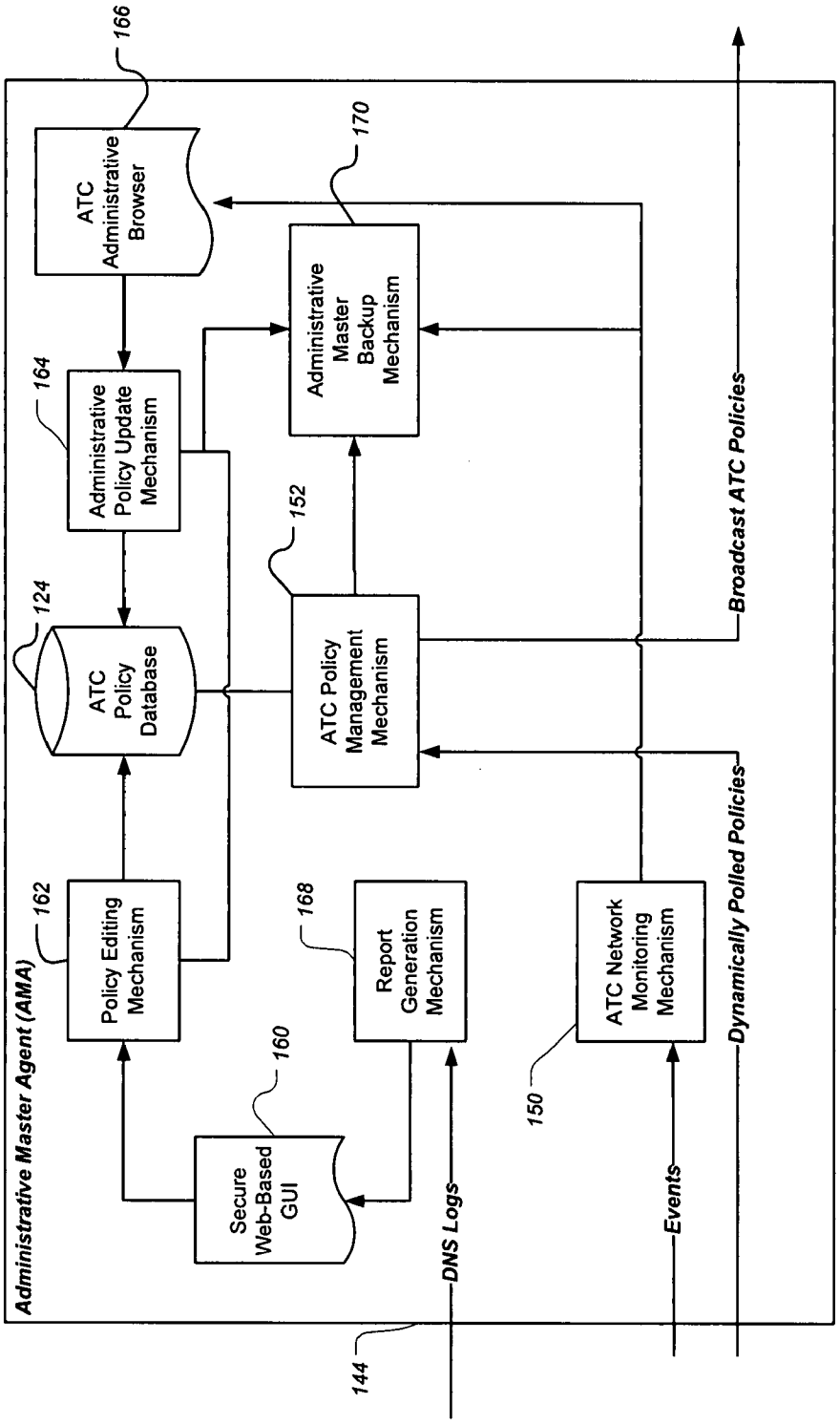


Fig. 6

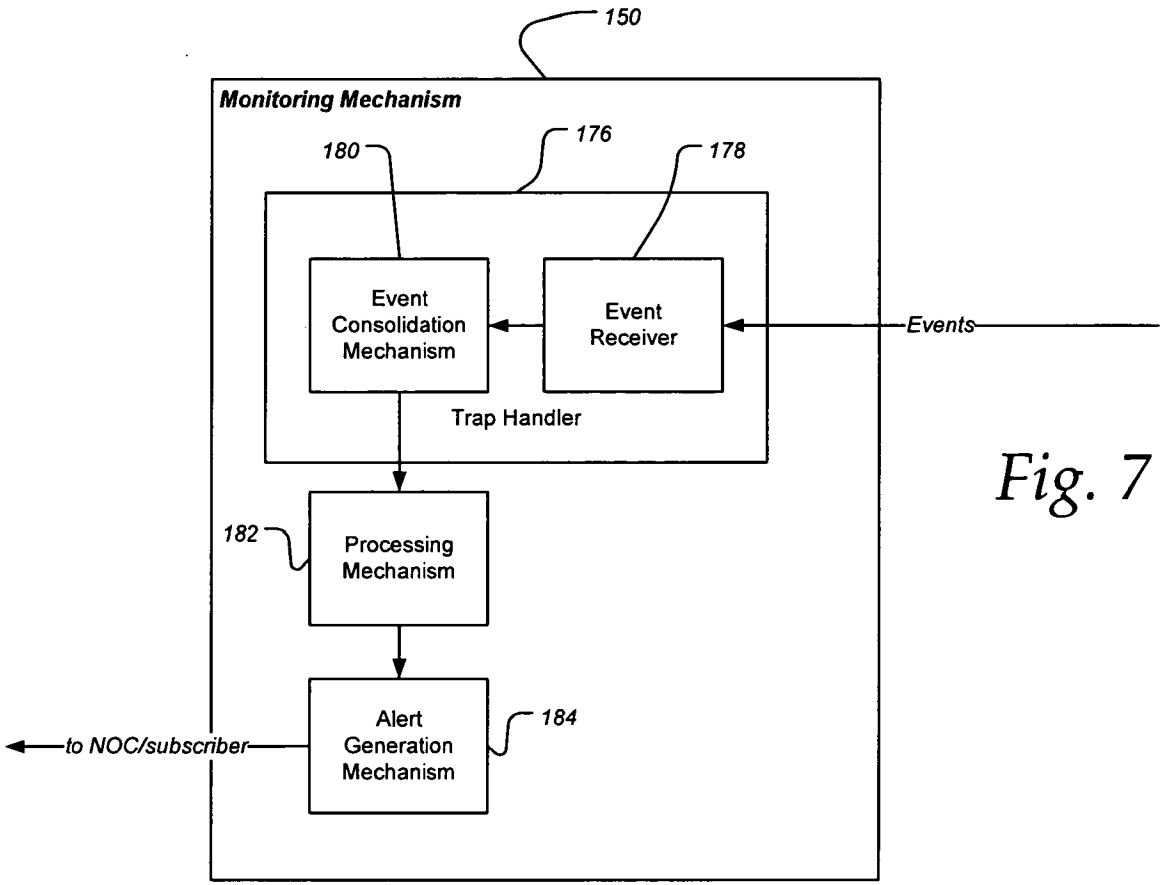

150
Monitoring Mechanism
180
176
178
Event Consolidation Mechanism
Event Receiver
Events
Trap Handler
182
Processing Mechanism
Alert Generation Mechanism
184
to NOC/subscriber

Fig. 7

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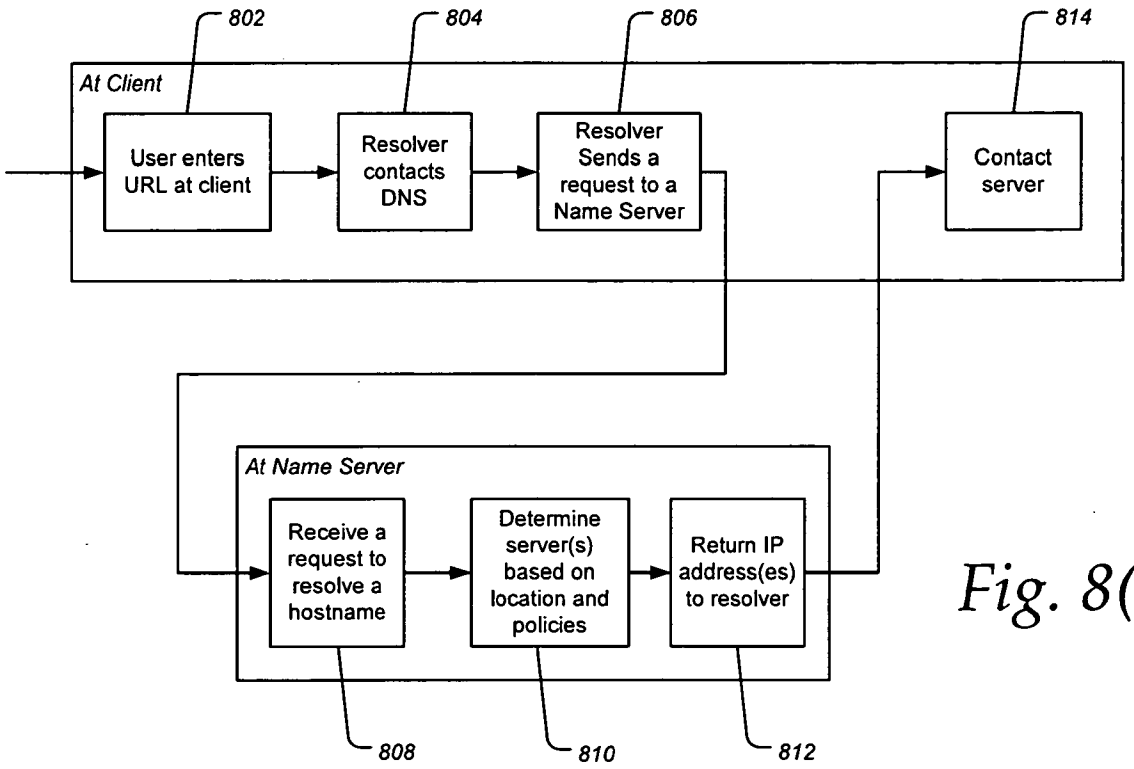

802
804
806
814
At Client
User enters URL at client
Resolver contacts DNS
Resolver Sends a request to a Name Server
Contact server
At Name Server
Receive a request to resolve a hostname
Determine server(s) based on location and policies
Return IP address(es) to resolver
808
810
812

Fig. 8(a)

8/31

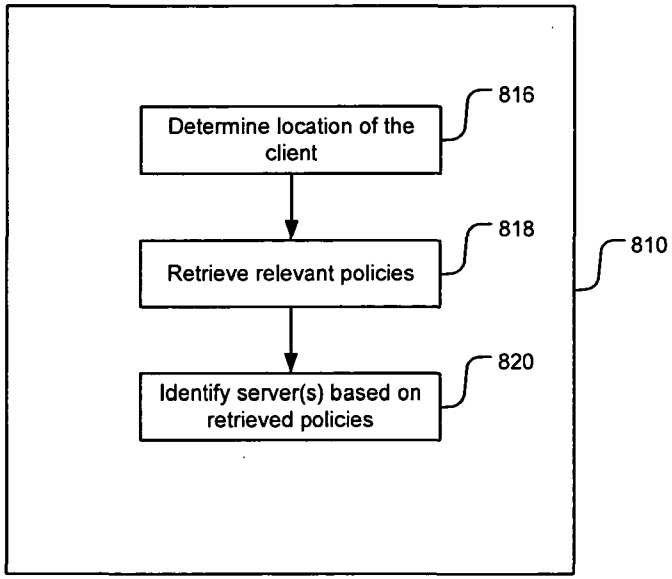

Determine location of the client
816
Retrieve relevant policies
818
Identify server(s) based on retrieved policies
820
810

Fig. 8(b)

9/31

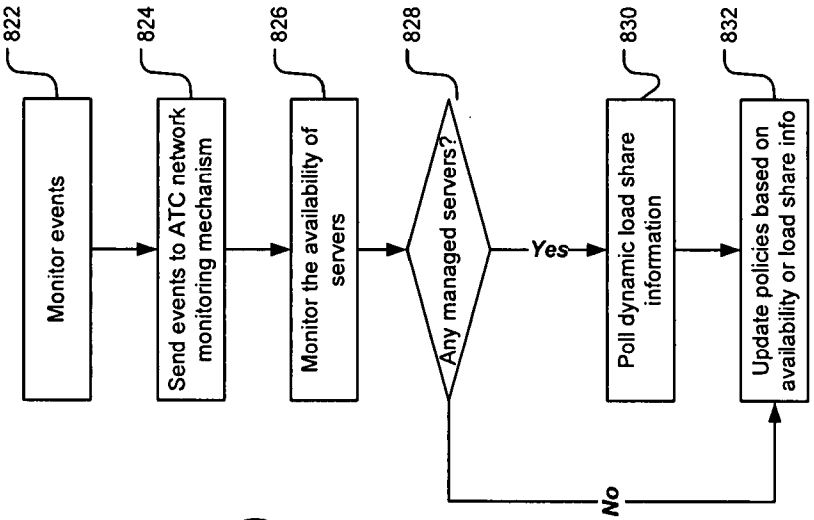
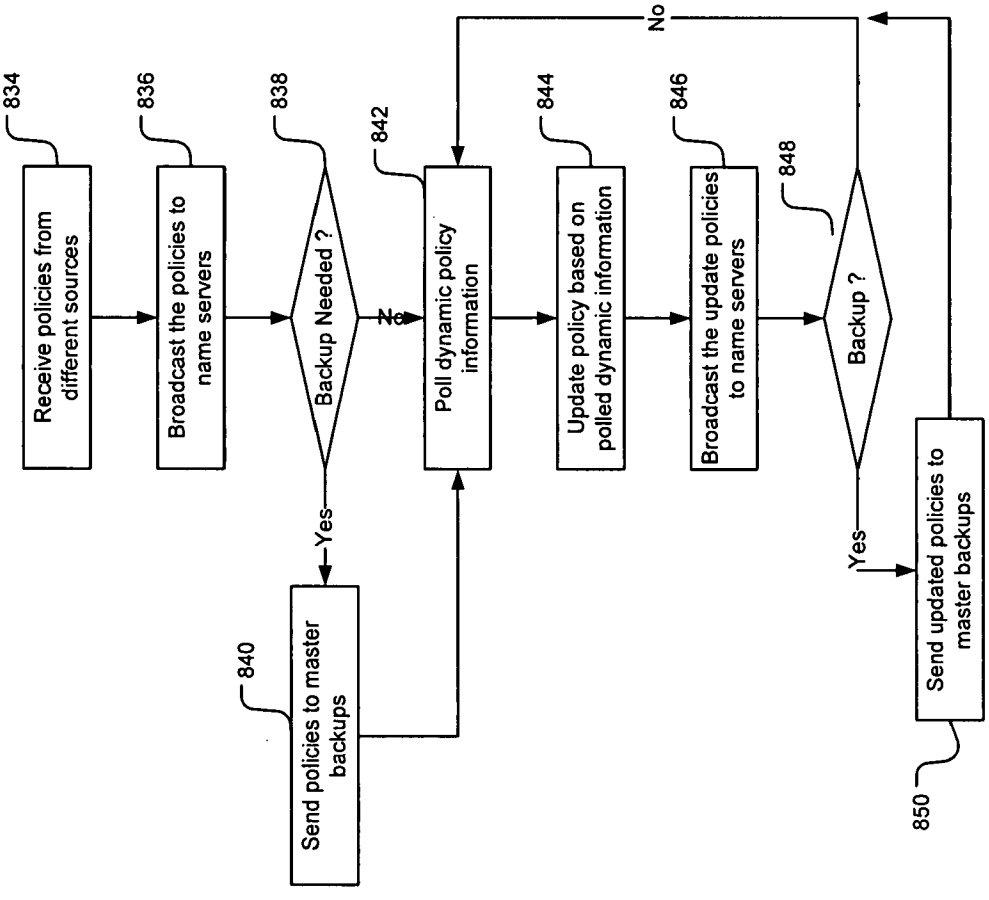

822
Monitor events
824
Send events to ATC network monitoring mechanism
826
Monitor the availability of servers
828
Any managed servers?
Yes
No
830
Poll dynamic load share information
832
Update policies based on availability or load share info

Fig. 8(c)

Fig. 8(d)


834
Receive policies from different sources
836
Broadcast the policies to name servers
838
Backup Needed ?
Yes
No
840
Send policies to master backups
842
Poll dynamic policy information
844
Update policy based on polled dynamic information
846
Broadcast the update policies to name servers
848
Backup ?
No
Yes
850
Send updated policies to master backups

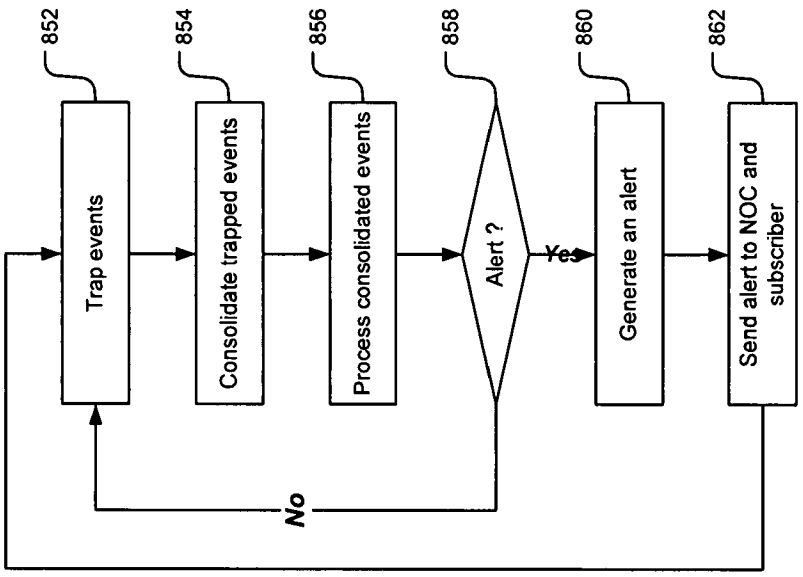

852
Trap events
854
Consolidate trapped events
856
Process consolidated events
858
Alert ?
Yes
No
860
Generate an alert
862
Send alert to NOC and subscriber

Fig. 8(e)

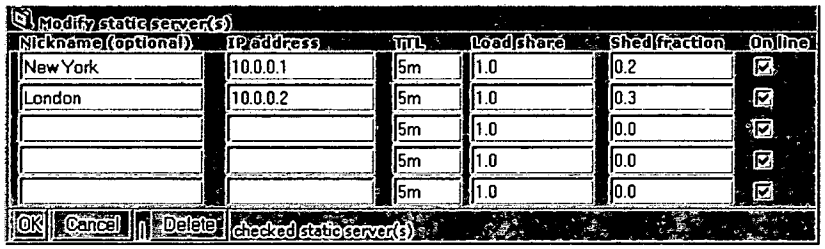

Modify static server(s)
Nickname (optional)
IP address
TTL
Load share
Shed fraction
On line
NewYork
10.0.0.1
5m
1.0
0.2
London
10.0.0.2
5m
1.0
0.3
5m
1.0
0.0
5m
1.0
0.0
5m
1.0
0.0
OK
Cancel
Delete
checked static server(s)

Fig. 9(a)

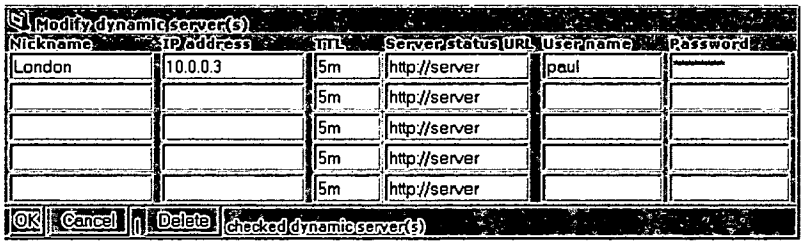

Modify dynamic server(s)
Nickname
IP address
TTL
Server status URL
User name
Password
London
10.0.0.3
5m
http://server
paul
5m
http://server
5m
http://server
5m
http://server
5m
http://server
OK
Cancel
Delete
checked dynamic server(s)

Fig. 9(b)

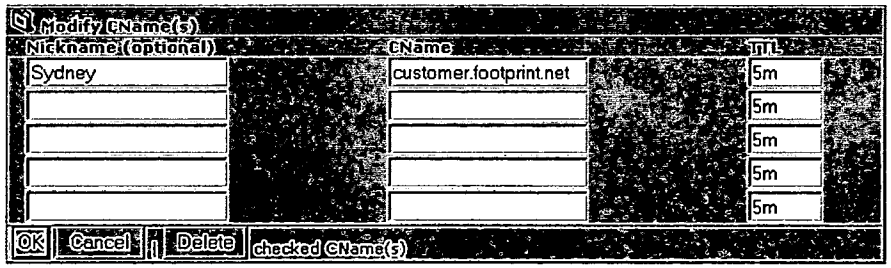

Modify CName(s)
Nickname (optional)
CName
TTL
Sydney
customer.footprint.net
5m
5m
5m
5m
5m
OK
Cancel
Delete
checked CName(s)

Fig. 9(c)

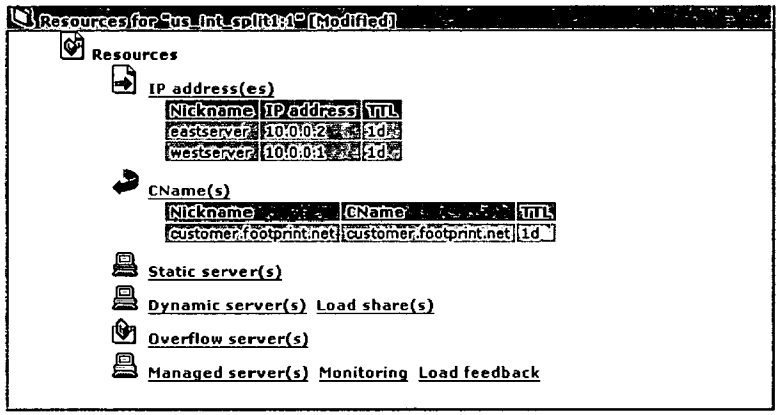

Resources for "us_int_split1:1" [Modified]
Resources
IP address(es)
Nickname IP address TTL
eastserver 10.0.0.2 1d
westserver 10.0.0.1 1d
CName(s)
Nickname CName TTL
customer.footprint.net customer.footprint.net 1d
Static server(s)
Dynamic server(s) Load share(s)
Overflow server(s)
Managed server(s) Monitoring Load feedback

Fig. 10(a)

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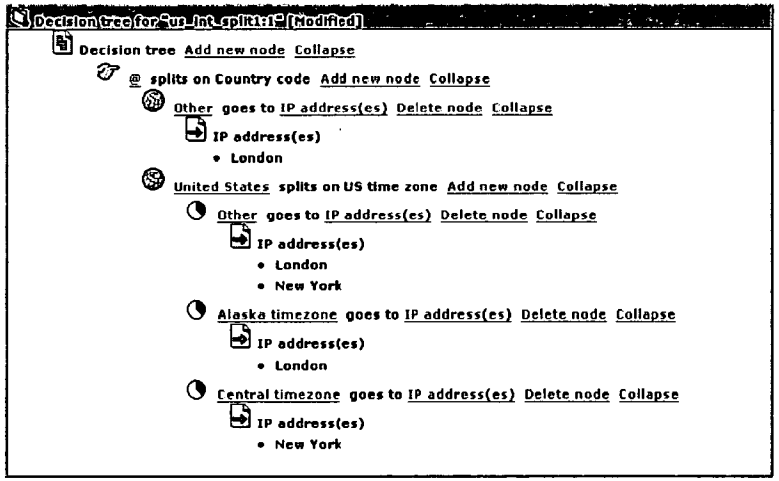

Decision tree for cus_int_split1:1 [Modified]
Decision tree Add new node Collapse
@ splits on Country code Add new node Collapse
Other goes to IP address(es) Delete node Collapse
IP address(es)
• London
United States splits on US time zone Add new node Collapse
Other goes to IP address(es) Delete node Collapse
IP address(es)
• London
• New York
Alaska timezone goes to IP address(es) Delete node Collapse
IP address(es)
• London
Central timezone goes to IP address(es) Delete node Collapse
IP address(es)
• New York

Fig. 10(b)

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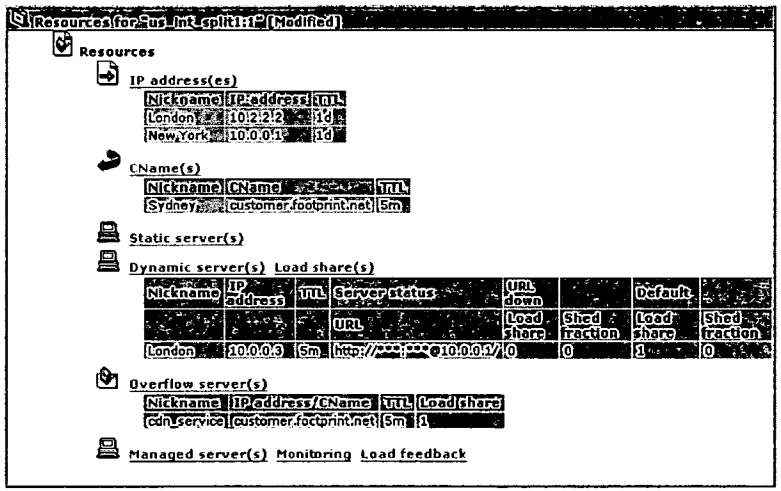

Resources for "us_int_split1:1" (Modified)
Resources
IP address(es)
Nickname IP address TTL
London 10.2.2.2 1d
New York 10.0.0.1 1d
CName(s)
Nickname CName TTL
Sydney customer.footprint.net 5m
Static server(s)
Dynamic server(s) Load share(s)
Nickname IP address TTL Server status URL down Default
URL Load share Shed fraction Load share Shed fraction
London 10.0.0.3 5m http://***:***@10.0.0.1/ 0 0 1 0
Overflow server(s)
Nickname IP address/CName TTL Load share
cdn_service customer.footprint.net 5m 1
Managed server(s) Monitoring Load feedback

Fig. 10(c)

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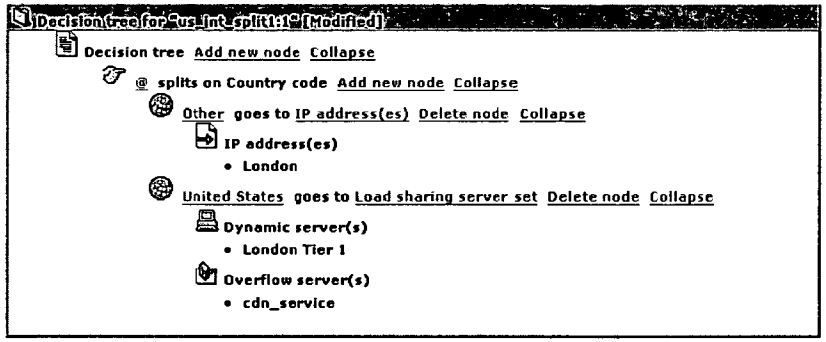

Decision tree for Cus_Int_split1:1 [Modified]
Decision tree Add new node Collapse
@ splits on Country code Add new node Collapse
Other goes to IP address(es) Delete node Collapse
IP address(es)
• London
United States goes to Load sharing server set Delete node Collapse
Dynamic server(s)
• London Tier 1
Overflow server(s)
• cdn_service

Fig. 10(d)

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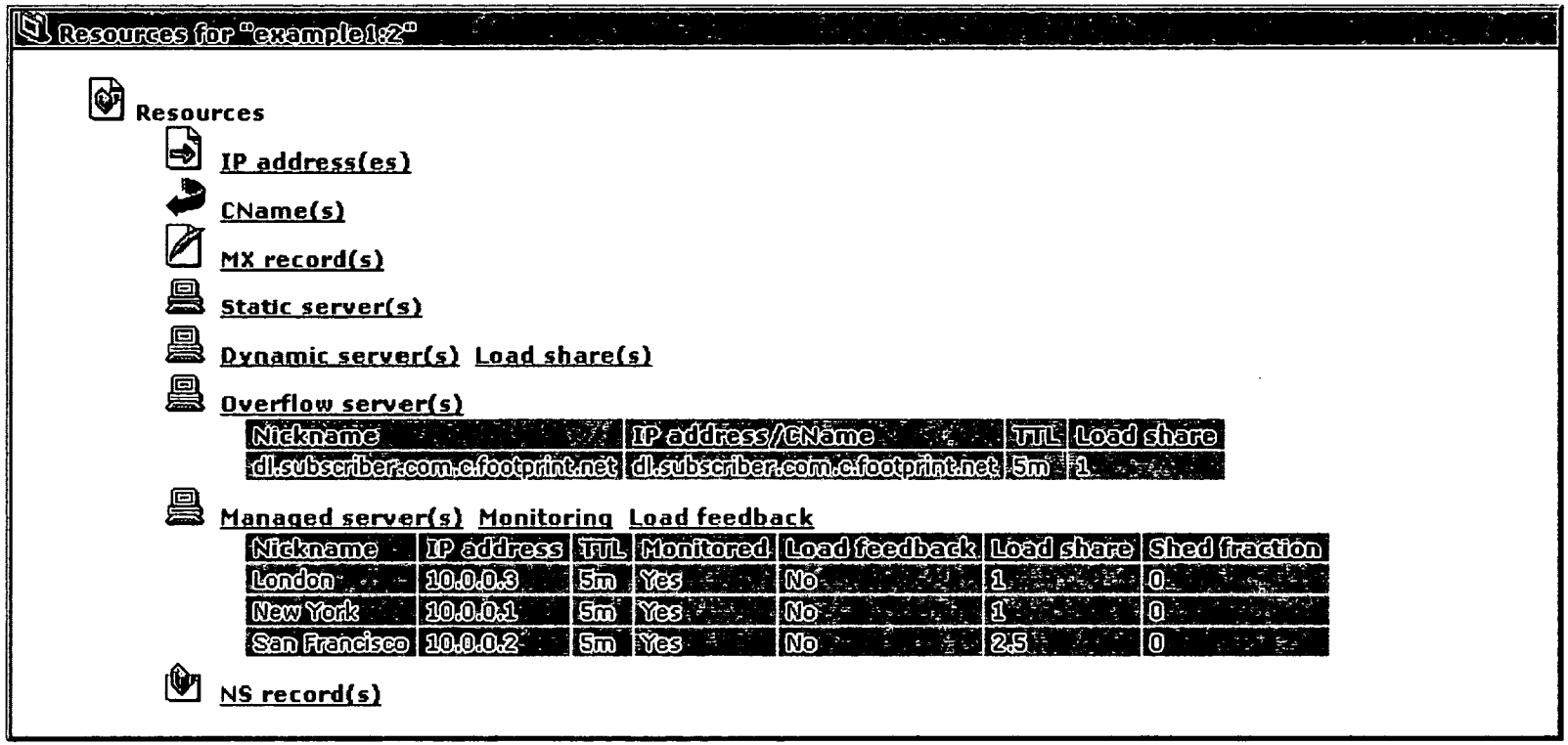

Resources for "example1:2"
Resources
IP address(es)
CName(s)
MX record(s)
Static server(s)
Dynamic server(s) Load share(s)
Overflow server(s)
Nickname
IP address/CName
TTL
Load share
dl.subscriber.com.c.footprint.net
dl.subscriber.com.c.footprint.net
5m
1
Managed server(s) Monitoring Load feedback
Nickname
IP address
TTL
Monitored
Load feedback
Load share
Shed fraction
London
10.0.0.3
5m
Yes
No
1
0
New York
10.0.0.1
5m
Yes
No
1
0
San Francisco
10.0.0.2
5m
Yes
No
2.5
0
NS record(s)

Fig. 10(e)

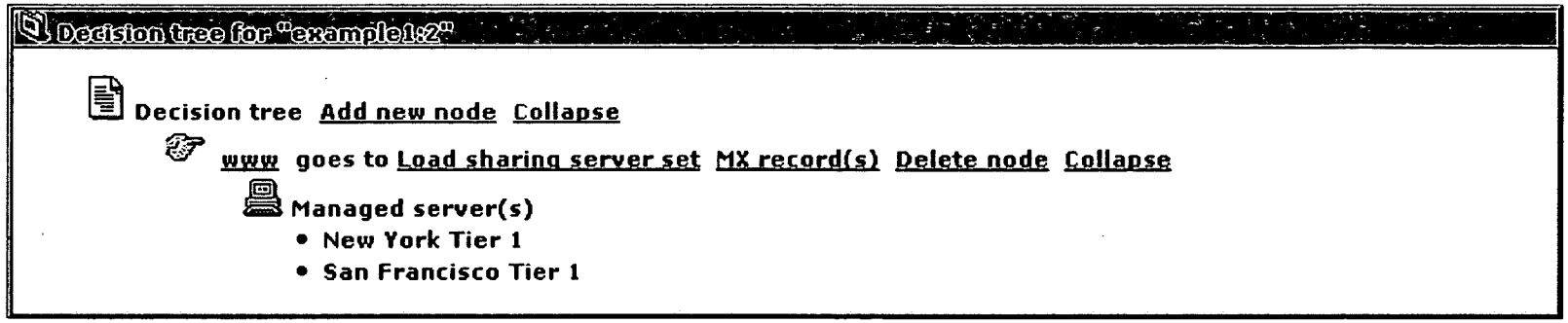


Fig. 10(f)

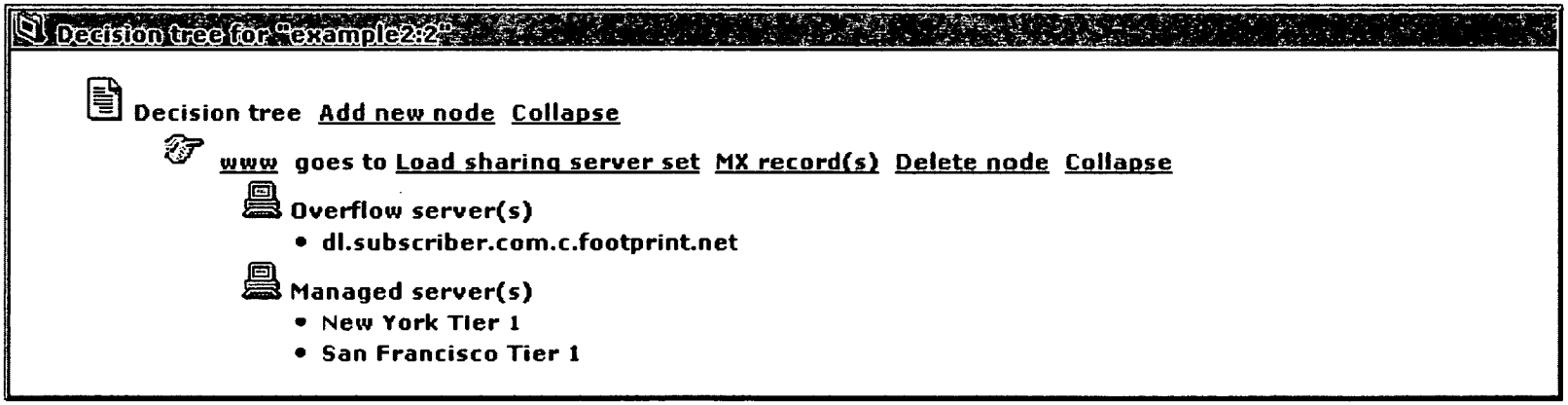


Fig. 10(g)

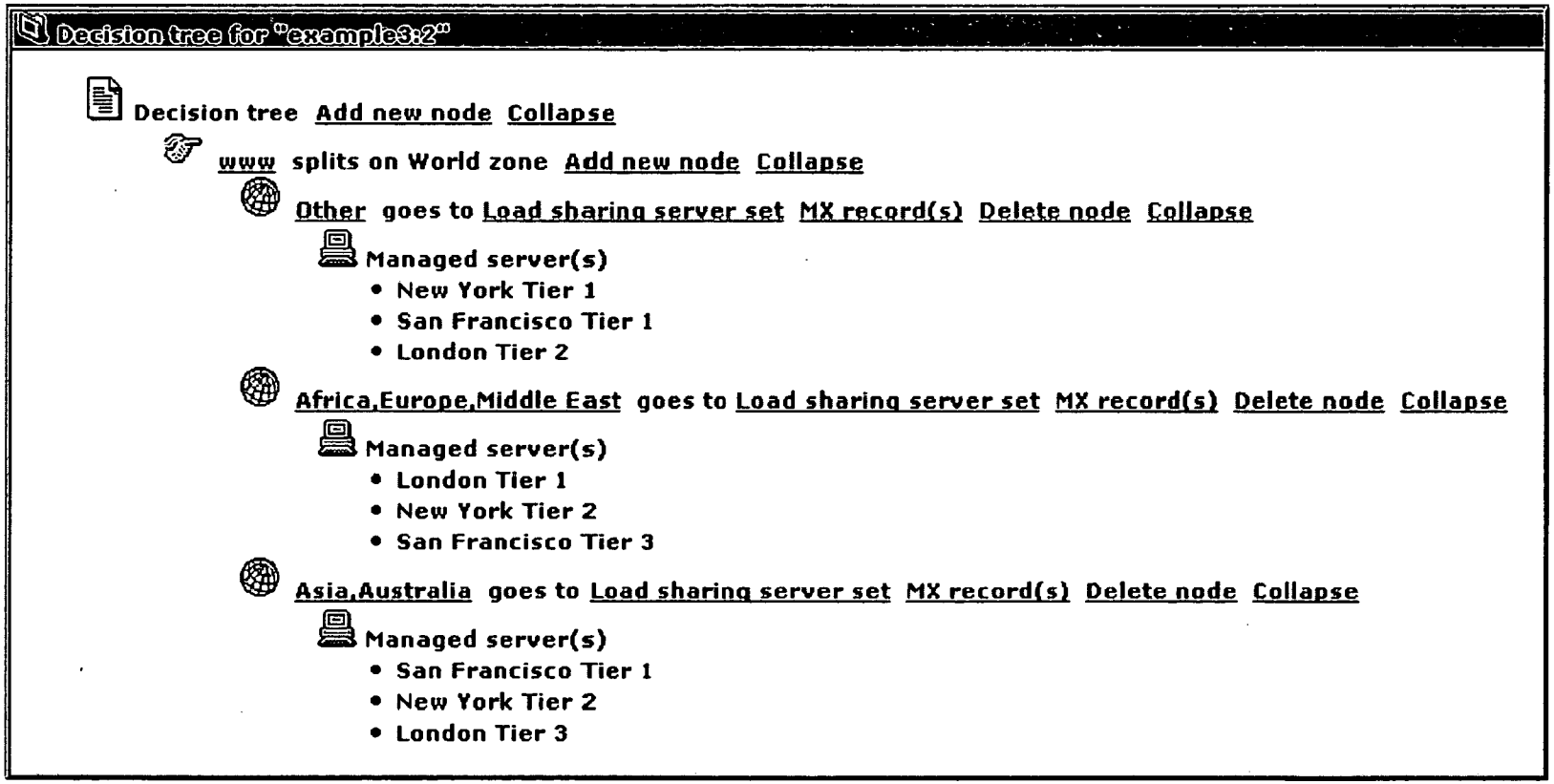

Decision tree for "example3:2"
Decision tree Add new node Collapse
www splits on World zone Add new node Collapse
Other goes to Load sharing server set MX record(s) Delete node Collapse
Managed server(s)
• New York Tier 1
• San Francisco Tier 1
• London Tier 2
Africa,Europe,Middle East goes to Load sharing server set MX record(s) Delete node Collapse
Managed server(s)
• London Tier 1
• New York Tier 2
• San Francisco Tier 3
Asia,Australia goes to Load sharing server set MX record(s) Delete node Collapse
Managed server(s)
• San Francisco Tier 1
• New York Tier 2
• London Tier 3

Fig. 10(h)

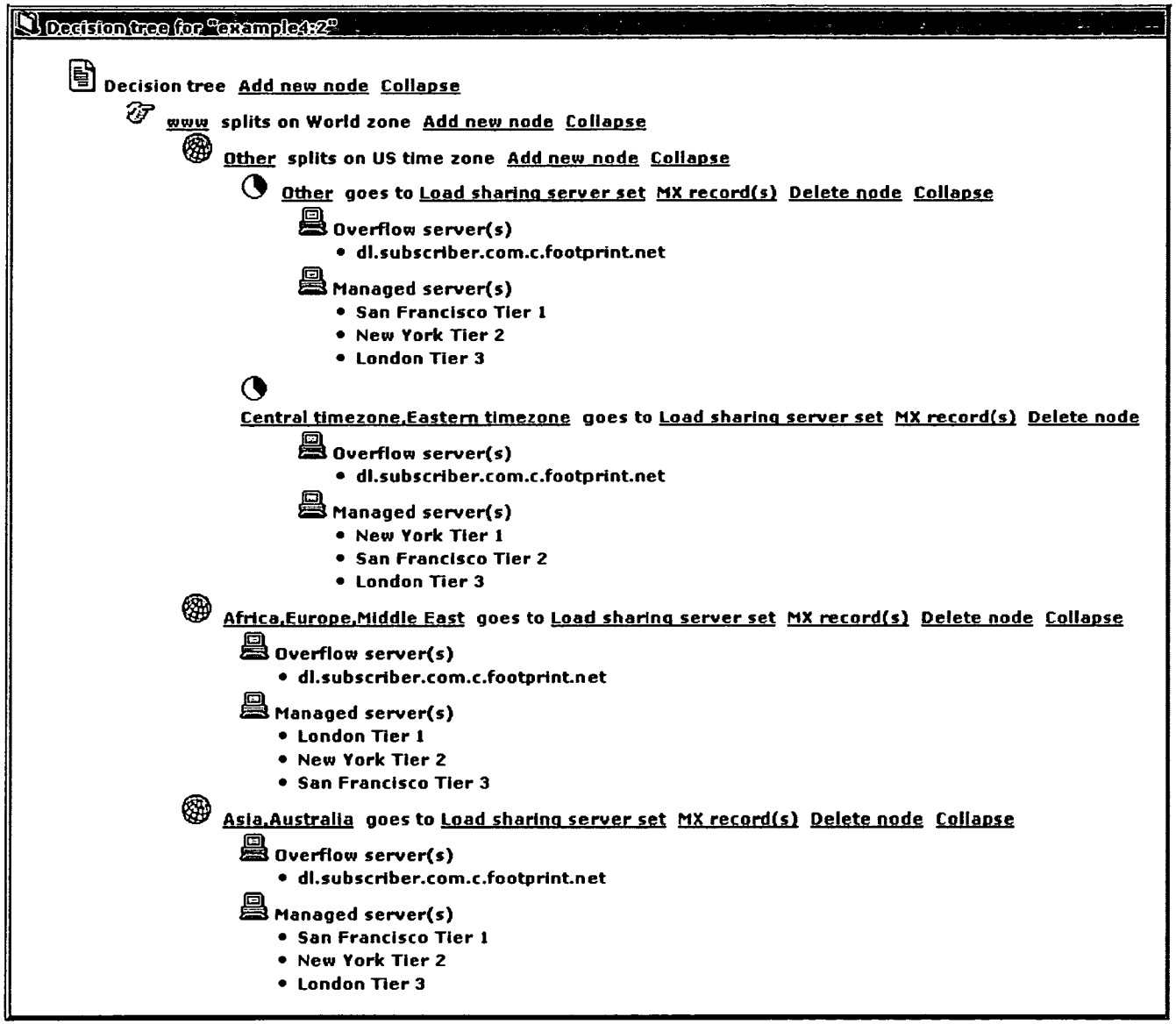

Decision tree for "example4:2"
Decision tree Add new node Collapse
www splits on World zone Add new node Collapse
Other splits on US time zone Add new node Collapse
Other goes to Load sharing server set MX record(s) Delete node Collapse
Overflow server(s)
• dl.subscriber.com.c.footprint.net
Managed server(s)
• San Francisco Tier 1
• New York Tier 2
• London Tier 3
Central timezone,Eastern timezone goes to Load sharing server set MX record(s) Delete node
Overflow server(s)
• dl.subscriber.com.c.footprint.net
Managed server(s)
• New York Tier 1
• San Francisco Tier 2
• London Tier 3
Africa,Europe,Middle East goes to Load sharing server set MX record(s) Delete node Collapse
Overflow server(s)
• dl.subscriber.com.c.footprint.net
Managed server(s)
• London Tier 1
• New York Tier 2
• San Francisco Tier 3
Asia,Australia goes to Load sharing server set MX record(s) Delete node Collapse
Overflow server(s)
• dl.subscriber.com.c.footprint.net
Managed server(s)
• San Francisco Tier 1
• New York Tier 2
• London Tier 3

Fig. 10(i)

Resources

IP address(es)

CName(s)

Nickname	CName	TTL
international.demo.com	international.demo.com	5m
us.demo.com	us.demo.com	5m

Static server(s)

Overflow server(s)

Nickname	IP address/CName	TTL	Load share
demo.cdn.com	demo.cdn.com	5m	1

Managed server(s) Monitoring Load feedback

Nickname	IP address	TTL	Monitored	Load feedback	Load share	Shed fraction
NY	10.0.0.2	5m	No	No	1	0
SF	10.0.0.1	5m	No	No	2	0
UK	10.0.0.3	5m	No	No	1	0

NS record(s)

Fig. 10(j)



Decision tree Collapse



images goes to Load sharing server set Collapse



Overflow server(s)

- Level 3 CDN



Managed server(s)

- NY Tier 1
- SF Tier 1



www goes to Load sharing server set Collapse



Overflow server(s)

- Level 3 CDN
- Other CDN



Managed server(s)

- NY Tier 1
- SF Tier 1

Fig. 10(k)

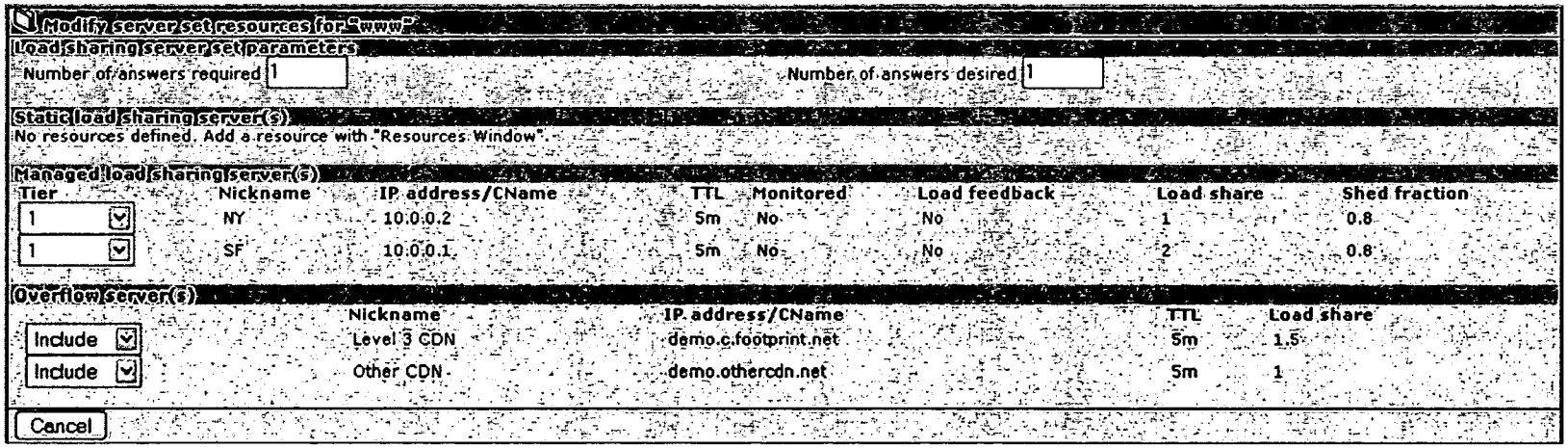

Modify server set resources for "www"
Load sharing server set parameters
Number of answers required 1
Number of answers desired 1
Static load sharing server(s)
No resources defined. Add a resource with "Resources Window".
Managed load sharing server(s)
Tier Nickname IP address/CName TTL Monitored Load feedback Load share Shed fraction
1 NY 10.0.0.2 5m No No 1 0.8
1 SF 10.0.0.1 5m No No 2 0.8
Overflow server(s)
Nickname IP address/CName TTL Load share
Include Level 3 CDN demo.c.footprint.net 5m 1.5
Include Other CDN demo.othercdn.net 5m 1
Cancel

Fig. 10(l)



Decision tree Collapse



www goes to Load sharing server set Collapse



Managed server(s)

- www.demo.com.cdn1.net Tier 1
- www.demo.com.cdn2.net Tier 1
- www.demo.com.cdn3.net Tier 1

Fig. 10(m)

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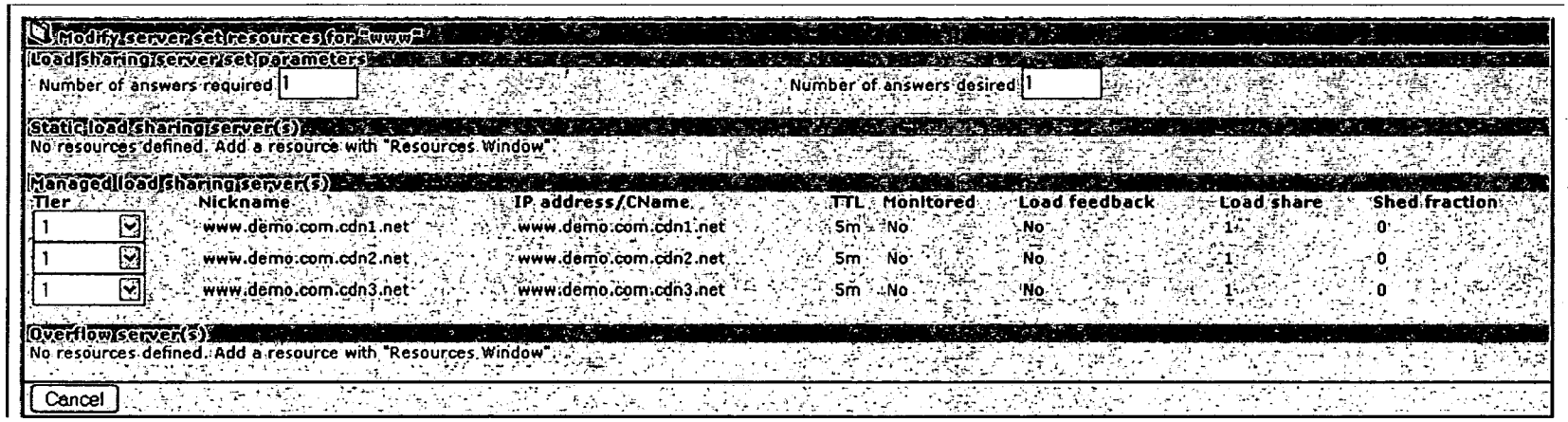

Modify server set resources for "www"
Load sharing server set parameters
Number of answers required 1
Number of answers desired 1
Static load sharing server(s)
No resources defined. Add a resource with "Resources Window".
Managed load sharing server(s)
Tier
Nickname
IP address/CName
TTL
Monitored
Load feedback
Load share
Shed fraction
1 www.demo.com.cdn1.net www.demo.com.cdn1.net 5m No No 1 0
1 www.demo.com.cdn2.net www.demo.com.cdn2.net 5m No No 1 0
1 www.demo.com.cdn3.net www.demo.com.cdn3.net 5m No No 1 0
Overflow server(s)
No resources defined. Add a resource with "Resources Window".
Cancel

Fig. 10(n)

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Decision tree Collapse

- **download** goes to Load sharing server set Collapse
  - Overflow server(s)
    - demo.cdn.com
  - Managed server(s)
    - NY Tier 1
    - SF Tier 1
- **ftp** splits on Country code Collapse
  - **Other** goes to international.demo.com
  - **United States** goes to us.demo.com
- **images** splits on World zone Collapse
  - **Other,North America** goes to Load sharing server set Collapse
    - Managed server(s)
      - NY Tier 1
      - SF Tier 1
      - UK Tier 2
  - **Asia,Australia** goes to Load sharing server set Collapse
    - Managed server(s)
      - SF Tier 1
      - NY Tier 2
      - UK Tier 3
  - **Europe** goes to Load sharing server set Collapse
    - Managed server(s)
      - UK Tier 1
      - NY Tier 2
      - SF Tier 3
- **www** goes to Load sharing server set Collapse
  - Managed server(s)
    - SF Tier 1
    - NY Tier 2

Fig. 10(o)

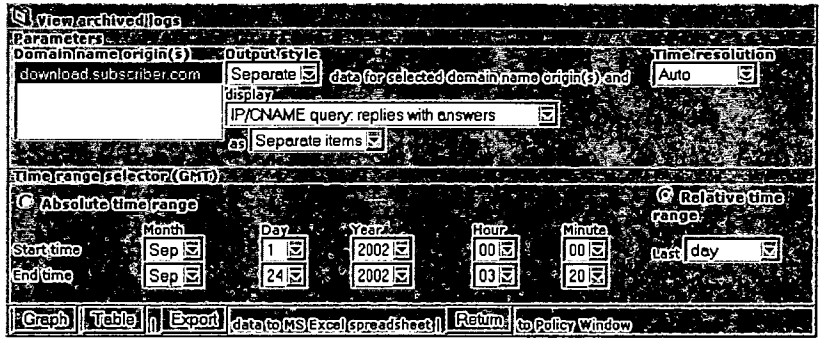

View archived logs
Parameters
Domain name or origin(s)
download.subscriber.com
Output style
Separate
data for selected domain name origin(s) and
display
IP/CNAME query: replies with answers
as
Separate items
Time resolution
Auto
Time range selector (GMT)
Absolute time range
Month
Day
Year
Hour
Minute
Start time
Sep
1
2002
00
00
End time
Sep
24
2002
03
20
Relative time range
Last
day
Graph
Table
Export
data to MS Excel spreadsheet
Return
to policy window

Fig. 11(a)

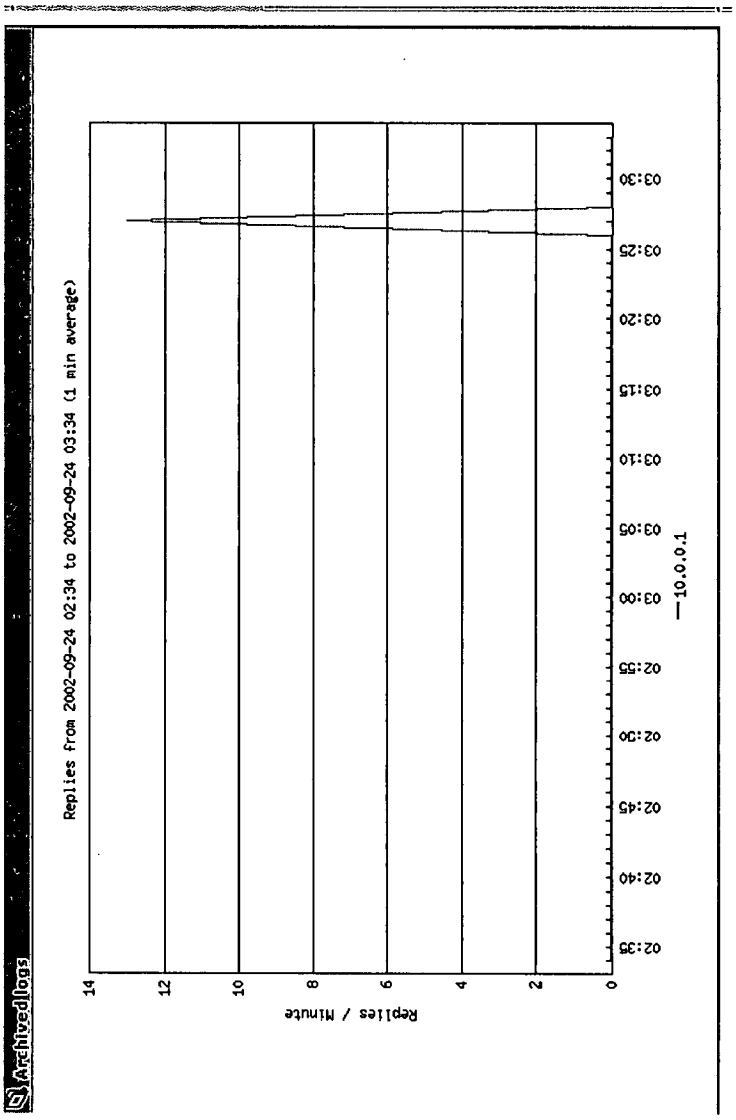

Archivedlogs
Replies from 2002-09-24 02:34 to 2002-09-24 03:34 (1 min average)
Replies / Minute
14
12
10
8
6
4
2
0
02:35
02:40
02:45
02:50
02:55
03:00
03:05
03:10
03:15
03:20
03:25
03:30
10.0.0.1

Fig. 11(b)

Archived logs

Domain name origin(s): "download.subscriber.com"

Time (GMT)	IP/CNAME query: replies with answers	Number of replies	Replies per minute
09/24/02 02:30:00 - 09/24/02 02:45:00	No data found		
09/24/02 02:45:00 - 09/24/02 03:00:00	No data found		
09/24/02 03:00:00 - 09/24/02 03:15:00	No data found		
09/24/02 03:15:00 - 09/24/02 03:30:00	10.0.0.1	13	0.87
09/24/02 03:30:00 - 09/24/02 03:45:00	No data found		

Fig. 11(c)

Electronic Acknowledgement Receipt

EFS ID:	9114180
Application Number:	12978537
International Application Number:	
Confirmation Number:	1389
Title of Invention:	Policy-Based Content Delivery Network Selection
First Named Inventor/Applicant Name:	Paul E Stolorz
Customer Number:	83579
Filer:	Brian Siritzky
Filer Authorized By:	
Attorney Docket Number:	0093-US-I2
Receipt Date:	24-DEC-2010
Filing Date:	
Time Stamp:	23:10:06
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		2711-0107_PA_Application_12_24_2010.pdf	325409 2d74f56765c7e16a72d370474f48754ec8f0bdb1	yes	54

	Multipart Description/PDF files in .zip description				
	Document Description	**Start**	**End**		
	Specification	1	52		
	Claims	53	53		
	Abstract	54	54		
Warnings:					
Information:					
2	Application Data Sheet	2711-0107_PA_ADS_12_24_2010.pdf	43940 95dceb67b2fd97597b5ea9560e78d45cd20855e9	no	6
Warnings:					
Information:					
This is not an USPTO supplied ADS fillable form					
3	Drawings-only black and white line drawings	2711-0107_PA_Drawings_from_parent_12_24_2010.pdf	1149473 6dee0bf6e698196972e2c92fd6388379197c14e9	no	31
Warnings:					
Information:					
		Total Files Size (in bytes):	1518822		

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.