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UNITED STATES DISTRICT COURT

CENTRAL DISTRICT OF CALIFORNIA, WESTERN DIVISION

SANDPIPER CDN, LLC, Plaintiff, vs. GOOGLE LLC, Defendant.	Case No. 2:24-cv-03951-AB (RAO) **GOOGLE'S PATENT L.R. 3-3 AND 3-4 INVALIDITY CONTENTIONS** JURY TRIAL DEMANDED

Sandpiper EX2004
Google v. Sandpiper
IPR2025-00969

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Pursuant to the Northern District of California's Patent L.R. 3-3 and 3-4, the Rule 26(f) Report (Dkt. 38), and the Amended Scheduling Order (Dkt. 54), Defendant Google LLC ("Google") hereby provides these Invalidity and Subject-Matter Eligibility Contentions ("Invalidity Contentions") for the claims asserted by Plaintiff Sandpiper CDN LLC ("Plaintiff") from U.S. Patent Nos. 8,478,903 (the "'903 patent"), 10,924,573 (the "'573 patent"), 8,645,517 (the "'517 patent"), 9,021,112 (the "'112 patent"), and 10,057,322 (the "'322 patent") (collectively, the "Asserted Patents") in its Infringement Contentions served January 14, 2025 ("Infringement Contentions").

These Invalidity Contentions address the invalidity of the Asserted Claims, identify additional reservations and explanations, and describe the accompanying document production. Google reserves the right to amend these contentions as provided by Federal Rule of Civil Procedure 26(e), the Scheduling Order, and any other applicable law, rule, or precedent. Google also reserves the right to amend and/or supplement these Invalidity Contentions based on information subsequently identified and/or should Plaintiff be permitted to correct, clarify, amend, and/or supplement its Infringement Contentions.

I. INTRODUCTION

A. Plaintiff's Infringement Contentions

On January 14, 2025, Plaintiff served Google with its Infringement Contentions, asserting 33 claims (the "Asserted Claims") across five patents. The Asserted Claims are:

Patent	Asserted Claims
8,478,903	28, 29, 30, 31, 32, 36, 37, 38, 39
10,924,573	1, 2, 3, 6, 10, 19, 20
8,645,517	1, 2, 3, 4, 5, 8
9,021,112	1, 2, 4, 5, 6, 7, 8, 10, 13, 14, 17
10,057,322	15

Patent L.R. 3-1 required Plaintiff in its Infringement Contentions to identify "*[s]eparately* . . . each accused apparatus, product, device, process, method, act, or other instrumentality," and to "identif[y] *specifically* where and how each limitation of each asserted claim is found within each Accused Instrumentality." P.L.R. 3-1(b)–(c) (emphasis added). The purpose of these requirements is to provide reasonable notice to the defendant and to crystallize the parties' theories of the case early in the litigation. *See O2 Micro Int'l Ltd. v. Monolithic Power Sys., Inc.*, 467 F.3d 1355, 1365 (Fed. Cir. 2006). Moreover, infringement contentions must be "specific enough to give a defendant notice of what products or processes are accused and where the alleged infringement occurs." *Network Caching Tech., LLC v. Novell, Inc.*, No. C-01-2079 VRW, 2002 WL 32126128, at *4 (N.D. Cal. Aug. 13, 2002). Reasonable notice requires the patentee to specifically tie the asserted claim language to some feature within the accused product. *View Engineering, Inc. v. Robotic Vision Systems, Inc.*, 208 F.3d 981, 986 (Fed. Cir. 2000). Contentions that merely parrot claim language or recite boilerplate, vague, and conclusory accusations are insufficient. *See Bender v. Maxim Integrated Prods., Inc.*, No. C 09-01152 SI, 2010 WL 1135762, at *2 (N.D. Cal. Mar. 22, 2010).

Nevertheless, the Infringement Contentions are deficient in that they fail to properly and completely disclose how the Accused Instrumentalities allegedly infringe the Asserted Claims. For example, each of the Asserted Claims requires numerous specific elements arranged in a particular manner and configured to perform certain functions. Instead of meaningfully identifying which aspects of the Accused Instrumentalities satisfy each claim limitation, Plaintiff's infringement contentions merely parrot the claim language and recite boilerplate, vague, and conclusory accusations that the products practice the claim limitations—utterly failing to describe where and how the claim limitation is found in the Accused Instrumentalities.

Accordingly, Google reserves the right to amend and/or supplement these Invalidity Contentions should the Court permit Plaintiff to correct, clarify, amend, and/or supplement its Infringement Contentions.

B. Overview of Invalidity Grounds

The Asserted Claims are invalid under 35 U.S.C. §§ 102 and 103 because all the claims are anticipated by, or would have been obvious to a skilled artisan in view of, the prior art. *See* Sections II (Identification of Relevant Prior Art) and III (Anticipation and Obviousness Under 35 U.S.C. §§ 102 and 103), *infra*. In addition, at least the '903 patent is invalid for double patenting. *See* Section IV (Double Patenting), *infra*. The Asserted Claims also are invalid under 35 U.S.C. § 112 for lack of written description, lack of enablement, indefiniteness, and/or because they do not set forth what the patentee regarded as the invention. *See* Section V (Invalidity Under 35 U.S.C. § 112), *infra*. Google also contends that at least a portion of the extension of patent term accorded to the '903, '517, and '322 patents pursuant to 35 U.S.C. § 154(b) is invalid. *See* Section VI (Invalid Patent Term Adjustment). Additionally, all the Asserted Claims are further invalid for failure to meet the subject-matter eligibility requirements of 35 U.S.C. § 101. *See* Section VII (Subject-Matter Eligibility). Google also incorporates by reference and reserves the right to rely on the invalidity and subject-matter eligibility contentions, expert reports, and other disclosures provided to Plaintiff or its privies by the defendant(s) in other cases, including *Sandpiper CDN, LLC v. Comcast Cable Communications, LLC, et al.*, No. 2:24-cv-886-JRG-RSP (E.D. Tex.) and *Level 3 Communications, LLC v. Limelight Networks, Inc.*, No. 2:07-cv-589 (E.D. Va.) (collectively, with any other cases filed by Plaintiff or its privies, the "Related Cases").

These disclosures are made based on prior art presently known to Google. Discovery in this case has only just commenced. The Court has not construed the terms of the Asserted Claims in this case, and the Court has not determined the level of education or experience of one of ordinary skill in the art. Google reserves the right

to modify, amend, and/or supplement these Invalidity Contentions in view of, without limitation, information provided by Plaintiff concerning its infringement allegations; to the extent relevant, additional discovery concerning the alleged priority, conception, and reduction to practice of any of the Asserted Claims; additional prior art obtained through discovery or further investigation, including without limitation discovery from Plaintiff or third parties; claim constructions by the Court; positions taken by Plaintiff in this action or any other proceeding; the parties' expert reports; and/or as other circumstances warrant.

These Invalidity Contentions are based on information currently available to Google and its current understanding of the Asserted Claims as stated in Plaintiff's deficient Infringement Contentions, without the benefit of a claim construction order in this case, fact discovery, or expert testimony. Google objects to any attempt to infer claim construction positions from any identification of prior art or invalidity contention contained herein. Certain positions set forth in these Invalidity Contentions are predicated (to the extent that Plaintiff's positions can be ascertained) on Plaintiff's incorrect interpretation of the Asserted Claims as evidenced by its Infringement Contentions. These Invalidity Contentions are not, and should not be construed as, admissions or adoptions of a particular claim scope or construction, or as an admission that any particular element of an Asserted Claim is found in any accused instrumentality. Google reserves the right to adopt claim construction positions that differ from positions put forth in this document. Google disagrees with Plaintiff's application of the Asserted Claims to the Accused Instrumentalities (to the extent that Plaintiff's positions can be ascertained), and Google expressly denies infringement.

Google expressly incorporates by reference, as if fully set forth herein, the invalidity contentions (including claim charts and expert reports) served on Plaintiff by the defendants in the Related Cases. Google also incorporates by reference all prior art and invalidity contentions identified in any post-issuance review by the U.S. Patent and Trademark Office of any Asserted Patent or patent owned by Plaintiff and

covering a subject matter that overlaps even in part with the Asserted Patents, including without limitation IPR2025-00806 ('517 patent), IPR2025-00826 ('112 patent) (collectively, the "Related IPRs").[1]

II. IDENTIFICATION OF RELEVANT PRIOR ART

A. Priority Dates

Google reserves the right to argue that some or all the Asserted Claims are not entitled to the priority date(s) claimed on the face of each Asserted Patent for failure to sufficiently disclose the full scope of the claimed invention(s) as of those claimed priority date(s). By way of example, Google provides the following arguments but reserves the right to argue that the Asserted Claims are not entitled to other priority dates as well.

A patent's claims are not entitled to an earlier priority date merely because the patent owner claims priority. *See Dynamic Drinkware, LLC v. National Graphics, Inc.*, 800 F.3d 1375, 1379-1380 (Fed. Cir. 2015). Rather, Plaintiff must show the earlier application provides written description support under 35 U.S.C. § 112(a). The test for written description sufficiency is whether the prior application's disclosure "reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date." *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc).

[1] In letters dated April 14, 2025, Google provided *Sotera* stipulations in support of its IPR petitions challenging the '517 and '112 patents, which were filed on April 14 and 15, 2025, respectively. Google stipulated that, if the PTAB institutes an IPR proceeding on the grounds presented in its petitions, Google will not pursue in this district court litigation the same grounds in the petition or any grounds that reasonably could have been raised during the IPRs with respect to the patent claims subjected to the instituted IPRs (i.e., any ground that reasonably could have been raised under 35 U.S.C. §§ 102 or 103 on the basis of prior art patents or printed publications).

1. The ’903 Patent Is Not Entitled to a Priority Date Any Earlier than February 10, 1998.

In its Infringement Contentions, Plaintiff contends that the ’903 patent is entitled to the filing date of its earliest-filed parent application, U.S. Patent Application No. 09/021,506, which was filed on February 10, 1998. *See* Infringement Contentions at 6. Plaintiff offers no contentions or evidence in its Infringement Contentions demonstrating that the alleged inventions claimed in the ’903 patent were invented earlier than February 10, 1998. Thus, the ’903 patent is not entitled to any date of invention any earlier than February 10, 1998.

2. The ’573 Patent Is Not Entitled to a Priority Date Any Earlier than February 25, 2019.

In its Infringement Contentions, Plaintiff contends that the ’573 patent is entitled to the filing date of U.S. Provisional Application No. 61/042,412, which was filed on April 4, 2008. Plaintiff offers no contentions or evidence in its Infringement Contentions demonstrating that the alleged inventions claimed in the ’573 patent were invented earlier than April 4, 2008. Thus, the ’573 patent is not entitled to any date of invention earlier April 4, 2008.

Moreover, none of the ’573 patent claims is entitled to a filing date any earlier than the patent’s own filing date of February 25, 2019. All the asserted independent claims of the ’573 patent include the limitation “instruction to not cache,” which appears only in the claims themselves—not in the written description of the ’573 patent or its priority applications. Because the priority documents lack written description support for this limitation, they cannot confer an earlier priority date. *See New Railhead Mfg., L.L.C. v. Vermeer Mfg. Co.*, 298 F.3d 1290, 1294 (Fed. Cir. 2002); *Dr. Reddy’s Labs. S.A. v. Indivior UK Ltd.*, IPR2019-00329, Paper 49, 82 (P.T.A.B. June 2, 2020) (finding earliest possible priority was filing date of last patent application where no application in priority chain provided written description

support). Thus, the ’573 patent claims are not entitled to any date of invention earlier than February 25, 2019.

3. The ’517 Patent Is Not Entitled to a Priority Date Any Earlier than October 26, 2007.

In its Infringement Contentions, Plaintiff contends that the ’517 patent is entitled to the filing date of U.S. Provisional Application No. 60/325,177 (the “’177 provisional application”), which was filed on September 28, 2001. Plaintiff offers no contentions or evidence in its Infringement Contentions demonstrating that the alleged inventions claimed in the ’517 patent were invented earlier than September 28, 2001. Thus, the ’517 patent is not entitled to any date of invention earlier than the effective filing date of its earliest-filed parent application.

Moreover, none of the Asserted Claims is entitled to a filing date any earlier than the filing date of its parent application, filed on October 26, 2007, which issued as U.S. Patent No. 7,860,964 (the “2007 CIP”). All the independent claims of the ’517 patent recite “one or more resource nodes [being] . . . mail exchange (MX) records,” a limitation that appears nowhere in the ’177 provisional application or in any other earlier-filed application in the priority chain—including the ’517 patent’s grandparent application, which issued as U.S. Patent No. 7,822,871. This limitation first appeared in the 2007 CIP. Indeed, the terms “mail exchange” and “MX” did not appear in any applications filed before the 2007 CIP. Accordingly, the ’517 patent claims are not entitled to any date of invention earlier than October 26, 2007.

4. The ’112 Patent Is Not Entitled to a Priority Date Any Earlier than October 18, 2001.

In its Infringement Contentions, Plaintiff contends that the ’112 patent is entitled to the filing date of its earliest-filed parent application, U.S. Patent Application No. 09/982,721, which was filed on October 18, 2001. *See* Infringement Contentions at 6. Plaintiff offers no contentions or evidence in its Infringement Contentions demonstrating that the alleged inventions claimed in the ’112 patent were

invented earlier than October 18, 2001. Thus, the ’112 patent is not entitled to any date of invention earlier than October 18, 2001.

5. The ’322 Patent Is Not Entitled to a Priority Date Any Earlier than December 31, 2014.

In its Infringement Contentions, Plaintiff contends that the ’322 patent is entitled to the filing date of U.S. Provisional Application No. 62/098,930, which was filed on December 31, 2014. *See* Infringement Contentions at 6. Plaintiff offers no contentions or evidence in its Infringement Contentions demonstrating that the alleged inventions claimed in the ’322 patent were invented earlier than December 31, 2014. Thus, the ’322 patent is not entitled to any date of invention earlier than December 31, 2014.

B. Prior Art for the Asserted Patents

Subject to its reservation of rights, Google identifies below (in Tables 1, 2, and 3) each item of prior art that anticipates or renders obvious one or more of the Asserted Claims. Table 1 provides the identity of each prior art patent publication by its number, filing or priority date, and date of issuance or publication. Table 2 provides the identity of each non-patent prior art publication including, where possible, its title, date of publication, author, and publisher. Table 3 provides the identity of each system or product that was in public use, on sale, or otherwise available to the public before the effective filing dates of the claimed inventions of all the Asserted Patents, including (where possible): the name of the item; the identity of the person or entity that made the use or sale or that made the information known; and date the system or product was in public use, on sale, or otherwise available to the public. In addition to the systems or products listed in Table 3, Google also relies on the systems and products discussed, disclosed, or referred to the prior art references listed in Tables 1 and 2. Tables 1, 2, and 3 further include references that may be relied upon to show the state of the art at the time and/or inherency regardless of whether the references themselves qualify as prior art. Google additionally relies on any of the Asserted

Patents (or related patents or patent applications in their families) that qualify as prior art against another Asserted Patent as anticipating or rendering obvious one or more of the Asserted Claims. Google reserves the right to rely on each reference with respect to any and all the Asserted Patents.

Prior art patents or publications included in these Invalidity Contentions may be related (such as a divisional, continuation, continuation-in-part, parent, or child) to earlier or later-filed patents or publications, may have counterparts filed in other jurisdictions, or may incorporate (or be incorporated by) other patents or publications by reference. The listed patents or publications are intended to be representative of these other patents or publications to the extent they exist. Google accordingly reserves the right to modify, amend, or supplement these Contentions with these related patents or publications, as well as other prior art references, upon further investigation. Additionally, any reference in these Contentions, including the appendices and exhibits thereto, to a specific subsection or subsections of 35 U.S.C. § 102, is merely exemplary, and Google expressly reserves the right to rely on additional or other sections of 35 U.S.C. § 102, as appropriate. If Plaintiff asserts that one or more of these references or systems fails to disclose one or more elements of a claim, Google reserves the right to also use those references to invalidate the claim under 35 U.S.C. § 103.

As noted above, Google incorporates by reference all prior art identified in the Related Cases and Related IPRs. Google also incorporates by reference all prior art identified in any post-issuance review by the U.S. Patent and Trademark Office of any Asserted Patent or patent owned by Plaintiff and covering a subject matter that overlaps in whole or in part with the Asserted Patents.

Discovery is ongoing, and Google expects relevant discovery to be obtained from Plaintiff and third parties. Google's prior art investigation, therefore, is not yet complete. As a result, Google reserves the right to present additional items of prior art under 35 U.S.C. § 102 or § 103 located through discovery. Google specifically

reserves the right to supplement these Invalidity Contentions with information obtained through discovery of Plaintiff and third parties.

1. Table 1: Prior Art Patents / Patent Publications[2]

Patent / Application	Filing / Priority Date	Published / Issue Date	Short Name	Starting Bates Number
US4495570	1/7/1982	1/22/1985	Kitajima 570	GOOG-SANDP-PA-00016066
US4591983	7/9/1984	5/27/1986	Bennett 983	GOOG-SANDP-PA-00001788
US4594704	11/16/1984	6/10/1986	Ollivier 704	GOOG-SANDP-PA-00022191
US4726017	5/21/1985	2/16/1988	Krum 017	GOOG-SANDP-PA-00017013
US4803641	11/25/1987	2/7/1989	Hardy 641	GOOG-SANDP-PA-00013378
US4839798	11/6/1985	6/13/1989	Eguchi 798	GOOG-SANDP-PA-00009519
US4847784	7/13/1987	7/11/1989	Clancey 784	GOOG-SANDP-PA-00005472
US4920432	1/12/1988	4/24/1990	Eggers 432	GOOG-SANDP-PA-00009479
US4922417	10/24/1986	5/1/1990	Churm 417	GOOG-SANDP-PA-00005388

[2] Google may rely on earlier priority dates claimed by these patent publications, including to establish that the patent publication is prior art under pre-AIA 35 U.S.C. § 102(e).

Patent / Application	Filing / Priority Date	Published / Issue Date	Short Name	Starting Bates Number
US4943932	4/15/1987	7/24/1990	Lark 932	GOOG-SANDP-PA-00017649
US4949187	12/16/1988	8/14/1990	Cohen 187	GOOG-SANDP-PA-00005666
US4949248	7/15/1988	8/14/1990	Caro 248	GOOG-SANDP-PA-00004706
US5029232	1/12/1989	7/2/1991	Nall 232	GOOG-SANDP-PA-00021423
US5130792	2/1/1990	7/14/1992	Tindell 792	GOOG-SANDP-PA-00026850
US5132992	1/7/1991	7/21/1992	Yurt 992	GOOG-SANDP-PA-00028331
US5136716	3/8/1990	8/4/1992	Harvey 716	GOOG-SANDP-PA-00013448
US5172413	12/20/1990	12/15/1992	Bradley 413	GOOG-SANDP-PA-00004095
US5191573	9/18/1990	3/2/1993	Hair 573	GOOG-SANDP-PA-00013218
US5253275	4/2/1992	10/12/1993	Yurt 275	GOOG-SANDP-PA-00028359
US5253341	4/11/1991	10/12/1993	Rozmanith 341	GOOG-SANDP-PA-00024375
US5287499	5/16/1991	2/15/1994	Nemes 499	GOOG-SANDP-PA-00021508

Patent / Application	Filing / Priority Date	Published / Issue Date	Short Name	Starting Bates Number
US5287537	9/21/1992	2/15/1994	Newmark 537	GOOG-SANDP-PA-00021522
US5291554	8/19/1992	3/1/1994	Morales 554	GOOG-SANDP-PA-00021337
US5341477	8/6/1993	8/23/1994	Pitkin 477	GOOG-SANDP-PA-00022946
US5371532	5/15/1992	12/6/1994	Gelman 532	GOOG-SANDP-PA-00012348
US5377323A	9/13/1991	12/27/1994	Vasudevan 323	GOOG-SANDP-PA-00027587
US5410343	4/2/1993	4/25/1995	Coddington 343	GOOG-SANDP-PA-00005583
US5414455	7/7/1993	5/9/1995	Hooper 455	GOOG-SANDP-PA-00013951
US5442389	12/28/1992	8/15/1995	Blahut 389	GOOG-SANDP-PA-00002751
US5442390	7/7/1993	8/15/1995	Hooper 390	GOOG-SANDP-PA-00013972
US5442749	7/9/1993	8/15/1995	Northcutt 749	GOOG-SANDP-PA-00021975
US5471622	4/20/1995	11/28/1995	Eadline 622	GOOG-SANDP-PA-00008027
US5475615	12/23/1993	12/12/1995	Lin 615	GOOG-SANDP-PA-00019118

Patent / Application	Filing / Priority Date	Published / Issue Date	Short Name	Starting Bates Number
US5508732	3/22/1993	4/16/1996	Bottomley 732	GOOG-SANDP-PA-00002905
US5511208	3/23/1993	4/23/1996	Boyles 208	GOOG-SANDP-PA-00004079
US5515511	6/6/1994	5/7/1996	Nguyen 511	GOOG-SANDP-PA-00021793
US5519435	9/1/1994	5/21/1996	Anderson 435	GOOG-SANDP-PA-00000550
US5522070	5/23/1995	5/28/1996	Sumimoto 070	GOOG-SANDP-PA-00026286
US5528281	7/30/1993	6/18/1996	Grady 281	GOOG-SANDP-PA-00012670
US5539621	6/23/1995	7/23/1996	Kikinis 621	GOOG-SANDP-PA-00015823
US5542087	10/15/1993	7/30/1996	Neimat 087	GOOG-SANDP-PA-00021489
US5544313	5/11/1994	8/6/1996	Shachnai 313	GOOG-SANDP-PA-00024830
US5544327	7/26/1994	8/6/1996	Dan 327	GOOG-SANDP-PA-00006006
US5550577	5/19/1994	8/27/1996	Verbiest 577	GOOG-SANDP-PA-00027602
US5550863	10/8/1993	8/27/1996	Yurt 863	GOOG-SANDP-PA-00028384

Patent / Application	Filing / Priority Date	Published / Issue Date	Short Name	Starting Bates Number
US5550982	6/24/1993	8/27/1996	Long 982	GOOG-SANDP-PA-00019479
US5557317	5/22/1995	9/17/1996	Nishio 317	GOOG-SANDP-PA-00021904
US5568181	5/1/1995	10/22/1996	Greenwood 181	GOOG-SANDP-PA-00012726
US5572643	10/19/1995	11/5/1996	Judson 643	GOOG-SANDP-PA-00014544
US5590288	3/13/1995	12/31/1996	Castor 288	GOOG-SANDP-PA-00004785
US5592611	3/14/1995	1/7/1997	Midgely 611	GOOG-SANDP-PA-00020669
US5594910	11/26/1993	1/14/1997	Filepp 910	GOOG-SANDP-PA-00011624
US5603026	12/7/1994	2/11/1997	Demers 026	GOOG-SANDP-PA-00006246
US5614940	10/21/1994	3/25/1997	Cobbley 940	GOOG-SANDP-PA-00005565
US5619648	11/30/1994	4/8/1997	Canale 648	GOOG-SANDP-PA-00004604
US5623656	12/15/1994	4/22/1997	Lyons 656	GOOG-SANDP-PA-00019749
US5625781	10/31/1995	4/29/1997	Cline 781	GOOG-SANDP-PA-00005541

Patent / Application	Filing / Priority Date	Published / Issue Date	Short Name	Starting Bates Number
US5627829	6/6/1995	5/6/1997	Gleeson 829	GOOG-SANDP-PA-00012488
US5630067	6/4/1996	5/13/1997	Kindell 067	GOOG-SANDP-PA-00015900
US5633999	12/18/1995	5/27/1997	Clowes 999	GOOG-SANDP-PA-00005551
US5634006	10/11/1995	5/27/1997	Baugher 006	GOOG-SANDP-PA-00001092
US5638443	11/23/1994	6/10/1997	Stefik 443	GOOG-SANDP-PA-00025968
US5644714	4/10/1995	7/1/1997	Kikinis 714	GOOG-SANDP-PA-00015835
US5646676	5/30/1995	7/8/1997	Dewkett 676	GOOG-SANDP-PA-00006393
US5649186	8/7/1995	7/15/1997	Ferguson 186	GOOG-SANDP-PA-00011537
US5657390A	8/25/1995	8/12/1997	Elgamal 390	GOOG-SANDP-PA-00009556
US5659729	2/1/1996	8/19/1997	Nielsen 729	GOOG-SANDP-PA-00021828
US5666362	7/25/1995	9/9/1997	Chen 362	GOOG-SANDP-PA-00005088
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US5682512	6/30/1995	10/28/1997	Tetrick 512	GOOG-SANDP-PA-00026810
US5699513	3/31/1995	12/16/1997	Feigen 513	GOOG-SANDP-PA-00011503
US5708780	6/7/1995	1/13/1998	Levergood 780	GOOG-SANDP-PA-00018317
US5712979	9/20/1995	1/27/1998	Graber 979	GOOG-SANDP-PA-00012603
US5715453	5/31/1996	2/3/1998	Stewart 453	GOOG-SANDP-PA-00026010
US5721914	9/14/1995	2/24/1998	DeVries 914	GOOG-SANDP-PA-00006369
US5734719	12/10/1996	3/31/1998	Tsevdos 719	GOOG-SANDP-PA-00027195
US5734831	4/26/1996	3/31/1998	Sanders 831	GOOG-SANDP-PA-00024521
US5740423	12/28/1995	4/14/1998	Logan 423	GOOG-SANDP-PA-00019388
US5742762	5/19/1995	4/21/1998	Scholl 762	GOOG-SANDP-PA-00024685
US5751961	1/31/1996	5/12/1998	Smyk 961	GOOG-SANDP-PA-00025540

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US5761663	5/15/1997	6/2/1998	Lagarde 663	GOOG-SANDP-PA-00017372
US5764906	11/7/1995	6/9/1998	Edelstein 906	GOOG-SANDP-PA-00009435
US5774660	8/5/1996	6/30/1998	Brendel 660	GOOG-SANDP-PA-00004208
US5774668	6/7/1995	6/30/1998	Choquier 668	GOOG-SANDP-PA-00005160
US5777988	4/17/1996	7/7/1998	Cisneros 988	GOOG-SANDP-PA-00005431
US5777989	12/19/1995	7/7/1998	McGarvey 989	GOOG-SANDP-PA-00020514
US5778187	5/9/1996	7/7/1998	Monteiro 187	GOOG-SANDP-PA-00020970
US5781909	2/13/1996	7/14/1998	Logan 909	GOOG-SANDP-PA-00019397
US5784058	5/28/1996	7/21/1998	LaStrange 058	GOOG-SANDP-PA-00017784
US5787470	10/18/1996	7/28/1998	DeSimone 470	GOOG-SANDP-PA-00006322
US5794253	7/12/1996	8/11/1998	Norin 253	GOOG-SANDP-PA-00021914

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US5799141	6/9/1995	8/25/1998	Galipeau 141	GOOG-SANDP-PA-00012145
US5802106	12/6/1996	9/1/1998	Packer 106	GOOG-SANDP-PA-00022593
US5802291	3/30/1995	9/1/1998	Balick 291	GOOG-SANDP-PA-00000974
US5812769	9/20/1995	9/22/1998	Graber 769	GOOG-SANDP-PA-00012621
US5815662	8/15/1996	9/29/1998	Ong 662	GOOG-SANDP-PA-00022211
US5815664	3/19/1996	9/29/1998	Asano 664	GOOG-SANDP-PA-00000721
US5819092	10/6/1997	10/6/1998	Ferguson 092	GOOG-SANDP-PA-00011552
US5826031	6/10/1996	10/20/1998	Nielsen 031	GOOG-SANDP-PA-00021844
US5828847	4/19/1996	10/27/1998	Gehr 847	GOOG-SANDP-PA-00012334
US5832069	11/17/1995	11/3/1998	Waters 069	GOOG-SANDP-PA-00027860
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US5838906	10/17/1994	11/17/1998	Doyle 906	GOOG-SANDP-PA-00007838
US5845090	9/30/1996	12/1/1998	Collins 090	GOOG-SANDP-PA-00005822
US5845303	10/2/1996	12/1/1998	Templeman 303	GOOG-SANDP-PA-00026772
US5856974	2/13/1996	1/5/1999	Gervais 974	GOOG-SANDP-PA-00012393
US5862331A	6/21/1996	1/19/1999	Herriot 331	GOOG-SANDP-PA-00013769
US5862339	7/9/1996	1/19/1999	Bonnaure 339	GOOG-SANDP-PA-00002804
US5867706	12/19/1996	2/2/1999	Martin 706	GOOG-SANDP-PA-00019966
US5867799	4/4/1996	2/2/1999	Lang 799	GOOG-SANDP-PA-00017590
US5870546	12/23/1997	2/9/1999	Kirsch 546	GOOG-SANDP-PA-00016039
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US5878212	7/31/1995	3/2/1999	Civanlar 212	GOOG-SANDP-PA-00005455
US5884038	5/2/1997	3/16/1999	Kapoor 038	GOOG-SANDP-PA-00015005
US5890171	8/6/1996	3/30/1999	Blumer 171	GOOG-SANDP-PA-00002780
US5893116	9/30/1996	4/6/1999	Simmonds 116	GOOG-SANDP-PA-00025198
US5894554	4/23/1996	4/13/1999	Lowery 554	GOOG-SANDP-PA-00019601
US5896533	7/6/1995	4/20/1999	Ramos 533	GOOG-SANDP-PA-00023655
US5898456	4/19/1996	4/27/1999	Wahl 456	GOOG-SANDP-PA-00027691
US5903723	12/21/1995	5/11/1999	Beck 723	GOOG-SANDP-PA-00001135
US5907704	10/2/1996	5/25/1999	Gudmundson 704	GOOG-SANDP-PA-00013000
US5913028	10/6/1995	6/15/1999	Wang 028	GOOG-SANDP-PA-00027839
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US5919247	7/24/1996	7/6/1999	Van Hoff 247	GOOG-SANDP-PA-00027479
US5920701	8/28/1996	7/6/1999	Miller 701	GOOG-SANDP-PA-00020792
US5925106	4/5/1996	7/20/1999	Nielsen 106	GOOG-SANDP-PA-00021858
US5931904	10/11/1996	8/3/1999	Banga 904	GOOG-SANDP-PA-00000991
US5933832	9/10/1997	8/3/1999	Suzuoka 832	GOOG-SANDP-PA-00026369
US5933835	4/9/1997	8/3/1999	Adams 835	GOOG-SANDP-PA-00000204
US5933849	4/10/1997	8/3/1999	Srbljic 849	GOOG-SANDP-PA-00025782
US5935207	4/9/1997	8/10/1999	Logue 207	GOOG-SANDP-PA-00019459
US5940831	8/22/1997	8/17/1999	Takano 831	GOOG-SANDP-PA-00026697
US5944780	5/5/1997	8/31/1999	Chase 780	GOOG-SANDP-PA-00004965
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US5956489	1/16/1996	9/21/1999	San Andres 489	GOOG-SANDP-PA-00024486
US5956716	6/7/1996	9/21/1999	Kenner 716	GOOG-SANDP-PA-00015420
US5958008	4/11/1997	9/28/1999	Pogrebisky 008	GOOG-SANDP-PA-00022965
US5961596	2/14/1997	10/5/1999	Takubo 596	GOOG-SANDP-PA-00026713
US5966440	6/6/1995	10/12/1999	Hair 440	GOOG-SANDP-PA-00013270
US5968119	12/9/1996	10/19/1999	Stedman 119	GOOG-SANDP-PA-00025909
US5968121	8/13/1997	10/19/1999	Logan 121	GOOG-SANDP-PA-00019421
US5973696	8/8/1997	10/26/1999	Agranat 696	GOOG-SANDP-PA-00000282
US5978791	10/24/1997	11/2/1999	Farber 791	GOOG-SANDP-PA-00010495
US5983005	7/6/1998	11/9/1999	Monteiro 005	GOOG-SANDP-PA-00021017
US5983214	11/5/1998	11/9/1999	Lang 214	GOOG-SANDP-PA-00017624

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US5991306A	8/26/1996	11/23/1999	Burns 306	GOOG-SANDP-PA-00004527
US5991809	7/25/1997	11/23/1999	Kriegsman 809	GOOG-SANDP-PA-00016878
US5996025	10/31/1997	11/30/1999	Day 025	GOOG-SANDP-PA-00006107
US6002720	4/10/1996	12/14/1999	Yurt 720	GOOG-SANDP-PA-00028409
US6003030	10/18/1996	12/14/1999	Kenner 030	GOOG-SANDP-PA-00015446
US6006264	3/30/1998	12/21/1999	Colby 264	GOOG-SANDP-PA-00005758
US6012090	3/14/1997	1/4/2000	Chung 090	GOOG-SANDP-PA-00005363
US6014686	6/20/1997	1/11/2000	Elnozahy 686	GOOG-SANDP-PA-00010074
US6014698	6/11/1997	1/11/2000	Griffiths 698	GOOG-SANDP-PA-00012738
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US6021426	12/1/1997	2/1/2000	Douglis 426	GOOG-SANDP-PA-00007736
US6023470	5/17/1996	2/8/2000	Lee 470	GOOG-SANDP-PA-00017986
US6026440	1/27/1997	2/15/2000	Shrader 440	GOOG-SANDP-PA-00024891
US6029175	6/7/1996	2/22/2000	Chow 175	GOOG-SANDP-PA-00005238
US6029176	11/25/1997	2/22/2000	Cannon 176	GOOG-SANDP-PA-00004634
US6035332	10/6/1997	3/7/2000	Ingrassia 332	GOOG-SANDP-PA-00014226
US6038216	11/1/1996	3/14/2000	Packer 216	GOOG-SANDP-PA-00022619
US6038310	8/1/1995	3/14/2000	Hollywood 310	GOOG-SANDP-PA-00013936
US6038610	7/17/1996	3/14/2000	Belfiore 610	GOOG-SANDP-PA-00001160
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US6044405	4/12/1996	3/28/2000	Driscoll 405	GOOG-SANDP-PA-00007888
US6046980	11/24/1997	4/4/2000	Packer 980	GOOG-SANDP-PA-00022641
US6047309	10/2/1995	4/4/2000	Dan 309	GOOG-SANDP-PA-00006019
US6049831	2/13/1997	4/11/2000	Gardell 831	GOOG-SANDP-PA-00012301
US6052718	1/7/1997	4/18/2000	Gifford 718	GOOG-SANDP-PA-00012409
US6052730	1/9/1998	4/18/2000	Felciano 730	GOOG-SANDP-PA-00011513
US6052788	4/26/1999	4/18/2000	Wesinger 788	GOOG-SANDP-PA-00027954
US6061349	5/2/1997	5/9/2000	Coile 349	GOOG-SANDP-PA-00005691
US6061738	10/28/1997	5/9/2000	Osaku 738	GOOG-SANDP-PA-00022255
US6065051	4/15/1998	5/16/2000	Steele 051	GOOG-SANDP-PA-00025954
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US6078955A	8/27/1997	6/20/2000	Konno 955	GOOG-SANDP-PA-00016230
US6081829	1/31/1996	6/27/2000	Sidana 829	GOOG-SANDP-PA-00024908
US6081835	3/11/1997	6/27/2000	Antcliff 835	GOOG-SANDP-PA-00000574
US6081840	10/14/1997	6/27/2000	Zhao 840	GOOG-SANDP-PA-00028460
US6085193	9/29/1997	7/4/2000	Malkin 193	GOOG-SANDP-PA-00019839
US6092112	1/14/1997	7/18/2000	Fukushige 112	GOOG-SANDP-PA-00011969
US6092178	9/3/1998	7/18/2000	Jindal 178	GOOG-SANDP-PA-00014392
US6092204	6/8/1999	7/18/2000	Baker 204	GOOG-SANDP-PA-00000969
US6094680	6/27/1996	7/25/2000	Hokanson 680	GOOG-SANDP-PA-00013920
US6094706	3/2/1998	7/25/2000	Factor 706	GOOG-SANDP-PA-00010110

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US6098096	12/9/1996	8/1/2000	Tsirigotis 096	GOOG-SANDP-PA-00027360
US6105028	6/26/1997	8/15/2000	Sullivan 028	GOOG-SANDP-PA-00026257
US6108673	2/25/1997	8/22/2000	Brandt 673	GOOG-SANDP-PA-00004148
US6108703	5/19/1999	8/22/2000	Leighton 703	GOOG-SANDP-PA-00018065
US6112231	10/27/1998	8/29/2000	DeSimone 231	GOOG-SANDP-PA-00006334
US6112239	6/18/1997	8/29/2000	Kenner 239	GOOG-SANDP-PA-00015461
US6112240	9/3/1997	8/29/2000	Pogue 240	GOOG-SANDP-PA-00023009
US6115357	6/29/1998	9/5/2000	Packer 357	GOOG-SANDP-PA-00022674
US6115752	5/21/1998	9/5/2000	Chauhan 752	GOOG-SANDP-PA-00005074
US6119143	5/22/1997	9/12/2000	Dias 143	GOOG-SANDP-PA-00006512
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US6125394	6/6/1997	9/26/2000	Rabinovich 394	GOOG-SANDP-PA-00023108
US6128279	10/1/1998	10/3/2000	O'Neil 279	GOOG-SANDP-PA-00022198
US6128601	3/2/1998	10/3/2000	Van Horne 601	GOOG-SANDP-PA-00027506
US6128623	4/15/1998	10/3/2000	Mattis 623	GOOG-SANDP-PA-00019988
US6128660	3/20/1997	10/3/2000	Grimm 660	GOOG-SANDP-PA-00012780
US6130890	9/11/1998	10/10/2000	Leinwand 890	GOOG-SANDP-PA-00018186
US6131095	12/11/1996	10/10/2000	Low 095	GOOG-SANDP-PA-00019490
US6134583	7/1/1996	10/17/2000	Herriot 583	GOOG-SANDP-PA-00013778
US6134588	11/12/1997	10/17/2000	Guenthner 588	GOOG-SANDP-PA-00013100
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US6144996	8/12/1998	11/7/2000	Starnes 996	GOOG-SANDP-PA-00025891
US6148410	9/15/1997	11/14/2000	Baskey 410	GOOG-SANDP-PA-00001049
US6151624	2/3/1998	11/21/2000	Teare 624	GOOG-SANDP-PA-00026741
US6154738	5/21/1999	11/28/2000	Call 738	GOOG-SANDP-PA-00004568
US6154744	12/17/1998	11/28/2000	Kenner 744	GOOG-SANDP-PA-00015478
US6154753	9/12/1996	11/28/2000	McFarland 753	GOOG-SANDP-PA-00020404
US6154777	7/1/1996	11/28/2000	Ebrahim 777	GOOG-SANDP-PA-00009422
US6157648	9/16/1997	12/5/2000	Voit 648	GOOG-SANDP-PA-00027631
US6161137	3/31/1998	12/12/2000	Ogdon 137	GOOG-SANDP-PA-00022050
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US6167446	11/3/1998	12/26/2000	Lister 446	GOOG-SANDP-PA-00041468
US6173311	2/13/1997	1/9/2001	Hassett 311	GOOG-SANDP-PA-00013646
US6173322	6/5/1997	1/9/2001	Hu 322	GOOG-SANDP-PA-00014067
US6175869	4/8/1998	1/16/2001	Ahuja 869	GOOG-SANDP-PA-00000533
US6178160	12/23/1997	1/23/2001	Bolton 160	GOOG-SANDP-PA-00002794
US6181690	7/18/1997	1/30/2001	Civanlar 690	GOOG-SANDP-PA-00005468
US6181867	6/7/1995	1/30/2001	Kenner 867	GOOG-SANDP-PA-00015492
US6182226	3/18/1998	1/30/2001	Reid 226	GOOG-SANDP-PA-00023689
US6185598	2/10/1998	2/6/2001	Farber 598	GOOG-SANDP-PA-00010553
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US6189043	6/9/1997	2/13/2001	Buyukkoc 043	GOOG-SANDP-PA-00004543
US6195680	7/23/1998	2/27/2001	Goldszmidt 680	GOOG-SANDP-PA-00012552
US6205120	3/13/1998	3/20/2001	Packer 120	GOOG-SANDP-PA-00022684
US6205477	10/20/1998	3/20/2001	Johnson 477	GOOG-SANDP-PA-00014513
US6212565	8/26/1998	4/3/2001	Gupta 565	GOOG-SANDP-PA-00013137
US6222856	8/28/1997	4/24/2001	Krishnan 856	GOOG-SANDP-PA-00016980
US6226618	8/13/1998	5/1/2001	Downs 618	GOOG-SANDP-PA-00007770
US6226642	9/11/1997	5/1/2001	Beranek 642	GOOG-SANDP-PA-00002130
US6226684	10/26/1998	5/1/2001	Sung 684	GOOG-SANDP-PA-00026344
US6230196	11/12/1997	5/8/2001	Guenthner 196	GOOG-SANDP-PA-00013112

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US6240461	10/8/1997	5/29/2001	Cieslak 461	GOOG-SANDP-PA-00005401
US6240462	10/14/1997	5/29/2001	Agraharam 462	GOOG-SANDP-PA-00000273
US6243760	6/24/1997	6/5/2001	Armbruster 760	GOOG-SANDP-PA-00000657
US6249810	4/27/1999	6/19/2001	Kiraly 810	GOOG-SANDP-PA-00015974
US6253234	10/17/1997	6/26/2001	Hunt 234	GOOG-SANDP-PA-00014114
US6256675	5/6/1998	7/3/2001	Rabinovich 675	GOOG-SANDP-PA-00023132
US6263313	11/30/1998	7/17/2001	Milsted 313	GOOG-SANDP-PA-00020825
US6266335	12/19/1997	7/24/2001	Bhaskaran 335	GOOG-SANDP-PA-00002226
US6266339	5/13/1999	7/24/2001	Donahue 339	GOOG-SANDP-PA-00006617
US6266699	4/17/1997	7/24/2001	Sevcik 699	GOOG-SANDP-PA-00024801
US6269394	12/16/1998	7/31/2001	Kenner 394	GOOG-SANDP-PA-00015506

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US6272566	11/18/1998	8/7/2001	Craft 566	GOOG-SANDP-PA-00005945
US6275470	6/18/1999	8/14/2001	Ricciulli 470	GOOG-SANDP-PA-00023982
US6282569	6/3/1997	8/28/2001	Wallis 569	GOOG-SANDP-PA-00027761
US6282574	2/24/2000	8/28/2001	Voit 574	GOOG-SANDP-PA-00027674
US6286045	5/19/1997	9/4/2001	Griffiths 045	GOOG-SANDP-PA-00012759
US6292465	12/29/1997	9/18/2001	Vaid 465	GOOG-SANDP-PA-00027454
US6292905	10/2/1997	9/18/2001	Wallach 905	GOOG-SANDP-PA-00027703
US6298041	4/27/1999	10/2/2001	Packer 041	GOOG-SANDP-PA-00022698
US6304913	11/9/1998	10/16/2001	Rune 913	GOOG-SANDP-PA-00024432
US6311214	6/29/1999	10/30/2001	Rhoads 214	GOOG-SANDP-PA-00023915
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US6324580	9/3/1998	11/27/2001	Jindal 580	GOOG-SANDP-PA-00014405
US6324582	10/20/1998	11/27/2001	Sridhar 582	GOOG-SANDP-PA-00025801
US6327622	9/3/1998	12/4/2001	Jindal 622	GOOG-SANDP-PA-00014420
US6330602	11/7/1997	12/11/2001	Law 602	GOOG-SANDP-PA-00017839
US6330605	11/19/1998	12/11/2001	Christensen 605	GOOG-SANDP-PA-00005332
US6332157	6/29/1999	12/18/2001	Mighdoll 157	GOOG-SANDP-PA-00020768
US6332195	2/22/1999	12/18/2001	Green 195	GOOG-SANDP-PA-00012695
US6335927	11/18/1996	1/1/2002	Elliott 927	GOOG-SANDP-PA-00009698
US6338044	3/17/1999	1/8/2002	Cook 044	GOOG-SANDP-PA-00005862
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US6347085	8/14/1997	2/12/2002	Kelly 085	GOOG-SANDP-PA-00015267
US6351775	5/30/1997	2/26/2002	Yu 775	GOOG-SANDP-PA-00028305
US6351776	5/12/2000	2/26/2002	O'Brien 776	GOOG-SANDP-PA-00022005
US6360256	7/1/1996	3/19/2002	Lim 256	GOOG-SANDP-PA-00019105
US6360262	11/24/1997	3/19/2002	Guenthner 262	GOOG-SANDP-PA-00013122
US6370571	3/5/1997	4/9/2002	Medin 571	GOOG-SANDP-PA-00020522
US6370580	9/15/1999	4/9/2002	Kriegsman 580	GOOG-SANDP-PA-00016893
US6374299	1/26/2000	4/16/2002	Ford 299	GOOG-SANDP-PA-00011699
US6389462	12/16/1998	5/14/2002	Cohen 462	GOOG-SANDP-PA-00005673
US6398245	12/1/1998	6/4/2002	Gruse 245	GOOG-SANDP-PA-00012860
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US6412000	11/23/1998	6/25/2002	Riddle 000	GOOG-SANDP-PA-00024122
US6412002	11/15/1999	6/25/2002	Denman 002	GOOG-SANDP-PA-00006264
US6412004	3/27/1997	6/25/2002	Chen 004	GOOG-SANDP-PA-00005102
US6415280	4/1/1999	7/2/2002	Farber 280	GOOG-SANDP-PA-00010576
US6415368	12/22/1999	7/2/2002	Glance 368	GOOG-SANDP-PA-00012479
US6418421	12/10/1998	7/9/2002	Hurtado 421	GOOG-SANDP-PA-00014155
US6418461	8/5/1998	7/9/2002	Barnhouse 461	GOOG-SANDP-PA-00001019
US6421714	8/24/1998	7/16/2002	Rai 714	GOOG-SANDP-PA-00023360
US6421726	3/1/1998	7/16/2002	Kenner 726	GOOG-SANDP-PA-00015541
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US6430618	3/13/1998	8/6/2002	Karger 618	GOOG-SANDP-PA-00015116
US6434608	2/26/1999	8/13/2002	Desai 608	GOOG-SANDP-PA-00006309
US6434622	7/17/2000	8/13/2002	Monteiro 622	GOOG-SANDP-PA-00021104
US6438652	10/9/1998	8/20/2002	Jordan 652	GOOG-SANDP-PA-00014528
US6442549	11/15/1999	8/27/2002	Schneider 549	GOOG-SANDP-PA-00024609
US6442588	8/20/1998	8/27/2002	Clark 588	GOOG-SANDP-PA-00005527
US6449650	5/21/1999	9/10/2002	Westfall 650	GOOG-SANDP-PA-00027985
US6452925	6/26/2000	9/17/2002	Sistanizadeh 925	GOOG-SANDP-PA-00025223
US6453319	4/5/2000	9/17/2002	Mattis 319	GOOG-SANDP-PA-00020037
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US6460085	5/6/1999	10/1/2002	Toporek 085	GOOG-SANDP-PA-00026901
US6463454	6/17/1999	10/8/2002	Lumelsky 454	GOOG-SANDP-PA-00019719
US6463508	7/19/1999	10/8/2002	Wolf 508	GOOG-SANDP-PA-00028138
US6466949	11/23/1998	10/15/2002	Yang 949	GOOG-SANDP-PA-00028221
US6470389	3/14/1997	10/22/2002	Chung 389	GOOG-SANDP-PA-00005375
US6473405	6/25/2001	10/29/2002	Ricciulli 405	GOOG-SANDP-PA-00023996
US6477707	3/24/1998	11/5/2002	King 707	GOOG-SANDP-PA-00015922
US6480893	4/21/2000	11/12/2002	Kriegsman 893	GOOG-SANDP-PA-00016911
US6484143	8/18/2000	11/19/2002	Swildens 143	GOOG-SANDP-PA-00026493
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US6490580	10/29/1999	12/3/2002	Dey 580	GOOG-SANDP-PA-00006417
US6490615	11/20/1998	12/3/2002	Dias 615	GOOG-SANDP-PA-00006526
US6493707	10/29/1999	12/10/2002	Dey 707	GOOG-SANDP-PA-00006441
US6496856	5/18/2000	12/17/2002	Kenner 856	GOOG-SANDP-PA-00015559
US6502125	8/9/2000	12/31/2002	Kenner 125	GOOG-SANDP-PA-00015575
US6502205	11/10/2000	12/31/2002	Yanai 205	GOOG-SANDP-PA-00028163
US6502215	4/17/2001	12/31/2002	Raad 215	GOOG-SANDP-PA-00023085
US6505248	3/24/1999	1/7/2003	Casper 248	GOOG-SANDP-PA-00004765
US6529477	2/2/1999	3/4/2003	Toporek 477	GOOG-SANDP-PA-00026926
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US6553420	6/2/1998	4/22/2003	Karger 420	GOOG-SANDP-PA-00015152
US6557054	4/20/2000	4/29/2003	Reisman 054	GOOG-SANDP-PA-00023745
US6564251	12/3/1998	5/13/2003	Katariya 251	GOOG-SANDP-PA-00015187
US6574612	6/29/1999	6/3/2003	Baratti 612	GOOG-SANDP-PA-00001006
US6577595	11/12/1999	6/10/2003	Counterman 595	GOOG-SANDP-PA-00005933
US6578066	9/17/1999	6/10/2003	Logan 066	GOOG-SANDP-PA-00019448
US6578068	8/31/1999	6/10/2003	Bowman-Amuah 068	GOOG-SANDP-PA-00003039
US6581090	9/30/1997	6/17/2003	Lindbo 090	GOOG-SANDP-PA-00019140
US6584083	2/2/1999	6/24/2003	Toporek 083	GOOG-SANDP-PA-00026947
US6587837	12/1/1998	7/1/2003	Spagna 837	GOOG-SANDP-PA-00025553
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US6598121	11/6/2001	7/22/2003	Challenger 121	GOOG-SANDP-PA-00004886
US6601082	7/30/1999	7/29/2003	Durham 082	GOOG-SANDP-PA-00008012
US6601084	12/19/1997	7/29/2003	Bhaskaran 084	GOOG-SANDP-PA-00002245
US6611862	4/20/2000	8/26/2003	Reisman 862	GOOG-SANDP-PA-00023810
US6614757	11/23/1998	9/2/2003	Rochberger 757	GOOG-SANDP-PA-00024278
US6625643	11/13/1999	9/23/2003	Colby 643	GOOG-SANDP-PA-00005797
US6636499	12/2/1999	10/21/2003	Dowling 499	GOOG-SANDP-PA-00007744
US6647422	11/10/1998	11/11/2003	Wesinger 422	GOOG-SANDP-PA-00027973
US6651141	12/29/2000	11/18/2003	Adrangi 141	GOOG-SANDP-PA-00000228
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US6665706	12/30/2002	12/16/2003	Kenner 706	GOOG-SANDP-PA-00015589
US6665726	1/6/2000	12/16/2003	Leighton 726	GOOG-SANDP-PA-00018096
US6678659	6/20/1997	1/13/2004	Van Kommer 659	GOOG-SANDP-PA-00027543
US6687731	6/8/1998	2/3/2004	Kavak 731	GOOG-SANDP-PA-00015222
US6691148	12/24/1998	2/10/2004	Zinky 148	GOOG-SANDP-PA-00028494
US6694358	8/23/2000	2/17/2004	Swildens 358	GOOG-SANDP-PA-00026520
US6698020	6/15/1998	2/24/2004	Zigmond 020	GOOG-SANDP-PA-00028474
US6699418	2/14/2002	3/2/2004	Okada 418	GOOG-SANDP-PA-00022176
US6708137	7/16/2001	3/16/2004	Carley 137	GOOG-SANDP-PA-00004676
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US6732237	8/29/2000	5/4/2004	Jacobs 237	GOOG-SANDP-PA-00014275
US6741563	8/31/2001	5/25/2004	Packer 563	GOOG-SANDP-PA-00022728
US6741990	5/23/2001	5/25/2004	Nair 990	GOOG-SANDP-PA-00021411
US6751673	1/3/2001	6/15/2004	Shaw 673	GOOG-SANDP-PA-00024844
US6754699	7/19/2001	6/22/2004	Swildens 699	GOOG-SANDP-PA-00026537
US6754706	8/11/2000	6/22/2004	Swildens 706	GOOG-SANDP-PA-00026580
US6763377	3/3/2000	7/13/2004	Belknap 377	GOOG-SANDP-PA-00001599
US6763388	8/10/1999	7/13/2004	Tsimelzon 388	GOOG-SANDP-PA-00027284
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US6779031	7/28/1999	8/17/2004	Picher-Dempsey 031	GOOG-SANDP-PA-00022911
US6785704	7/3/2000	8/31/2004	McCanne 704	GOOG-SANDP-PA-00020266
US6792507	12/14/2000	9/14/2004	Chiou 507	GOOG-SANDP-PA-00005138
US6795858	12/29/2000	9/21/2004	Jain 858	GOOG-SANDP-PA-00014324
US6799221	8/4/2000	9/28/2004	Kenner 221	GOOG-SANDP-PA-00015603
US6801576	6/7/2000	10/5/2004	Haldeman 576	GOOG-SANDP-PA-00013305
US6823362	10/16/2001	11/23/2004	Eshghi 362	GOOG-SANDP-PA-00010084
US6834306	8/10/1999	12/21/2004	Tsimelzon 306	GOOG-SANDP-PA-00027317
US6839758	9/28/2001	1/4/2005	Sorensen 758	GOOG-SANDP-PA-00025548
US6842604	10/12/2001	1/11/2005	Cook 604	GOOG-SANDP-PA-00005877
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US6874032	11/15/2001	3/29/2005	Gersht 032	GOOG-SANDP-PA-00012379
US6901604	4/27/1999	5/31/2005	Kiraly 604	GOOG-SANDP-PA-00016007
US6915307	5/6/2002	7/5/2005	Mattis 307	GOOG-SANDP-PA-00020085
US6915329	6/11/2001	7/5/2005	Kriegsman 329	GOOG-SANDP-PA-00016928
US6928442	11/15/2001	8/9/2005	Farber 442	GOOG-SANDP-PA-00010659
US6934255	1/28/2000	8/23/2005	Toporek 255	GOOG-SANDP-PA-00026995
US6938095	3/21/2002	8/30/2005	Basturk 095	GOOG-SANDP-PA-00001064
US6944676	11/13/2000	9/13/2005	Armbruster 676	GOOG-SANDP-PA-00000665
US6950623	9/18/2001	9/27/2005	Brown 623	GOOG-SANDP-PA-00004269
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US6963981	1/29/2002	11/8/2005	Bailey 981	GOOG-SANDP-PA-00000916
US6965890	10/3/2002	11/15/2005	Dey 890	GOOG-SANDP-PA-00006465
US6970432	6/18/2001	11/29/2005	Hankins 432	GOOG-SANDP-PA-00013347
US6973485	10/30/2002	12/6/2005	Ebata 485	GOOG-SANDP-PA-00009367
US6973490	6/23/2000	12/6/2005	Robertson 490	GOOG-SANDP-PA-00024263
US6976090	2/16/2001	12/13/2005	Ben-Shaul 090	GOOG-SANDP-PA-00001946
US6981050	2/11/2000	12/27/2005	Tobias 050	GOOG-SANDP-PA-00026860
US6981180	3/16/2001	12/27/2005	Bailey 180	GOOG-SANDP-PA-00000932
US6983317	6/5/2000	1/3/2006	Bishop 317	GOOG-SANDP-PA-00002609
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US7003572	4/30/2001	2/21/2006	Lownsbrough 572	GOOG-SANDP-PA-00019621
US7007089	6/6/2002	2/28/2006	Freedman 089	GOOG-SANDP-PA-00011806
US7010578	9/21/2000	3/7/2006	Lewin 578	GOOG-SANDP-PA-00018481
US7012900	8/22/2001	3/14/2006	Riddle 900	GOOG-SANDP-PA-00024157
US7013342	12/10/2001	3/14/2006	Riddle 342	GOOG-SANDP-PA-00024170
US7024466	4/6/2001	4/4/2006	Outten 466	GOOG-SANDP-PA-00022327
US7032072	12/31/2001	4/18/2006	Quinn 072	GOOG-SANDP-PA-00023073
US7039633	10/3/2002	5/2/2006	Dey 633	GOOG-SANDP-PA-00006488
US7047300	2/10/1998	5/16/2006	Oehrke 300	GOOG-SANDP-PA-00022033
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US7058706	9/7/2000	6/6/2006	Iyer 706	GOOG-SANDP-PA-00014263
US7061923	12/19/2001	6/13/2006	Dugan 923	GOOG-SANDP-PA-00007939
US7069177	12/24/2003	6/27/2006	Carley 177	GOOG-SANDP-PA-00004690
US7075897	12/20/2001	7/11/2006	Uematsu 897	GOOG-SANDP-PA-00027427
US7076544	4/8/2002	7/11/2006	Katz 544	GOOG-SANDP-PA-00041362
US7080153	5/4/2004	7/18/2006	Monteiro 153	GOOG-SANDP-PA-00021150
US7082464	7/6/2001	7/25/2006	Hasan 464	GOOG-SANDP-PA-00013509
US7096266	1/7/2002	8/22/2006	Neerdaels 266	GOOG-SANDP-PA-00021472
US7103564	8/17/2000	9/5/2006	Ehnebuske 564	GOOG-SANDP-PA-00009528
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US7117259	3/3/2000	10/3/2006	Rohwer 259	GOOG-SANDP-PA-00024292
US7133905	4/9/2002	11/7/2006	Dilley 905	GOOG-SANDP-PA-00006556
US7136374	5/24/2001	11/14/2006	Kompella 374	GOOG-SANDP-PA-00016198
US7149797	4/2/2002	12/12/2006	Weller 797	GOOG-SANDP-PA-00027896
US7181523	5/18/2001	2/20/2007	Sim 523	GOOG-SANDP-PA-00025056
US7185052	5/16/2001	2/27/2007	Day 052	GOOG-SANDP-PA-00006121
US7188085	7/20/2001	3/6/2007	Pelletier 085	GOOG-SANDP-PA-00022813
US7200662	7/5/2002	4/3/2007	Hasan 662	GOOG-SANDP-PA-00013532
US7206748	12/10/1998	4/17/2007	Gruse 748	GOOG-SANDP-PA-00012933
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US7219153	12/2/2002	5/15/2007	Day 153	GOOG-SANDP-PA-00006133
US7254645	3/27/2001	8/7/2007	Nishi 645	GOOG-SANDP-PA-00021881
US7260639	7/9/2002	8/21/2007	Afergan 639	GOOG-SANDP-PA-00000253
US7266686	6/26/2002	9/4/2007	Monteiro 686	GOOG-SANDP-PA-00021192
US7266832	6/14/2001	9/4/2007	Miller 832	GOOG-SANDP-PA-00020810
US7272613	10/26/2001	9/18/2007	Sim 613	GOOG-SANDP-PA-00025116
US7274658	3/1/2002	9/25/2007	Bornstein 658	GOOG-SANDP-PA-00002890
US7286479	7/12/2002	10/23/2007	Bragg 479	GOOG-SANDP-PA-00004114
US7339937	11/15/2002	3/4/2008	Mitra 937	GOOG-SANDP-PA-00020921
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US7359955	3/4/2002	4/15/2008	Menon 955	GOOG-SANDP-PA-00020652
US7373644	10/2/2001	5/13/2008	Aborn 644	GOOG-SANDP-PA-00000012
US7376716	11/6/2006	5/20/2008	Dilley 716	GOOG-SANDP-PA-00006568
US7376736	11/13/2006	5/20/2008	Sundaram 736	GOOG-SANDP-PA-00026335
US7426534	12/19/2001	9/16/2008	Challenger 534	GOOG-SANDP-PA-00004902
US7441045	2/16/2001	10/21/2008	Skene 045	GOOG-SANDP-PA-00025337
US7444413	6/26/2002	10/28/2008	Saxena 413	GOOG-SANDP-PA-00024581
US7447605	4/21/2006	11/4/2008	Kuehnrich 605	GOOG-SANDP-PA-00017077
US7454500	9/26/2000	11/18/2008	Hsu 500	GOOG-SANDP-PA-00014048
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US7562153	7/9/2001	7/14/2009	Biliris 153	GOOG-SANDP-PA-00002594
US7574499	1/19/2005	8/11/2009	Swildens 499	GOOG-SANDP-PA-00026637
US7577754	4/26/2001	8/18/2009	Garcia-Luna-Aceves 754	GOOG-SANDP-PA-00012242
US7600007	5/23/2000	10/6/2009	Lewis 007	GOOG-SANDP-PA-00018616
US7600120	7/10/2006	10/6/2009	Monteiro 120	GOOG-SANDP-PA-00021234
US7647424	1/26/2006	1/12/2010	Kim 424	GOOG-SANDP-PA-00015880
US7653700	11/16/2000	1/26/2010	Bahl 700	GOOG-SANDP-PA-00000886
US7680845	6/8/2007	3/16/2010	Fujimoto 845	GOOG-SANDP-PA-00011911
US7690020	6/7/2001	3/30/2010	Lebar 020	GOOG-SANDP-PA-00017851
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US7725570	5/23/2000	5/25/2010	Lewis 570	GOOG-SANDP-PA-00018669
US7725571	5/23/2000	5/25/2010	Lewis 571	GOOG-SANDP-PA-00018721
US7725596	4/26/2001	5/25/2010	Garcia-Luna-Aceves 596	GOOG-SANDP-PA-00012261
US7725596	4/26/2001	5/25/2010	Aceves 596	GOOG-SANDP-PA-00000171
US7730172	5/23/2000	6/1/2010	Lewis 172	GOOG-SANDP-PA-00018772
US7734730	8/5/2004	6/8/2010	McCanne 730	GOOG-SANDP-PA-00020302
US7802310	10/31/2007	9/21/2010	Farber 310	GOOG-SANDP-PA-00010746
US7808968	1/29/2004	10/5/2010	Kalmanek 968	GOOG-SANDP-PA-00014728
US7822862	6/9/2003	10/26/2010	Slater 862	GOOG-SANDP-PA-00041395
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US7930716	12/31/2002	4/19/2011	Liga 716	GOOG-SANDP-PA-00019060
US7934230	5/4/2007	4/26/2011	Badt 230	GOOG-SANDP-PA-00000861
US7945539	10/31/2007	5/17/2011	Farber 539	GOOG-SANDP-PA-00010807
US7945544	10/31/2007	5/17/2011	Farber 544	GOOG-SANDP-PA-00010868
US7945693	10/31/2007	5/17/2011	Farber 693	GOOG-SANDP-PA-00010928
US7949662	12/23/2003	5/24/2011	Farber 662	GOOG-SANDP-PA-00010959
US7949779	10/31/2007	5/24/2011	Farber 779	GOOG-SANDP-PA-00011019
US7962597	3/31/2008	6/14/2011	Richardson 597	GOOG-SANDP-PA-00024045
US8001096	10/31/2007	8/16/2011	Farber 096	GOOG-SANDP-PA-00011050
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US8060613	10/31/2007	11/15/2011	Farber 613	GOOG-SANDP-PA-00011116
US8073721	5/23/2000	12/6/2011	Lewis 721	GOOG-SANDP-PA-00018823
US8082262	3/15/2007	12/20/2011	Farber 262	GOOG-SANDP-PA-00011147
US8099420	12/22/2004	1/17/2012	Farber 420	GOOG-SANDP-PA-00011213
US8132203	9/30/2005	3/6/2012	deHeer 203	GOOG-SANDP-PA-00006232
US8191097	11/23/1999	5/29/2012	Armstrong 097	GOOG-SANDP-PA-00000673
US8214450	8/1/2005	7/3/2012	Raciborski 450	GOOG-SANDP-PA-00023284
US8291108	3/12/2007	10/16/2012	Raja 108	GOOG-SANDP-PA-00023517
US8332484	9/6/2007	12/11/2012	Afergan 484	GOOG-SANDP-PA-00000264
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US8478903	2/23/2005	7/2/2013	Farber 903	GOOG-SANDP-PA-00011283
US8479242	5/4/2007	7/2/2013	Chen 242	GOOG-SANDP-PA-00005122
US8484656	3/12/2007	7/9/2013	Raja 656	GOOG-SANDP-PA-00023567
US8549558	728/2006	10/1/2013	Riedl 558	GOOG-SANDP-PA-00024188
US8561116	9/26/2007	10/15/2013	Hasek 116	GOOG-SANDP-PA-00013601
US8584226	1/26/2007	11/12/2013	Kudla 226	GOOG-SANDP-PA-00017051
US8595757	3/5/2008	11/26/2013	White 757	GOOG-SANDP-PA-00028061
US86066845	11/6/2001	12/10/2013	Bi 684	GOOG-SANDP-PA-00002355
US8631147	3/12/2007	1/14/2014	Khemani 147	GOOG-SANDP-PA-00015763
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US8930538	3/21/2009	1/6/2015	Fullagar 538	GOOG-SANDP-PA-00012070
US8949533	2/5/2010	2/3/2015	Puthalath 533	GOOG-SANDP-PA-00023056
US8971862	11/4/2008	3/3/2015	Dingler 862	GOOG-SANDP-PA-00006607
US9021079	9/10/2012	4/28/2015	Pulleyn 079	GOOG-SANDP-PA-00023040
US9077855	7/24/2007	7/7/2015	Riley 855	GOOG-SANDP-PA-00024202
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US9246965	1/28/2013	1/26/2016	Stoica 965	GOOG-SANDP-PA-00026069
US9380269	9/22/2004	6/28/2016	Boortz 269	GOOG-SANDP-PA-00002836
US9542674	12/18/2015	1/10/2017	Tomasi 674	GOOG-SANDP-PA-00026870
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US10810822	2/5/2018	10/20/2020	Hoersten 822	GOOG-SANDP-PA-00013888
US20010027491	2/12/2001	10/4/2001	Terretta 491	GOOG-SANDP-PA-00026787
US20010028662	12/14/2000	10/11/2001	Hunt 662	GOOG-SANDP-PA-00014102
US20010029525	1/29/2001	10/11/2001	Lahr 525	GOOG-SANDP-PA-00017394
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US20020016831	8/7/2001	2/7/2002	Peled 831	GOOG-SANDP-PA-00022793
US20020016835	5/24/2001	2/7/2002	Gamerman 835	GOOG-SANDP-PA-00012160
US20020018449	7/27/2001	2/14/2002	Ricciulli 449	GOOG-SANDP-PA-00023954
US20020021675	7/18/2001	2/21/2002	Feldmann 675	GOOG-SANDP-PA-00011520
US20020023164	1/29/2001	2/21/2002	Lahr 164	GOOG-SANDP-PA-00017410
US20020023165	1/29/2001	2/21/2002	Lahr 165	GOOG-SANDP-PA-00017428
US20020032777	4/9/2001	3/14/2002	Kawata 777	GOOG-SANDP-PA-00015229
US20020038360	11/29/2000	3/28/2002	Andrews 360	GOOG-SANDP-PA-00000558
US20020040404	1/29/2001	4/4/2002	Lahr 404	GOOG-SANDP-PA-00017446
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US20020049857	12/6/2001	4/25/2002	Farber 857	GOOG-SANDP-PA-00010146
US20020053082	8/3/2001	5/2/2002	Weaver 082	GOOG-SANDP-PA-00027878
US20020059592	5/17/2001	5/16/2002	Kiraly 592	GOOG-SANDP-PA-00015942
US20020066038	11/29/2000	5/30/2002	Mattsson 038	GOOG-SANDP-PA-00020216
US20020067730	12/5/2001	6/6/2002	Hinderks730	GOOG-SANDP-PA-00013803
US20020069420	4/6/2001	6/6/2002	Russell 420	GOOG-SANDP-PA-00024454
US20020073199	5/29/2001	6/13/2002	Levine 199	GOOG-SANDP-PA-00018466
US20020075836	12/20/2001	6/20/2002	Uematsu 836	GOOG-SANDP-PA-00027399
US20020078233	7/9/2001	6/20/2002	Biliris 233	GOOG-SANDP-PA-00002577
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US20020083124	5/11/2001	6/27/2002	Knox 124	GOOG-SANDP-PA-00016121
US20020087684	12/29/2000	7/4/2002	Foth 684	GOOG-SANDP-PA-00011721
US20020087797	12/29/2000	7/4/2002	Adrangi 797	GOOG-SANDP-PA-00000214
US20020087976	12/28/2000	7/4/2002	Kaplan 976	GOOG-SANDP-PA-00014792
US20020089470	11/20/2001	7/11/2002	Raman 470	GOOG-SANDP-PA-00023645
US20020092026	8/14/2001	7/11/2002	Janniello 026	GOOG-SANDP-PA-00014336
US20020099850	3/13/2002	7/25/2002	Farber 850	GOOG-SANDP-PA-00010170
US20020112240	11/20/2001	8/15/2002	Basco 240	GOOG-SANDP-PA-00000841
US20020116444	12/1/2000	8/22/2002	Chaudhri 444	GOOG-SANDP-PA-00004997
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US20020131645	1/16/2001	9/19/2002	Hamilton 645	GOOG-SANDP-PA-00013317
US20020133537	3/12/2001	9/19/2002	Lau 537	GOOG-SANDP-PA-00017797
US20020143798	4/1/2002	10/3/2002	Lisiecki 798	GOOG-SANDP-PA-00019241
US20020143888	4/1/2002	10/3/2002	Lisiecki 888	GOOG-SANDP-PA-00019261
US20020145975	4/27/2001	10/10/2002	MeLampy 975	GOOG-SANDP-PA-00020546
US20020147774	4/1/2002	10/10/2002	Lisiecki 774	GOOG-SANDP-PA-00019281
US20020152318	3/4/2002	10/17/2002	Menon 318	GOOG-SANDP-PA-00020605
US20020163882	3/1/2002	11/7/2002	Bornstein 882	GOOG-SANDP-PA-00002875
US20020166117	9/10/2001	11/7/2002	Abrams 117	GOOG-SANDP-PA-00000030
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US20020184357	1/22/2002	12/5/2002	Traversat 357	GOOG-SANDP-PA-00027037
US20020198953	6/26/2001	12/26/2002	O'Rourke 953	GOOG-SANDP-PA-00022240
US20020199016	6/22/2001	12/26/2002	Freedman 016	GOOG-SANDP-PA-00011786
US20030009444	6/14/2002	1/9/2003	Eidler 444	GOOG-SANDP-PA-00009543
US20030018966	10/19/2001	1/23/2003	Cook 966	GOOG-SANDP-PA-00005841
US20030028505	6/26/2001	2/6/2003	O'Rourke 505	GOOG-SANDP-PA-00021992
US20030028623	8/2/2002	2/6/2003	Hennessey 623	GOOG-SANDP-PA-00013721
US20030028624	7/6/2001	2/6/2003	Hasan 624	GOOG-SANDP-PA-00013464
US20030028626	8/2/2002	2/6/2003	Hennessey 626	GOOG-SANDP-PA-00013737
US20030028777	8/2/2002	2/6/2003	Hennessey 777	GOOG-SANDP-PA-00013753
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US20030061263	9/26/2001	3/27/2003	Riddle 263	GOOG-SANDP-PA-00024100
US20030061280	9/24/2002	3/27/2003	Bulson 280	GOOG-SANDP-PA-00004494
US20030065703	10/2/2001	4/3/2003	Aborn 703	GOOG-SANDP-PA-00000001
US20030065761	9/27/2002	4/3/2003	Cereja 761	GOOG-SANDP-PA-00004804
US20030065762	9/30/2002	4/3/2003	Stolorz 762	GOOG-SANDP-PA-00026088
US20030078888	10/15/2001	4/24/2003	Lee 888	GOOG-SANDP-PA-00017903
US20030078889	10/15/2001	4/24/2003	Lee 889	GOOG-SANDP-PA-00017915
US20030079005	5/29/2001	4/24/2003	Myers 005	GOOG-SANDP-PA-00021390
US20030079027	10/18/2001	4/24/2003	Slocombe 027	GOOG-SANDP-PA-00025517
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US20030110262	7/5/2002	6/12/2003	Hasan 262	GOOG-SANDP-PA-00013485
US20030112792	12/14/2001	6/19/2003	Cranor 792	GOOG-SANDP-PA-00005953
US20030140111	9/4/2001	7/24/2003	Pace 111	GOOG-SANDP-PA-00022451
US20030149581	2/28/2001	8/7/2003	Chaudhri 581	GOOG-SANDP-PA-00005011
US20030154239	1/10/2003	8/14/2003	Davis 239	GOOG-SANDP-PA-00006049
US20030158923	5/2/2001	8/21/2003	Burkhart 923	GOOG-SANDP-PA-00004513
US20030158928	11/13/2002	8/21/2003	Knox 928	GOOG-SANDP-PA-00016140
US20030165241	12/16/2002	9/4/2003	Fransdonk 241	GOOG-SANDP-PA-00011730
US20030191800	12/20/2001	10/9/2003	Challenger 800	GOOG-SANDP-PA-00004817
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US20030226142	11/29/2000	12/4/2003	Rand 142	GOOG-SANDP-PA-00023670
US20030229682	5/16/2001	12/11/2003	Day 682	GOOG-SANDP-PA-00006094
US20030233423	4/9/2002	12/18/2003	Dilley 423	GOOG-SANDP-PA-00041351
US20040010544	6/9/2003	1/15/2004	Slater 544	GOOG-SANDP-PA-00025385
US20040010588	6/6/2003	1/15/2004	Slater 588	GOOG-SANDP-PA-00025456
US20040010601	7/9/2002	1/15/2004	Afergan 601	GOOG-SANDP-PA-00000243
US20040022194	7/30/2003	2/5/2004	Ricciulli 194	GOOG-SANDP-PA-00023968
US20040039798	6/18/2003	2/26/2004	Hotz 798	GOOG-SANDP-PA-00014008
US20040064832	6/3/2003	4/1/2004	Tsukidate 832	GOOG-SANDP-PA-00027370
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US20040133467	6/17/2003	7/8/2004	Siler 467	GOOG-SANDP-PA-00024977
US20040139097	12/23/2003	7/15/2004	Farber 097	GOOG-SANDP-PA-00010194
US20040162871	2/13/2003	8/19/2004	Pabla 871	GOOG-SANDP-PA-00022351
US20040167973	7/3/2003	8/26/2004	Shima 973	GOOG-SANDP-PA-00024877
US20040177148	3/17/2004	9/9/2004	Tsimelzon 148	GOOG-SANDP-PA-00027251
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WO2007003310	6/27/2006	1/11/2007	Groten 310	GOOG-SANDP-PA-00012813
WO2009108593	2/23/2009	9/3/2009	Yevmenkin 593	GOOG-SANDP-PA-00028257
WO2009123868	3/21/2009	10/8/2009	Lipstone 868	GOOG-SANDP-PA-00019208
WO2012037039	9/12/2011	3/22/2012	Fullagar 039	GOOG-SANDP-PA-00012090

2. Table 2: Non-Patent Prior Art Publications

Description	Publication Date	Short Name	Starting Bates Number
Carter, J. L., & Wegman, M. N. (1977, May). Universal classes of hash functions. In Proceedings of the ninth annual ACM symposium on Theory of computing (pp. 106-112).	1977	1977 Carter	GOOG-SANDP-PA-00028514

Description	Publication Date	Short Name	Starting Bates Number
Tarjan, R. E., & Yao, A. C. C. (1979). Storing a sparse table. Communications of the ACM, 22(11), 606-611.	1979	1979 Tarjan	GOOG-SANDP-PA-00028521
Wegman, M. N., & Carter, J. L. (1981). New hash functions and their use in authentication and set equality. Journal of computer and system sciences, 22(3), 265-279.	1981	1981 Wegman	GOOG-SANDP-PA-00028527
Yao, A. C. C. (1981). Should tables be sorted?. Journal of the ACM (JACM), 28(3), 615-628.	1981	1981 Yao	GOOG-SANDP-PA-00028542
Fredman, M. L., Komlós, J., & Szemerédi, E. (1984). Storing a sparse table with 0 (1) worst case access time. Journal of the ACM (JACM), 31(3), 538-544.	1984	1984 Fredman	GOOG-SANDP-PA-00028556
Mockapetris, P. (1987). Domain names-concepts and facilities (No. rfc1034).	1987	1987 Mockapetris Concepts	GOOG-SANDP-PA-00028563
Mockapetris, P. V. (1987). Domain Names - Implementation and Specification.	1987	1987 Mockapetris Domain Names	GOOG-SANDP-PA-00028618
Mourad, A., & Liu, H. (1997, July). Scalable web server architectures. In Proceedings Second IEEE Symposium on Computer and Communications (pp. 12-16). IEEE.	1987	1987 Mourad	GOOG-SANDP-PA-00031199
Mockapetris, P., & Dunlap, K. J. (1988, August). Development of the domain name system. In Symposium proceedings on Communications architectures and protocols (pp. 123-133).	1988	1988 Mockapetris	GOOG-SANDP-PA-00028673

Description	Publication Date	Short Name	Starting Bates Number
Rabin, M. O. (1989). Efficient dispersal of information for security, load balancing, and fault tolerance. Journal of the ACM (JACM), 36(2), 335-348.	1989	1989 Rabin	GOOG-SANDP-PA-00028684
Berra, P. B., Chen, C. R., Ghafoor, A., Lin, C. C., Little, T. D., & Shin, D. (1990). Architecture for distributed multimedia database systems. Computer Communications, 13(4), 217-231.	1990	1990 Berra	GOOG-SANDP-PA-00028698
Callon, R. (1990). Use of OSI IS-IS for routing in TCP/IP and dual environments (No. rfc1195).	1990	1990 Callon	GOOG-SANDP-PA-00028742
Cormen, T. H., Leiserson, C. E., Rivest, R. L., & Stein, C. (2001). Introduction to algorithms. MIT press.	1990	1990 Cormen	GOOG-SANDP-PA-00035349
Deering, S. E., & Cheriton, D. R. (1990). Multicast routing in datagram internetworks and extended LANs. ACM Transactions on Computer Systems (TOCS), 8(2), 85-110.	1990	1990 Deering	GOOG-SANDP-PA-00028810
Nisan, N. (1990, April). Pseudorandom generators for space-bounded computations. In Proceedings of the twenty-second annual ACM symposium on Theory of computing (pp. 204-212).	1990	1990 Nisan	GOOG-SANDP-PA-00028836
Topolcic, C. (1990). Experimental internet stream protocol: Version 2 (ST-II) (No. rfc1190).	1990	1990 Topolcic	GOOG-SANDP-PA-00028845

Description	Publication Date	Short Name	Starting Bates Number
Grigni, M., & Peleg, D. (1991). Tight bounds on mimimum broadcast networks. SIAM Journal on Discrete Mathematics, 4(2), 207-222.	1991	1991 Grigni	GOOG-SANDP-PA-00028993
Krishnan, P., & Vitter, J. S. Optimal Prefetching via Data Compression. IEEE FOCS (Oct 1991).	1991	1991 Krishnan	GOOG-SANDP-PA-00029019
Palmer, M., & Zdonik, S. B. (1991). Fido: A cache that learns to fetch. Brown University, Department of Computer Science.	1991	1991 Palmer	GOOG-SANDP-PA-00029039
Bartal, Y., Fiat, A., & Rabani, Y. (1992, July). Competitive algorithms for distributed data management. In Proceedings of the twenty-fourth annual ACM symposium on Theory of computing (pp. 39-50).	1992	1992 Bartal	GOOG-SANDP-PA-00029049
Cate, V. (1992, May). Alex-a global filesystem. In Proceedings of the 1992 USENIX File System Workshop (No. 7330, pp. 1-12).	1992	1992 Cate	GOOG-SANDP-PA-00029061
Danzig, P. B., Obraczka, K., & Kumar, A. (1992, October). An analysis of wide-area name server traffic: A study of the internet domain name system. In Conference proceedings on Communications architectures & protocols (pp. 281-292).	1992	1992 Danzig	GOOG-SANDP-PA-00029072

Description	Publication Date	Short Name	Starting Bates Number
Awerbuch, B., Bartal, Y., & Fiat, A. (1993, June). Competitive distributed file allocation. In Proceedings of the twenty-fifth annual ACM symposium on Theory of computing (pp. 164-173).	1993	1993 Awerbuch	GOOG-SANDP-PA-00029084
Devine, R. (1993, October). Design and implementation of DDH: A distributed dynamic hashing algorithm. In International Conference on Foundations of Data Organization and Algorithms (pp. 101-114). Berlin, Heidelberg: Springer Berlin Heidelberg.	1993	1993 Devine	GOOG-SANDP-PA-00029094
Parris, C., & Ferrari, D. (1993). A dynamic connection management scheme for guaranteed performance services in packet-switching integrated services networks. International Computer Science Institute.	1993	1993 Parris	GOOG-SANDP-PA-00029108
Partridge, C. (1993). Request for Comments (RFC) 1546: Host Anycasting Service.	1993	1993 Partridge	GOOG-SANDP-PA-00029145
Schuba, C., & Spafford, E. H. (1993). Addressing weaknesses in the domain name system protocol. Master's thesis, Purdue University.	1993	1993 Schuba	GOOG-SANDP-PA-00029154
Berners-Lee, T. (1994). Uniform resource locators. IEFT Internet Draft.	1994	1994 Berners-Lee	GOOG-SANDP-PA-00029253

Description	Publication Date	Short Name	Starting Bates Number
Berners-Lee, T. (1994). Universal resource identifiers in WWW: a unifying syntax for the expression of names and addresses of objects on the network as used in the World-Wide web (No. rfc1630).	1994	1994 Berners-Lee Universal	GOOG-SANDP-PA-00029278
Berners-Lee, T., Uniform Resource Locators (URL), Network Working Group, Request for Comments: 1738 (1994)	1994	RFC 1738	GOOG-SANDP-PA-00029798
Braun, H. (1994). An Assessment of the Impact of Caching Documents from NCSA's Web server. In Proc. Second Int'l World Wide Web Conf.	1994	1994 Braun	GOOG-SANDP-PA-00029306
De Bra, P. M., & Post, R. D. J. (1994). Information retrieval in the World-Wide Web: Making client-based searching feasible. Computer Networks and ISDN Systems, 27(2), 183-192.	1994	1994 De Bra	GOOG-SANDP-PA-00029321
Eriksson, H. (1994). Mbone: The multicast backbone. Communications of the ACM, 37(8), 54-60.	1994	1994 Eriksson	GOOG-SANDP-PA-00029331
Luotonen, A., & Altis, K. (1994). World-wide web proxies. Computer Networks and ISDN systems, 27(2), 147-154.	1994	1994 Luotonen	GOOG-SANDP-PA-00029338
Malkin, G. (1994). RIP version 2-carrying additional information (No. rfc1723).	1994	1994 Malkin	GOOG-SANDP-PA-00029346
Moy, J. (1994). OSPF version 2. Internet Engineering Task Force (IETF) Request For Comments (RFC), 132 pgs.	1994	1994 Moy	GOOG-SANDP-PA-00029355

Description	Publication Date	Short Name	Starting Bates Number
Naor, M., & Wool, A. (1994, November). The load, capacity and availability of quorum systems. In Proceedings 35th Annual Symposium on Foundations of Computer Science (pp. 214-225). IEEE.	1994	1994 Naor	GOOG-SANDP-PA-00029599
Parris, C. J. (1994). The dynamic management of guaranteed-performance connections in packet-switched integrated services networks. University of California, Berkeley.	1994	1994 Parris	GOOG-SANDP-PA-00029611
Postel, J. (1994). RFC1591: Domain Name System Structure and Delegation.	1994	1994 Postel	GOOG-SANDP-PA-00029756
Ramanathan, S. & Rangan, P. Venkat. (1994). Architectures for Personalized Multimedia. Multimedia, IEEE. 1. 37 - 46.	1994	1994 Ramanathan	GOOG-SANDP-PA-00029763
Ravi, R. (1994, November). Rapid rumor ramification: Approximating the minimum broadcast time. In Proceedings 35th Annual Symposium on Foundations of Computer Science (pp. 202-213). IEEE.	1994	1994 Ravi	GOOG-SANDP-PA-00029774
Smith, N. (1994). What can archives offer the World Wide Web?.	1994	1994 Smith	GOOG-SANDP-PA-00029786
Adler, R. M. (1995). Distributed coordination models for client/server computing. Computer, 28(4), 14-22.	1995	1995 Adler	GOOG-SANDP-PA-00029823

Description	Publication Date	Short Name	Starting Bates Number
Berners-Lee, T. & Connolly, D., Hypertext Markup Language - 2.0, Internet Engineering Task Force (IETF) Request for Comments (RFC) 1866 (Nov. 1995).	1995	1995 Hypertext Markup Language 2.0	GOOG-SANDP-PA-00029915
Bestavros, A. (1995, October). Demand-based document dissemination to reduce traffic and balance load in distributed information systems. In Proceedings. Seventh IEEE Symposium on Parallel and Distributed Processing (pp. 338-345). IEEE.	1995	1995 Bestavros	GOOG-SANDP-PA-00029840 GOOG-SANDP-PA-00029832
Bowman, C. M., Danzig, P. B., Hardy, D. R., Manber, U., & Schwartz, M. F. (1995). The Harvest information discovery and access system. Computer networks and ISDN Systems, 28(1-2), 119-125.	1995	1995 Bowman, Harvest Information Discovery	GOOG-SANDP-PA-00029848
Brisco, T. (1995). DNS support for load balancing (No. rfc1794).	1995	1995 Brisco	GOOG-SANDP-PA-00029855
Crovella, M (1995). Dynamic server selection in the Internet. In Proc. 3rd IEEE Workshop on the Architecture and Implementation of High Performance Communication Subsystems (HPCS'95).pp. 158-162.	1995	1995 Crovella	GOOG-SANDP-PA-00029862

Description	Publication Date	Short Name	Starting Bates Number
Feeley, M. J., Morgan, W. E., Pighin, E. P., Karlin, A. R., Levy, H. M., & Thekkath, C. A. (1995, December). Implementing global memory management in a workstation cluster. In Proceedings of the fifteenth ACM symposium on Operating systems principles (pp. 201-212).	1995	1995 Feeley	GOOG-SANDP-PA-00029867
Floyd, S. (1995). A Reliable Multicast Framework for Light-weight Sessions and Application-Level Framing, Extended Report. ftp://ftp. ee. lbl. gov/papers/wb. tech. ps. Z.	1995	1995 Floyd	GOOG-SANDP-PA-00029879
Guyton, J. D., & Schwartz, M. F. (1995, October). Locating nearby copies of replicated internet servers. In Proceedings of the conference on Applications, technologies, architectures, and protocols for computer communication (pp. 288-298).	1995	1995 Guyton	GOOG-SANDP-PA-00029899
Gwertzman, J. (1995). The Case for Geographical Push-Caching. In Fifth Annual Workshop on Hot Operating Systems,	1995	1995 Gwertzman	GOOG-SANDP-PA-00029910
Korkea-aho, M. (1995). Scalability in Distributed Multimedia Systems. Helsinki University of Technology.	1995	1995 Korkea-aho	GOOG-SANDP-PA-00029992
Kwan, T. T., McGrath, R. E., & Reed, D. A. (1995). NCSA's world wide web server: Design and performance. Computer, 28(11), 68-74.	1995	1995 Kwan	GOOG-SANDP-PA-00030088

Description	Publication Date	Short Name	Starting Bates Number
Li, T., Rekhter, Y., & Hares, S. (1995). A border gateway protocol 4 (BGP-4). RFC 1771.	1995	1995 Li	GOOG-SANDP-PA-00030095
Little, T. D. C., Ahanger, G., Chen, H. J., Folz, R. J., Gibbon, J. F., Krishnamurthy, A., .. & Venkatesh, D. (1995). Selection and dissemination of digital video via the Virtual Video Browser. Multimedia Tools and Applications, 1, 149-172.	1995	1995 Little	GOOG-SANDP-PA-00030152
López-Ortiz, A., & Germán, D. M. (1995). A multicollaborative push-caching http protocol for the WWW. In World Wide Web Conference (WWW5).	1995	1995 Lopez, Push-Caching http Protocol for the WWW	GOOG-SANDP-PA-00030182
Malpani, R., Lorch, J., & Berger, D. (1995, December). Making world wide web caching servers cooperate. In Proceedings of the Fourth International Conference on World Wide Web (pp. 107-117).	1995	1995 Malpani	GOOG-SANDP-PA-00030194
Peleg, D., & Wool, A. (1995). The availability of quorum systems. Information and Computation, 123(2), 210-223.	1995	1995 Peleg	GOOG-SANDP-PA-00030205
Petri, S., & Langendörfer, H. (1995). Load balancing and fault tolerance in workstation clusters migrating groups of communicating processes. ACM SIGOPS Operating Systems Review, 29(4), 25-36.	1995	1995 Petri	GOOG-SANDP-PA-00030236

Description	Publication Date	Short Name	Starting Bates Number
Rekhter, Y., & Gross, P. (1995). Application of the border gateway protocol in the internet (No. rfc1772).	1995	1995 Rekhter	GOOG-SANDP-PA-00030248
Schemers, R. (1995, September). lbnamed: A Load Balancing Name Server in Perl. In LISA (pp. 1-12).	1995	1995 Schemers	GOOG-SANDP-PA-00030267
Schmidt, J. P., Siegel, A., & Srinivasan, A. (1995). Chernoff–Hoeffding bounds for applications with limited independence. SIAM Journal on Discrete Mathematics, 8(2), 223-250.	1995	1995 Schmidt	GOOG-SANDP-PA-00030280
Traina, P. (1995). BGP-4 protocol analysis (No. rfc1774).	1995	1995 Traina	GOOG-SANDP-PA-00030290
Wessels, D. (1995, June). Intelligent caching for world-wide web objects.	1995	1995 Wessels	GOOG-SANDP-PA-00030300
Anawat, C. H. A. N. K. H. U. N. T. H. O. D. (1996). A Hierarchical Internet Object Cache. In USENIX 1996 TECHNICAL CONFERENCE, January.	1996	1996 Anawat	GOOG-SANDP-PA-00030393
Andresen, D., Yang, T., Holmedahl, V., & Ibarra, O. H. (1996, April). SWEB: Towards a scalable World Wide Web server on multicomputers. In Proceedings of International Conference on Parallel Processing (pp. 850-856). IEEE.	1996	1996 Andresen	GOOG-SANDP-PA-00030404

Description	Publication Date	Short Name	Starting Bates Number
Baentsch, M., Molter, G., & Sturm, P. (1996). Introducing application-level replication and naming into today's Web. Computer Networks and ISDN Systems, 28(7-11), 921-930.	1996	1996 Baentsch	GOOG-SANDP-PA-00030429
Berners-Lee, T. et al., Hypertext Transfer Protocol - HTTP/1.0, Internet Engineering Task Force (IETF) Request for Comments (RFC) 1945 (May 1996).	1996	1996 HTTP/1.0	GOOG-SANDP-PA-00030685
Bestavros, A. (1996, February). Speculative data dissemination and service to reduce server load, network traffic and service time in distributed information systems. In Proceedings of the twelfth international conference on data engineering (pp. 180-187). IEEE.	1996	1996 Bestavros	GOOG-SANDP-PA-00030447
Bestavros, A., & Cunha, C. (1996). Server-Initated Document Dissemination for the WWW. IEEE Data Eng. Bull., 19(3), 3-11.	1996	1996 Bestavros Server-Initiated Document	GOOG-SANDP-PA-00030439
Bradley, D. J. (1996). Impact of the Internet and online services on business research methods (Doctoral dissertation, Massachusetts Institute of Technology).	1996	1996 Bradley	GOOG-SANDP-PA-00030473
Carter, R. L., & Crovella, M. E. (1996). Dynamic server selection using bandwidth probing in wide-area networks. Boston University Computer Science Department.	1996	1996 Carter	GOOG-SANDP-PA-00030586

Description	Publication Date	Short Name	Starting Bates Number
Case, J. (1996). Management Information Base for Version 2 of the Simple Network Management Protocol (SNMPv2). SNMPv2 Working Group. RFC1907.	1996	1996 Case	GOOG-SANDP-PA-00030607
Chandra, R., & Traina, P. (1996). T. Li," BGP Communities Attribute. RFC 1996, August.	1996	1996 Chandra	GOOG-SANDP-PA-00030627
Chen, E., & Bates, T. (1996). An application of the BGP community attribute in multi-home routing (No. rfc1998).	1996	1996 Chen	GOOG-SANDP-PA-00030632
Cisco Systems, Inc., "Cisco DistributedDirector," White Paper (1996), at https://web.archive.org/web/19961220203609/http://www.cisco.com/warp/public/751/distdir/dd_wp.htm	1996	1996 Cisco DistributedDirector White Paper	GOOG-SANDP-PA-00030641
Doi, K. (1996) Super Proxy Script—How to make distributed proxy servers by URL hashing, Sharp Corp.	1996	1996 Doi	GOOG-SANDP-PA-00030647
Gwertzman, J., & Seltzer, M. I. (1996, January). World Wide Web Cache Consistency. In USENIX annual technical conference (pp. 141-152).	1996	1996 Gwertzman	GOOG-SANDP-PA-00030673
Jeffery, C. L., Das, S. R., & Bernal, G. S. (1996, May). Proxy-sharing proxy servers. In Proceedings of COM'96. First Annual Conference on Emerging Technologies and Applications in Communications (pp. 116-119). IEEE.	1996	1996 Jeffery	GOOG-SANDP-PA-00030745

Description	Publication Date	Short Name	Starting Bates Number
Jim Gettys, Hypertext Transport Protocol HTTP/1.1, Presentation, World Wide Web Consortium (Oct. 17, 1996)	1996	1996 Gettys	GOOG-SANDP-PA-00030654
Litwin, W., Neimat, M. A., & Schneider, D. A. (1996). LH*—a scalable, distributed data structure. ACM Transactions on Database Systems (TODS), 21(4), 480-525.	1996	1996 Litwin	GOOG-SANDP-PA-00030749
Oguchi, M., & Ono, K. (1996, August). A study of caching proxy mechanisms realized on wide area distributed networks. In Proceedings of 5th IEEE International Symposium on High Performance Distributed Computing (pp. 443-449). IEEE.	1996	1996 Oguchi	GOOG-SANDP-PA-00030795
Plaxton, C. G., & Rajaraman, R. (1996, October). Fast fault-tolerant concurrent access to shared objects. In Proceedings of 37th Conference on Foundations of Computer Science (pp. 570-579). IEEE.	1996	1996 Plaxton	GOOG-SANDP-PA-00030802
Vixie, P. (1996). Name Server Operations Guide for BIND-Release 4.9. 5. Internet Software Consortium.	1996	1996 Vixie	GOOG-SANDP-PA-00030812
"Benefits of an Interactive Web Site," ClearWay (April 1, 1997), available at https://web.archive.org/web/19970401162836/http://www.clearway.com/pages/Benefits.html	1997	Clearway - Benefits	GOOG-SANDP-PA-00041324

Description	Publication Date	Short Name	Starting Bates Number
"Downloadable Demo Software," ClearWay (April 1, 1997), available at https://web.archive.org/web/19970401162919/http://www.clearway.com/pages/Demos.html	1997	Clearway - Demo	GOOG-SANDP-PA-00041326
"FAQ Page," ClearWay (April 1, 1997), available at https://web.archive.org/web/19970401163105/http://www.clearway.com/pages/FAQPage.html	1997	Clearway - FAQ	GOOG-SANDP-PA-00041334
"FireSite Home Page," ClearWay (April 1, 1997), available at https://web.archive.org/web/19970401162605/http://www.clearway.com/pages/FireSite-home.html	1997	Clearway - Home	GOOG-SANDP-PA-00041341
"Hard Way vs. FireSite Way," ClearWay (April 1, 1997), available at https://web.archive.org/web/19970401162911/http://www.clearway.com:80/pages/HardEasy.html	1997	Clearway - Hard Way	GOOG-SANDP-PA-00041349
"How can you use FireSite in your business?," ClearWay (April 1, 1997), available at https://web.archive.org/web/19970401162901/http://www.clearway.com/pages/Cookbook.html	1997	Clearway - Examples	GOOG-SANDP-PA-00041332
"How FireSite Works," ClearWay (April 1, 1997), available at https://web.archive.org/web/19970401162824/http://www.clearway.com:80/pages/How.html	1997	Clearway - How FireSite Works	GOOG-SANDP-PA-00041343

Description	Publication Date	Short Name	Starting Bates Number
"How to Order," ClearWay (April 1, 1997), available at https://web.archive.org/web/19970401162659/http://www.clearway.com/pages/OrderPage.html	1997	Clearway - Order	GOOG-SANDP-PA-00041347
"Meet ClearWay," ClearWay (April 1, 1997), available at https://web.archive.org/web/19970401163206/http://www.clearway.com/pages/meetClearWay.html	1997	Clearway - Meet Clearway	GOOG-SANDP-PA-00041346
"Support and Updates," ClearWay (April 1, 1997), available at https://web.archive.org/web/19970401162649/http://www.clearway.com/pages/Support.html	1997	Clearway - Support	GOOG-SANDP-PA-00041327
"Who's Using FireSite," ClearWay (April 1, 1997), available at https://web.archive.org/web/19970401162710/http://www.clearway.com/pages/Testimonials.html	1997	Clearway - Who's Using	GOOG-SANDP-PA-00041329
an Goldszmidt, G., & Clark, A. S. (1997, October). Load Distribution for Scalable Web Servers: Summer Olympics 1996-A Case Study. In Proceedings of the 8th IFIP/IEEE International Workshop on Distributed Systems: Operations & Management, Sydney, Australia.	1997	1997 Goldszmidt	GOOG-SANDP-PA-00030979
Andresen, D., & Yang, T. (1997, July). Multiprocessor scheduling with client resources to improve the response time of WWW applications. In Proceedings of the 11th international conference on Supercomputing (pp. 92-99).	1997	1997 Andresen	GOOG-SANDP-PA-00030841

Description	Publication Date	Short Name	Starting Bates Number
Baentsch, M., Baum, L., Molter, G., Rothkugel, S., & Sturm, P. (1997). Enhancing the web's infrastructure: From caching to replication. IEEE Internet Computing, 1(2), 18-27.	1997	1997 Baentsch	GOOG-SANDP-PA-00030849
Bhattacharjee, S., Ammar, M. H., Zegura, E. W., Shah, V., & Fei, Z. (1997, April). Application-layer anycasting. In Proceedings of INFOCOM'97 (Vol. 3, pp. 1388-1396). IEEE.	1997	1997 Bhattacharjee	GOOG-SANDP-PA-00030881
Carter, R. L., & Crovella, M. E. (1997, April). Server selection using dynamic path characterization in wide-area networks. In Proceedings of INFOCOM'97 (Vol. 3, pp. 1014-1021). IEEE.	1997	1997 Carter	GOOG-SANDP-PA-00030890
Cisco Distributed Director (1997). White Papers	1997	1997 Cisco	GOOG-SANDP-PA-00030898
Cisco, The Effects of Distributing Load Randomly to Servers, White Paper (1997), available at https://web.archive.org/web/20050518110252/http://cisco.com/warp/public/cc/pd/cxsr/dd/tech/ddran_wp.pdf.	1997		GOOG-SANDP-PA-00030914
Cohen, J. (1997). Cache array routing protocol v1. 0. http://www. ietf. org/internet-drafts/draft-vinod-carp-v1-03. txt.	1997	1997 Cohen	GOOG-SANDP-PA-00030932

Description	Publication Date	Short Name	Starting Bates Number
Colajanni, M., & Yu, P. S. (1997). Adaptive TTL schemes for load balancing of distributed web servers. ACM Sigmetrics Performance Evaluation Review, 25(2), 36-42.	1997	1997 Coljanni	GOOG-SANDP-PA-00030944
Colajanni, M., Yu, P. S., & Dias, D. M. (1997, May). Scheduling algorithms for distributed web servers. In Proceedings of 17th International Conference on Distributed Computing Systems (pp. 169-176). IEEE.	1997	1997 Coljanni Scheduling	GOOG-SANDP-PA-00030951
Fielding, R. et al., Hypertext Transfer Protocol - HTTP/1.1, Internet Engineering Task Force (IETF) Request for Comments (RFC) 2068 (Jan. 1997).	1997	1997 HTTP/1.1	GOOG-SANDP-PA-00031003
Fox, A., Gribble, S. D., Chawathe, Y., Brewer, E. A., & Gauthier, P. (1997, October). Cluster-based scalable network services. In Proceedings of the sixteenth ACM symposium on Operating systems principles (pp. 78-91).	1997	1997 Fox	GOOG-SANDP-PA-00030959
Gadde, S., Rabinovich, M., & Chase, J. (1997, May). Reduce, reuse, recycle: An approach to building large internet caches. In Proceedings. The Sixth Workshop on Hot Topics in Operating Systems (Cat. No. 97TB100133) (pp. 93-98). IEEE.	1997	1997 Gadde	GOOG-SANDP-PA-00030973

Description	Publication Date	Short Name	Starting Bates Number
Hollingsworth, J. K., & Miller, E. L. (1997). Using content-derived names for caching and software distribution. In In Proceedings of the 1997 ACm Symposium on Software Reusability.	1997	1997 Hollingsworth	GOOG-SANDP-PA-00030989
Karger, D., Lehman, E., Leighton, T., Panigrahy, R., Levine, M., & Lewin, D. (1997, May). Consistent hashing and random trees: Distributed caching protocols for relieving hot spots on the world wide web. In Proceedings of the twenty-ninth annual ACM symposium on Theory of computing (pp. 654-663).	1997	1997 Karger	GOOG-SANDP-PA-00031165
Krishnamurthy, B., & Wills, C. E. (1997). Study of piggyback cache validation for proxy caches in the world wide web. In USENIX Symposium on Internet Technologies and Systems (USITS 97).	1997	1997 Kirshnamurthy	GOOG-SANDP-PA-00031175
Kroeger, T. M., Long, D. D., & Mogul, J. C. (1997). Exploring the bounds of web latency reduction from caching and prefetching. In USENIX Symposium on Internet Technologies and Systems (USITS 97).	1997	1997 Kroeger	GOOG-SANDP-PA-00031188
Panigrahy, R. (1997). Relieving hot spots on the world wide web (Doctoral dissertation, Massachusetts Institute of Technology).	1997	1997 Panigraphy	GOOG-SANDP-PA-00031204

Description	Publication Date	Short Name	Starting Bates Number
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Kasenna vFusion v1.2 Datasheet, Kasenna (Nov. 5, 2006), available at https://web.archive.org/web/20061105182802if_/http://www1.kasenna.com/downloads/datasheets/Kasenna_vFusion_1.2_Datasheet.pdf	2006	Kasenna - vFusion Datasheet	GOOG-SANDP-PA-00040494

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MediaBase XMP v8.1 Datasheet, Kasenna (Nov. 5, 2006), available at https://web.archive.org/web/20061105182759if_/http://www1.kasenna.com/downloads/datasheets/Kasenna_MediaBase_XMP_v8.1_VOD_Software_Datasheet.pdf	2006	Kasenna - MediaBase XMP Datasheet	GOOG-SANDP-PA-00040491
Riedl, S., & Delzio, P. (2006). Indivually targeted advertising in a switched services environment. NCTA technical papers.	2006	2006 Riedk, Indivually targeted advertising in a switched services environment	GOOG-SANDP-PA-00040420
ThePlatform: Media Publishing System (Oct. 2006) Media Publishing System	Oct. 2006	2006 ThePlatform, Media Publishing Systems	GOOG-SANDP-PA-00040435
"CDN Service Overview," CDNetworks (Dec. 16, 2007), available at https://web.archive.org/web/20071216005332/http://www.us.cdnetworks.com:80/service/cdn_cdn.php	2007	2007 CDNetworks - CDN Service Overview	GOOG-SANDP-PA-00040705
"CDNetworks Gets $96.5 mln in Private Investment," Reuters (Dec. 19, 2007), https://jp.reuters.com/article/cdnetworks-funding/update-1-cdnetworks-gets-96-5-mln-in-private-investment-idUKN1963516520071219/	2007	CDNetworks - Reuters	GOOG-SANDP-PA-00040712

Description	Publication Date	Short Name	Starting Bates Number
"Cluster File System," CDNetworks (Dec. 16, 2007), available at https://web.archive.org/web/20071216012807/http://www.us.cdnetworks.com:80/technology/cluster_file_system.php	2007	2007 CDNetworks - Cluster File System	GOOG-SANDP-PA-00040708
"Content Delivery Services (CDN)," Savvis.net (Mar. 7, 2007), available at https://web.archive.org/web/20070307151503/http://www.savvis.net/corp/Products+Services/Digital+Content+Services/Content+Delivery+Services/	2007	SAVVIS - Content Delivery Services	GOOG-SANDP-PA-00040674
"Monitoring & Reporting," CDNetworks (Dec. 16, 2007), available at https://web.archive.org/web/20071216013020/http://www.us.cdnetworks.com:80/technology/monitoring&reporting.php	2007	2007 CDNetworks - Monitoring & Reporting	GOOG-SANDP-PA-00040710
"Redbox Surpasses 38 Million Rentals and 2,900 Locations, Becomes Fifth Largest DVD Rental Company Nationwide," Press Release, Redbox (Apr. 11, 2007), available at https://web.archive.org/web/20070502221755/http://www.redbox.com/Press/PressReleases/Benchmark%20release%20-%20FINAL.pdf	2007	Redbox - 2007-04-11 Press Release	GOOG-SANDP-PA-00040681

Description	Publication Date	Short Name	Starting Bates Number
"SAVVIS Hones Strategic Focus with Sale of CDN Services Business to Level 3 Communications," News Release, Lumen.com (Dec. 26, 2006), https://news.lumen.com/SAVVIS-Hones-Strategic-Focus-with-Sale-of-CDN-Services-Business-to-Level-3-Communications	2007	SAVVIS - News Release	GOOG-SANDP-PA-00040495
"Survey of Online Companies Reveals Flexibility, Responsiveness & Reliability More Important than Price in Selecting a CDN," Press Release, CDNetworks (July 17, 2007), available at https://web.archive.org/web/20080103054707/http://www.us.cdnetworks.com/about/pr_news_view.php?page=1&page_num=10&biid=1&bbid=6&searchDesc=&searchKeyword=	2007	2007 CDNetworks - Press Release	GOOG-SANDP-PA-00040684
"UGC Platform," CDNetworks (Dec. 21, 2007), available at https://web.archive.org/web/20071221003200/http://www.us.cdnetworks.com/service/sero_fms.php	2007	2007 CDNetworks - UGC Platform	GOOG-SANDP-PA-00040730
"Why CDNetworks," CDNetworks (Dec. 20, 2007), available at https://web.archive.org/web/20071220225816/http://www.us.cdnetworks.com/about/biz_area.php	2007	2007 CDNetworks - Why CDNetworks	GOOG-SANDP-PA-00040728

Description	Publication Date	Short Name	Starting Bates Number
"Cisco Content Delivery Engines," Data Sheet, Cisco (Jan. 26, 2007), available at https://web.archive.org/web/20070126075342/http://www.cisco.com:80/en/US/products/ps7126/products_data_sheet0900aecd8057f446.html	2007	Cisco - Content Delivery Engines	GOOG-SANDP-PA-00040665
"Content Delivery Systems," Cisco (Mar. 16, 2007), available at https://web.archive.org/web/20070316155452/http://www.cisco.com/en/US/products/ps7191/Products_Sub_Category_Home.html	2007	Cisco - Content Delivery Systems	GOOG-SANDP-PA-00040676
BestHop Global Traffic Management, CacheFly.com (Mar. 22, 2007), available at https://web.archive.org/web/20070322055438/http://www.cachefly.com:80/product_besthop.html	2007	CacheFly - BestHop Global Traffic Management	GOOG-SANDP-PA-00040679
Cisco Systems Inc., OL-14895-01, Data Center: Site Selection for Business Continuance, Dec. 2007, www.cisco.com/application/pdf/en/us/guest/netsol/ns107/c649/ccmigration—09186a008073377d.pdf.	2007	Cisco, Data Center	GOOG-SANDP-PA-00040503
Content Delivery Service - Features, VitalStrem (Mar. 30, 2007), available at https://web.archive.org/web/20070330221129/http://www.vitalstream.com/content/features.html	2007	VitalStream - Content Delivery Service Features	GOOG-SANDP-PA-00040680

Description	Publication Date	Short Name	Starting Bates Number
Content Delivery Service - Overview, VitalStream (Mar. 18, 2007), available at https://web.archive.org/web/20070318181730/http://www.vitalstream.com/content/index.html	2007	VitalStream - Content Delivery Service Overview	GOOG-SANDP-PA-00040678
Content Delivery Services, NaviSite (May 2, 2007), available at https://web.archive.org/web/20070502134254/http://www.navisite.com/sublevel.aspx?id=1523	2007	NaviSite - Content Delivery Services	GOOG-SANDP-PA-00040683
EdgeCast.com Homepage, EdgeCast (Aug. 11, 2007), available at https://web.archive.org/web/20070811124040/http://edgecast.com:80/	2007	EdgeCast - Homepage	GOOG-SANDP-PA-00040702
Granelli, James S., "A New Contender in Content Delivery," LA Times (Aug. 6, 2007), available at https://web.archive.org/web/20191006195556/https://www.latimes.com/archives/la-xpm-2007-aug-06-fi-network6-story.html	2007	EdgeCast - New Contender	GOOG-SANDP-PA-00040692
Iano, Y., & Magri, M. P. (2007, June). How to architect an IPTV system. In Eighth International Workshop on Image Analysis for Multimedia Interactive Services (WIAMIS'07) (pp. 53-53). IEEE.	Jun. 2007	2007 Iano, How to architect an IPTV system	GOOG-SANDP-PA-00040604

Description	Publication Date	Short Name	Starting Bates Number
Pathan, A. M. K., & Buyya, R. (2007). A taxonomy and survey of content delivery networks. Grid computing and distributed systems laboratory, University of Melbourne, Technical Report, 4(2007), 70.	2007	2007 Pathan	GOOG-SANDP-PA-00040608
Redbox.com Home Page (Mar. 14, 2007), available at https://web.archive.org/web/20070314030242/http://www.redbox.com/home.aspx	2007	Redbox - 2007-03-14 Home Page	GOOG-SANDP-PA-00040675
Srinivasan, S. (2007). vADeo: video advertising system. In International Multimedia Conference: Proceedings of the 15 th international conference on Multimedia (Vol. 25, No. 29, pp. 455-456).	2007	2007 Srinivasan, vADeo - video advertising system.	GOOG-SANDP-PA-00040652
Sullivan, Laurie, "EdgeCast Ready to Take on Akamai, Limelight," NewTeeVee (Aug. 5, 2007), available at https://web.archive.org/web/20071011005412/http://newteevee.com/2007/08/05/cdn-lowers-bandwidth-costs/	2007	EdgeCast - Ready	GOOG-SANDP-PA-00040687
The EdgeCast Difference, EdgeCast.com (Oct. 23, 2007), available at https://web.archive.org/web/20071023221936/http://www.edgecast.com/edgecast_difference.htm	2007	EdgeCast - Difference	GOOG-SANDP-PA-00040703

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Tyson, G., & Mauthe, A. (2007). A topology aware clustering mechanism. In In Proc. 8th EPSRC Annual Postgraduate Symposium on the Convergence of Telecommunications, Networking and Broadcasting. ACM Press.	2007	2007 Tyson, A topology aware clustering mechanism	GOOG-SANDP-PA-00040654
Wan, K., & Yan, X. (2007). Advertising insertion in sports webcasts. IEEE MultiMedia, 14(2), 78-82.	2007	2007 Wan, Advertising insertion in sports webcasts	GOOG-SANDP-PA-00040660
Yen, Yi-Wyn, "The Hot Web 2.0 Market You Don't Know About," The Startup Game (Aug. 7, 2007), available at https://web.archive.org/web/20070911094116/http://blogs.business2.com/startups/2007/08/their-new-techn.html	2007	Yen - Hot Web 2.0 Market	GOOG-SANDP-PA-00040697
"Equinix to Provide Data Center and Connectivity Infrastructure for Hulu's New Online Video Service," Press Release (Mar. 17, 2008), https://www.equinix.com/newsroom/press-releases/2008/03/equinix-to-provide-data-center-and-connectivity-infrastructure-for-hulu-s-new-online-video-service	2008	Redbox - Equinix	GOOG-SANDP-PA-00040772
Pathan, M., Buyya, R., & Vakali, A. (2008). Content delivery networks: State of the art, insights, and imperatives. Content Delivery Networks, 3-32.	2008	2008 Pathan	GOOG-SANDP-PA-00040733

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Turkmen, F., Mazzoleni, P., Crispo, B., & Bertino, E. (2008, July). P-CDN: Extending access control capabilities of P2P systems to provide CDN services. In 2008 IEEE Symposium on Computers and Communications (pp. 480-486). IEEE.	2008	2008 Turkmen, P2P Systems	GOOG-SANDP-PA-00040763
Free CDN, Wordpress Plugin. (2010) Pheonixheart. https://web.archive.org/web/20131019094748/http://www.phoenixheart.net/wp-plugins/free-cdn/	2010	2010 Pheonixheart FreeCDN	GOOG-SANDP-PA-00040775
Amazon CloudFront Developer Guide API Version 2010-11-01. Amazon Web Services. https://web.archive.org/web/20111019110439/http://docs.amazonwebservices.com/AmazonCloudFront/latest/DeveloperGuide	2011	2011 Amazon CloudFront	GOOG-SANDP-PA-00040790
Amazon CloudFront Features Page (2011). Amazon Web Services. https://web.archive.org/web/20111101234339/http://aws.amazon.com/cloudfront/	2011	2011 Amazon CloudFront Features	GOOG-SANDP-PA-00040784
Triukose, S., Wen, Z., & Rabinovich, M. (2011, March). Measuring a commercial content delivery network. In Proceedings of the 20th international conference on World wide web (pp. 467-476).	2011	2011 Triukose	GOOG-SANDP-PA-00040926
Gheorghe, C. D., & Pierre, G. (2012). A Content Delivery Service for Federated PaaS Environments.	2012	2012 Gheorghe	GOOG-SANDP-PA-00040936

Description	Publication Date	Short Name	Starting Bates Number
Niven-Jenkins, B., Le Faucheur, F., & Bitar, N. (2012). Content distribution network interconnection (CDNI) problem statement (No. rfc6707).	2012	2012 Jenkins	GOOG-SANDP-PA-00040970
Amazon CloudFront Developer Guide API Version 2012-07-01 (2013). Amazon Web Services, Inc. https://web.archive.org/web/20130112222343/http://awsdocs.s3.amazonaws.com/CF/latest/cf_dg.pdf	2013	2013 Amazon CloudFront	GOOG-SANDP-PA-00041002
van Brandenburg, R., van Deventer, O., Le Faucheur, F., & Leung, K. (2013). Models for HTTP-adaptive-streaming-aware content distribution network interconnection (CDNI) (No. rfc6983).	2013	2013 Brandenberg	GOOG-SANDP-PA-00041264
CDN Rewrites (2014). Wordpress.org https://web.archive.org/web/20140407022241/http://wordpress.org/plugins/cdn-rewrites/	2014	2014 CDN Rewrites	GOOG-SANDP-PA-00041323
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Description	Publication Date	Short Name	Starting Bates Number
UmbrellaCDN™ or CDN selector for live and on-demand content (2014). Broadpeak. https://web.archive.org/web/20140116205644/http://www.broadpeak.tv/upload/documentation/fichier/101-371-broadpeak_umbrellacdn_whitepaper_201401.pdf	2014	2014 Broadpeak	GOOG-SANDP-PA-00041311

3. Table 3: Prior Art Products and Systems

Name	Developer, Provider, or Manufacturer[3]	Short Name	Date in Public Use, on Sale, or Otherwise Available to the Public[4]
Amazon.com inventory and distribution system	Amazon.com	Amazon.com System	1995
Apache	The Apache Software Foundation	Apache	1995
Harvest Cache	Unknown	Harvest Cache	1995
Cisco DistributedDirector	Cisco Systems	DistributedDirector	1996
Cisco LocalDirector	Cisco Systems	LocalDirector	1996

[3] Including all relevant affiliates and/or successors in interest.

[4] These products were in public use, on sale, offered for sale, or otherwise known to others or available to the public (including in the United States) at least as of this date. Google reserves the right to revise these dates or rely on subsequent versions of the products in light of additional discovery from the parties or third parties.

Name	Developer, Provider, or Manufacturer[3]	Short Name	Date in Public Use, on Sale, or Otherwise Available to the Public[4]
FireSite, Clearway	Clearway Technologies	Clearway	1996
HydraWEB	SOS Corp.	HydraWEB	1996
Squid Cache	Unknown	Squid	1996
Cachemesh	Unknown	Cachemesh	1997
InterVU	InterVU, Inc.	InterVU	1997
Mirror-Image	Mirror Image Internet, Inc.	Mirror Image	1997
NetCache	NetApp	NetCache	1997
3-DNS Distributed Traffic Controller	F5 Networks, Inc.	3DNS	1998
Akamai content delivery products, services, or systems	Akamai Technologies, Inc.	Akamai CDN	1998
CacheFlow	Broadcom Inc.	CacheFlow	1998
NaviSite content delivery products, services, or systems	NaviSite	NaviSite CDN	1998
Network Dispatcher	International Business Machines Corp.	Network Dispatcher	1998
Resonate Central Dispatch	Resonate, Inc.	Resonate	1998
SecureZone	Secure Computing Corp.	SecureZone	1998
Summary Cache	Department of Computer Science,	Summary Cache	1998

Name	Developer, Provider, or Manufacturer[3]	Short Name	Date in Public Use, on Sale, or Otherwise Available to the Public[4]
	University of Wisconsin-Madison		
Global Service Load Balancing (GSLB) and related products, services, or systems, including Alteon 180 Series, ACEdirector Series, CACHEdirector Series, Alteon 700 Series, and iSD-SSL Accelerator	Alteon WebSystems	Alteon System	1999
CDNetworks content delivery products, services, or systems	CDNetworks	CDNetworks CDN	2000
Cisco content delivery products, services, or systems	Cisco Systems	Cisco CDN	2000
VitalStream content delivery products, services, or systems	VitalStream / InterNAP	VitalStream CDN	2000
Intelligent Domain Name Server (IDNS)	AT&T	IDNS	2001
WebDNS and related products, services, or systems, including NavisAccess	Lucent Technologies	WebDNS	2001
Mobile Streaming Media Content Delivery Network	NTT DoCoMo, Multimedia Laboratories;	MSM-CDN	2002

Name	Developer, Provider, or Manufacturer[3]	Short Name	Date in Public Use, on Sale, or Otherwise Available to the Public[4]
	Hewlett-Packard Laboratories		
Kasenna Video-on-Demand Solutions	Kasenna, Inc.	Kasenna CDN	2003
Redbox inventory and distribution system	Redbox Automated Retail, LLC	Redbox System	2003
SAVVIS content delivery products, services, or systems	SAVVIS / Level 3 Communications, Inc.	SAVVIS CDN	2003
CacheFly content delivery products, services, or systems	CacheFly	CacheFly CDN	2005
DirecTV content distribution system	DirecTV	DirecTV System	2007
Edgecast Networks content delivery products, services, or systems	Edgecast Networks, Inc.	Edgecast CDN	2007
Amazon CloudFront	Amazon Web Services	Amazon CloudFront	2008
Hulu content distribution system	Hulu	Hulu System	2008

C. Admitted Prior Art

The Asserted Patents, in their file histories or specifications, contain statements admitting that certain claim limitations were already known in the art at the time of the purported invention or cite references as prior art. Such admissions "are binding

on the patentee for purposes of a later inquiry into obviousness." *PharmaStem Therapeutics, Inc. v. ViaCell, Inc.*, 491 F.3d 1342, 1362 (Fed. Cir. 2007); *see also Constant v. Advanced Micro-Devices, Inc.*, 848 F.2d 1560, 1570 (Fed. Cir. 1988) (same as to anticipation). Exemplary admissions are discussed below. Google reserves the right to rely on all admitted prior art for purposes of one or more of the Asserted Patents, including to rely on prior art admissions relating to one Asserted Patent against another Asserted Patent. References cited as admitted prior art in the Asserted Patents are incorporated herein by reference.

1. Admitted Prior Art for the '903 Patent

- content delivery networks / repeater server operable to replicate resources associated with [a] plurality of origin severs
  - "To address more serious bandwidth growth problems, publishers may develop more complex and costly custom solutions. The solution to the most common need, increasing capacity, is generally based on replication of hardware resources and site content (known as mirroring), and duplication of bandwidth resources." '903 patent, 1:43-48.
  - "A number of solutions have been developed to advance replication and mirroring. In general, these technologies are designed for use by a single Web site and do not include features that allow their components to be shared by many Web sites simultaneously." '903 patent, 1:53-57.
  - "Some solution mechanisms offer replication software that helps keep mirrored servers up-to-date. These mechanisms generally operate by making a complete copy of a file system. One such system operates by transparently keeping multiple copies of a file system in synch. Another system provides mechanisms for explicitly and regularly copying files that have changed." '903 patent, 1:58-63.

- "Several mechanisms allow for replication of databases, although there are no standard approaches for accomplishing it. Several companies offering proxy caches describe them as replication tools." '903 patent, 1:65-2:1.
- "Gifford uses so-called replica routers and a replica routing database to route clients requests to replica servers. (See, *e.g.*, Gifford, Fig. 4A and related description)." SANDPIPER-G-00000001, at -00006829 ('903 file history, 2009.07.09 Office Action Response).

- associating the at least one repeater server with a first alias name, wherein requests for a first resource located on a first origin server are directed, based at least in part on said first alias name, to the at least one repeater server for delivery of the first resource from said at least one repeater server
  - "A number of solutions have been developed to advance replication and mirroring. In general, these technologies are designed for use by a single Web site and do not include features that allow their components to be shared by many Web sites simultaneously." '903 patent, 1:53-57.
  - "Some solution mechanisms offer replication software that helps keep mirrored servers up-to-date. These mechanisms generally operate by making a complete copy of a file system. One such system operates by transparently keeping multiple copies of a file system in synch. Another system provides mechanisms for explicitly and regularly copying files that have changed." '903 patent, 1:58-63.
  - "Several mechanisms allow for replication of databases, although there are no standard approaches for accomplishing it. Several companies offering proxy caches describe them as replication tools." '903 patent, 1:65-2:1.
  - "A number of companies offer products which improve network performance by prioritizing and filtering network traffic.

Proxy caches provide a way for client aggregators to reduce network resource

consumption by storing copies of popular resources close to the end users. A client aggregator is an Internet service provider or other organization that brings a large number of clients operating browsers to the Internet. Client aggregators may use proxy caches to reduce the bandwidth required to serve web content to these browsers. However, traditional proxy caches are operated on behalf of Web clients rather than Web publishers.

Proxy caches store the most popular resources from all publishers, which means they must be very large to achieve reasonable cache efficiency. (The efficiency of a cache is defined as the number of requests for resources which are already cached divided by the total number of requests.)" '903 patent, 2:30-48.

- "For example, the following is a URL identifying a file "F" in the path "A/B/C" on a computer at "www.uspto.gov":

http://www.uspto.gov/A/B/C/F

In order to access the file "F" (the resource) specified by the above URL, a program (e.g., a browser) running on a user's computer (i.e., a client computer) would have to first locate the computer (i.e., a server computer) specified by the host name. I.e., the program would have to locate the server "www.uspto.gov". To do this, it would access a Domain Name Server (DNS), providing the DNS with the host name ("www.uspto.gov"). The DNS acts as a kind of centralized directory for resolving addresses from names. If the DNS determines that there is a (remote server) computer corresponding to the name "www.uspto.gov", it will provide the program with an actual computer network address for that server computer. On the Internet this is called an Internet Protocol (or IP) address and it has the form "123.345.456.678". The program on the user's (client) computer would then use the actual address to access the

remote (server) computer.

The program opens a connection to the HTTP server. (Web server) on the remote computer "www.uspto.gov" and uses the connection to send a request message to the remote computer (using the HTTP scheme). The message is typically an HTTP GET request which includes the url-path of the requested resource, "A/B/C/F". The HTTP server receives the request and uses it to access the resource specified by the url-path "A/B/C/F". The server returns the resource over the same connection." '903 patent, 6:42-7:3.

- "Thus, conventionally HTTP client requests for Web resources at an origin server **102** are processed as follows (see FIG. 2) (This is a description of the process when no reflector **108** is installed.):

A1. A browser (e.g., Netscape's Navigator) at the client receives a resource identifier (i.e., a URL) from a user.
A2. The browser extracts the host (origin server) name from the resource identifier, and uses a domain name server (DNS) to look up the network (IP) address of the corresponding server. The browser also extracts a port number, if one is present, or uses a default port number (the default port number for http requests is 80).
A3. The browser uses the server's network address and port number to establish a connection between the client **106** and the host or origin server **102**.
A4. The client **106** then sends a (GET) request over the connection identifying the requested resource.
A5. The origin server **102** receives the request and
A6. locates or composes the corresponding resource.
A7. The origin server **102** then sends back to the client **106** a reply containing the requested resource (or some form of error indicator if the resource is

unavailable). The reply is sent to the client over the same connection as that on which the request was received from the client.

A8. The client **106** receives the reply from the origin server **102**.

There are many variations of this basic model. For example, in one variation, instead of providing the client with the resource, the origin server can tell the client to re-request the resource by another name. To do so, in A7 the server **102** sends back to the client **106** a reply called a "REDIRECT" which contains a new URL indicating the other name. The client **106** then repeats the entire sequence, normally without any user intervention, this time requesting the resource identified by the new URL." '903 patent, 7:4-38.

- "Martin describes a system that serves resources only from and on behalf of a single content source. ln Martin, no matter which processor 20, 30 or 40 is used, Martin only teaches delivering resources from and on behalf of a single content provider- IBM in the example given. Martin's parallel server 10 has a single storage device 120 that is shared by the various processors 20, 30, 40. Thus, regardless of which processor is used for a particular client request, that processor will get the content from the same content source (that is, from storage device 120). This configuration is similar to a mirrored system in which each processor has an identical copy of the content, and it does not include features that allow its shared use by and on behalf of many content sources / providers at the same time. (Although in Martin no processor has its own copy of the content to be delivered.)" SANDPIPER-G-00000001, at -00006821 ('903 file history, 2009.07.09 Office Action Response).
- "Gifford uses so-called replica routers and a replica routing database to route clients requests to replica servers. (See, *e.g.*, Gifford, Fig. 4A and related description)." SANDPIPER-G-00000001, at -00006829 ('903 file history, 2009.07.09 Office Action Response).

- "Several incomplete solutions have been proposed and partially implemented . . . . DNS is sometimes used to select from among several identical servers. Distributed Naming Service (DNS) is used to [sic] by a client to resolve a server name to a server address. When identical replicated services are available, DNS can be used to select which server to use. Sometimes this is based on a simple 'rotation' to share the load. Recently, more intelligent techniques for selecting an address have been proposed. However, because DNS requests are made prior to requesting a specific resource, the replicated server must be capable of servicing any request. Furthermore, once the selection has been made, the client saves (caches) the server address, so the selection cannot easily be changed. It takes many hours for a change to DNS to propagate throughout the caches in a network. . . . The DNS mechanism described above is a kind of reflection, but is quite different from the form of reflection proposed here, as reflection must be performed for an entire system rather than selectively for individual resources in the system." 09/612,598 file history, 2001.01.26 Decl. of Andrew D. Swart Under 37 CFR § 1.131, Ex. A ("Rule 131 Aff.") at 5.[5]
- "Proxy caches may be used to handle requests on behalf of one or more servers. A proxy cache 'impersonates' a server, and understands the protocol offered by that server. (The protocol of interest in the Internet today is called Hypertext Transfer Protocol, or HTTP.) If it has sufficient information to resolve a request, it does so; otherwise, it forwards the request to the 'Origin Server'. Proxy caches are widely used to reduce traffic on the network. Proxy caches only work well with static data (data which changes infrequently). Because the proxy cache must intercept all requests on behalf of a server, the proxy cache must be known to the client, or must take over the address of the server (in

[5] Plaintiff also produced this document as part of the '903 file history. *See* SANDPIPER-G-00000001, at -00007413.

which case it is known as a 'reverse proxy')." 09/612,598 file history, 2001.01.26 Rule 131 Aff. at 5.

- "Routers may be modified to transmit conversations to one of several identical servers. A router connects several networks and manages traffic between them. A router uses the header on a message to determine its destination, and forwards the message to the appropriate network. Normally, messages must go to the identified system, because both sender and recipient maintain context that would otherwise be lost. A router could, by analyzing message headers, select among several identical servers to handle an individual session. Like the DNS solutions, a router solution requires that all replicated servers provide identical service. Furthermore, the router must be in the path between the requesting client and the selected server; this presents a serious problem if a number of replicated servers are deployed at distant locations." 09/612,598 file history, 2001.01.26 Rule 131 Aff. at 5.
- "Software is commonly available to permit the creation of both mirror servers and of HTTP caches, and is not discussed further herein." 09/612,598 file history, 2001.01.26 Rule 131 Aff. at 17.
- "What is *not* unique: intercepting a request at a server[,] extracting its origin[,] creating a REDIRECT message and returning it to the requester[,] forwarding a request to another server[,] individual notions for measuring cost or distance." 09/612,598 file history, 2001.01.26 Rule 131 Aff. at 20.

- HTML documents and HTTP requests
  - "Client **106** is a processor requesting resources from origin server **102** on behalf of an end user. The client **106** is typically a user agent (e.g., a Web browser such as Netscape Communications Corporation's Navigators™) or a proxy for a user agent. Components other than the reflector **108** and the repeaters **104*a*, 104*b*,** etc., may be implemented using commonly available software programs.

In particular, this invention works with any HTTP client (e.g., a Web browser), proxy cache, and Web server." '903 patent, 4:56-64.

- "In the case of the Internet in general and the World Wide Web specifically, documents can be created using a standardized form known as the Hypertext Markup Language (HTML). In HTML, a document consists of data (text, images, sounds, and the like), including links to other sections of the same document or to other documents. The links are generally provided as URLs, and can be in relative or absolute form." '903 patent, 5:64-6:4.
- "Thus, conventionally HTTP client requests for Web resources at an origin server **102** are processed as follows (see FIG. 2) (This is a description of the process when no reflector **108** is installed.):

A1. A browser (e.g., Netscape's Navigator) at the client receives a resource identifier (i.e., a URL) from a user.

A2. The browser extracts the host (origin server) name from the resource identifier, and uses a domain name server (DNS) to look up the network (IP) address of the corresponding server. The browser also extracts a port number, if one is present, or uses a default port number (the default port number for http requests is 80).

A3. The browser uses the server's network address and port number to establish a connection between the client **106** and the host or origin server **102**.

A4. The client **106** then sends a (GET) request over the connection identifying the requested resource.

A5. The origin server **102** receives the request and

A6. locates or composes the corresponding resource.

A7. The origin server **102** then sends back to the client **106** a reply containing the requested resource (or some form of error indicator if the resource is unavailable). The reply is sent to the client over the same connection as that on

which the request was received from the client.

A8. The client **106** receives the reply from the origin server **102**.

There are many variations of this basic model. For example, in one variation, instead of providing the client with the resource, the origin server can tell the client to re-request the resource by another name. To do so, in A7 the server **102** sends back to the client **106** a reply called a "REDIRECT" which contains a new URL indicating the other name. The client **106** then repeats the entire sequence, normally without any user intervention, this time requesting the resource identified by the new URL." '903 patent, 7:4-38.

- "The protocol of interest in the Internet today is called Hypertext Transfer Protocol, or HTTP." 09/612,598 file history, 2001.01.26 Rule 131 Aff. at 5.
- "HTML - HyperText Markup Language, a set of rules for describing the hypertext documents which comprise the vast part of the World Wide Web. HTML documents contain URLs (called 'links') which refer to other resources." 09/612,598 file history, 2001.01.26 Rule 131 Aff. at 8.
- "Other components may be commonly available software programs; in particular, the invention is designed to work with any HTTP client (e.g. a Web browser), proxy, and server." 09/612,598 file history, 2001.01.26 Rule 131 Aff. at 9.

- alias names
  - "In HTML, a document consists of data (text, images, sounds, and the like), including links to other sections of the same document or to other documents. The links are generally provided as URLs, and can be in relative or absolute form. Relative URLs simply omit the parts of the URL which are the same as for the document including the link, such as the address of the document (when linking to the same document), etc. In general, a browser program will fill in missing parts of a URL using the corresponding parts from the current

document, thereby forming a fully formed URL including a fully qualified domain name, etc." '903 patent, 5:67-6:10.

- "URLs generally have the following form (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/rfcl 738.txt', which is hereby incorporated herein by reference):

  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 maps to a particular network address for a particular computer. 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." '903 patent, 6:22-41.
- "The following terms have commonly understood meanings within the industry: Absolute URL - a URL that indicates the Origin Server on which the requested resource resides, and the exact location of the resource on that Server. . . . Relative URL - a portion of a URL which appears in a resource and which is interpreted relative to the address of the resource in which it appears (its 'context'). The client is responsible for keeping track of the context and converting relative URLs to absolute URLs before making requests. . . . URL - Uniform Resource Locator, a textual name that identifies a resource (e.g. an

HTML page) and the Origin Server on which it resides." 09/612,598 file history, 2001.01.26 Rule 131 Aff. at 8.

- origin servers
  - "Origin server **102** is a server at which resources originate. More generally, the origin server **102** is any process or collection of processes that provide resources in response to requests from a client **106.** Origin server **102** can be any off-the-shelf Web server. In a preferred embodiment, origin server **102** is typically a Web server such as the Apache server or Netscape Communications Corporation's Enterprise™ server." '903 patent, 4:48-55.
- clients requesting resources from origin servers
  - "Client **106** is a processor requesting resources from origin server **102** on behalf of an end user. The client **106** is typically a user agent (e.g., a Web browser such as Netscape Communications Corporation's Navigators™) or a proxy for a user agent. Components other than the reflector **108** and the repeaters **104***a***,** **104***b***,** etc., may be implemented using commonly available software programs. In particular, this invention works with any HTTP client (e.g., a Web browser), proxy cache, and Web server." '903 patent, 4:56-64.
- in response to a request for the first resource issued by a particular client machine, identifying the at least one shared repeater server from a set of shared repeater servers based at least in part on [a network cost of delivering resources to the particular client machine / load characteristics of the set of shared repeater servers / a location of the particular client machine relative to the at least one shared repeater server]
  - "Once a Web site is served by multiple servers, a challenge is to ensure that the load is appropriately distributed or balanced among those servers. Domain name-server-based round-robin address resolution causes different clients to be directed to different mirrors.

Another solution, load balancing, takes into account the load at each server (measured in a variety of ways) to select which server should handle a particular request.

Load balancers use a variety of techniques to route the request to the appropriate server. Most of those load-balancing techniques require that each server be an exact replica of the primary Web site. Load balancers do not take into account the 'network distance'" between the client and candidate mirror servers." '903 patent, 2:4-18.

- "A number of companies offer products which improve network performance by prioritizing and filtering network traffic.

  Proxy caches provide a way for client aggregators to reduce network resource consumption by storing copies of popular resources close to the end users. A client aggregator is an Internet service provider or other organization that brings a large number of clients operating browsers to the Internet. Client aggregators may use proxy caches to reduce the bandwidth required to serve web content to these browsers. However, traditional proxy caches are operated on behalf of Web clients rather than Web publishers.

  Proxy caches store the most popular resources from all publishers, which means they must be very large to achieve reasonable cache efficiency. (The efficiency of a cache is defined as the number of requests for resources which are already cached divided by the total number of requests.)" '903 patent, 2:30-48.
- "The NetMap procedure calculates a 'link cost' for transmission of data between each Repeater Group and each Group in the Group Registry. This overall link cost is defined as the minimum cost of any path between the two groups, where the cost of a path is equal to the sum of the costs of the individual

links in the path. The link cost algorithm presented below is essentially the same as algorithm #562 from ACM journal Transactions on Mathematical Software: 'shortest Path From a Specific Node to All Other Nodes in a Network' by U. Pape, ACM TOMS 6 (1980) pp. 450-455, http://www.netlib.org/toms/562." '903 patent, 13:47-57.

- "The 'object [of Martin is] ... to provide a mechanism to alleviate unbalanced load across the processors, thereby helping to avert ... [a] toasting effect.' *Martin,* col. 2, lines 10-12. Thus, in Martin, requests made to the parallel web server (10) are distributed among the processors (20, 30, 40) using a processor load balancing technique that takes into account load on the various processors. See, e.g., *Id.* col. 5, lines 13-32. Martin describes the use of a name server to perform aspects of the processor load balancing." SANDPIPER-G-00000001, at -00006821 ('903 file history, 2009.07.09 Office Action Response).
- "Martin describes a system that tries to perform processor load balancing, and all that Martin is concerned with is the load on the processors. So, in Martin, client requests are directed to one of the processors according to those loads (see, e.g., 'decision means 90 refers to a load distribution record providing information about the loads on all the processors of the server.' *Martin,* col. 7, lines 3 *et seq*.)." SANDPIPER-G-00000001, at -00006825 ('903 file, 2009.07.09 Office Action Response).

- rejecting the client request for the particular resource if the alias name received with the client request is not included in the table
  - "[C]onventionally HTTP client requests for Web resources at an origin server 102 are processed as follows (see FIG. 2) (This is a description of the process when no reflector 108 is installed.):

    . . . .

A7. The origin server 102 then sends back to the client 106 a reply containing the requested resource (or some form of error indicator if the resource is unavailable). The reply is sent to the client over the same connection as that on which the request was received from the client." '903 patent at 7:4-29.

2. Admitted Prior Art for the '573 Patent

- content delivery networks
  - "FIG. 1 depicts a general hierarchical, multi-tiered content delivery network (CDN)." '573 patent, 2:5-6.
  - "In order to offload the job of serving some or all of their content, many content providers now subscribe to so-called content delivery networks (CDNs). Using a CDN, some (or all) of a content provider's content can be served to clients from the CDN (i.e., from one or more servers in the CDN) instead of from the content provider's server(s)." '573 patent, 2:28-33.
  - "A typical content delivery network (CDN) operator deploys one or more parent servers, hosting a plurality of objects, in a network and one or more edge servers at the edge of the network to facilitate more cost-effective and efficient delivery of such objects to an end-user (client). . . . It is typically desirable to serve objects from edge servers because the edge servers are typically closer (by various measures of distance) to end-users. For example, streaming content data from edge servers saves parent-to-edge bandwidth. Furthermore, the less the distance objects must travel can also mean reduced network congestion and packet losses, which can lead to a better experience for the end-user through faster

response times and better quality of service." U.S. Patent App. No. 10/073,938 ("'938 App.")[6] at [0010].

- "In the typical network, the parent servers and edge servers are maintained by a network provider, wherein the parent servers are primarily used for storing and managing one or more objects and edge servers are primarily used for serving objects to clients. In some embodiments, all the objects are retrieved from origin servers and stored over one or more parent servers before any end-users can access each such object as the object is stored on the parent servers. Accordingly, in these embodiments, the origin servers play no significant role in the managed object replication and delivery method except to supply new and/or updated objects for storage on the parent servers. Moreover, only the parent servers communicate with the origin servers. In other embodiments, each requested object is replicated from one or more origin servers to one or more parent servers (and/or one or more edge servers) when the requested object becomes popular (as described in more detail below). In these embodiments, the origin servers play a more significant role in the managed object replication and delivery method to supply objects to parent and/or edge servers when requested. So, in these embodiments, the origin servers and parent servers communicate between each other and the origin servers and clients may also communicate between each other. In all of these embodiments, the communications relationships between origin servers and parent servers

[6] The '938 App. is incorporated by reference into the '573 patent and published as U.S. Patent App. Pub. No. 2006/0015574. All citations to the '938 App. herein are also citations to U.S. Patent App. Nos. 11/715,316, 11/978,656, and 11/980,672, which similarly are incorporated by reference into the '573 patent and contain materially identical disclosures as the '938 App.

may be one-to-one, one-to-many or many-to-many." '938 App. at [0021].

- "FIG. 1 shows a single layer or level of parent servers and origin servers. As will be apparent to those skilled in the art, more than one layer or level of parent servers and/or origin servers may be used." '938 App. at [0022].

- receiving, at a first server of a first tier of servers of the content delivery network, a request from a requesting device for a resource available from the content delivery network
  - "FIG. 1 depicts a general hierarchical, multi-tiered content delivery network (CDN)." '573 patent, 2:5-6.
  - "A typical CDN has only one or two tiers of servers. A CDN with only one tier will have only edge servers, whereas a CDN with two tiers will have edge servers and parent servers. (At a minimum, a CDN should have at least one tier of servers—the edge servers.)" '573 patent, 3:53-57.
  - "As understood by those of skill in the art, the server selector system **104** generally operates to direct a client's requests for content to an appropriate server in order for that content to be served to the requesting client. An appropriate server may be one which is close to the client (by some measure of cost) and/or one which is not too heavily loaded. All sorts of conditions may be applied to the term "appropriate", and all sorts of information and tests, both static and dynamic, may be used to determine an appropriate server. The server selector system 106 may, e.g., include or operate fully or partially in Domain Name Service (DNS) servers, standalone devices, or a combination thereof. For example, the server selector system 106 may comprise a single level DNS server that selects an appropriate server based at least in part on some combination

of the location of the requesting client and the load on some or all of the CDN servers. Those of skill in the art will know and understand, upon reading this description, that a client's location in a network such as the Internet may sometimes only be roughly determined, and the term 'location of the client' is generally taken to be a network location corresponding to the client's network service provider." '573 patent, 4:49-5:3.

- "Those of skill in the art will know and understand, upon reading this description, that the client's initial request may be directed to any tier in the CDN hierarchy, including, e.g., to the parent tier." '573 patent, 6:2-5.
- "A typical content delivery network (CDN) operator deploys one or more parent servers, hosting a plurality of objects, in a network and one or more edge servers at the edge of the network to facilitate more cost-effective and efficient delivery of such objects to an end-user (client). . . . It is typically desirable to serve objects from edge servers because the edge servers are typically closer (by various measures of distance) to end-users. For example, streaming content data from edge servers saves parent-to-edge bandwidth. Furthermore, the less the distance objects must travel can also mean reduced network congestion and packet losses, which can lead to a better experience for the end-user through faster response times and better quality of service." '938 App. at [0010].
- "In the typical network, the parent servers and edge servers are maintained by a network provider, wherein the parent servers are primarily used for storing and managing one or more objects and edge servers are primarily used for serving objects to clients." '938 App. at [0021].

- "As discussed in more detail below, the edge servers act as the primary source of serving objects but if a requested object is not available at the edge server a parent server that has the requested object will serve the requested object to the clients." '938 App. at [0022].
- "FIG. 1 shows a single layer or level of parent servers and origin servers. As will be apparent to those skilled in the art, more than one layer or level of parent servers and/or origin servers may be used." '938 App. at [0022].
- "In Outten [U.S. Patent No. 7,024,466], the edge servers can be considered to be the first tier of servers. Outten's parent servers can be considered to be the intermediate tier of servers. And, Outten's main server can be considered to be the origin server." Appeal Br. for U.S. Patent App. No. 12/880,324 (Nov. 11, 2014) at 12.
- "In a caching CDN, content that is served may also be cached on some or all of the CDN servers, either before being served or in response to specific requests for that content. Thus, when a typical CDN server serves some content to a user it may also cache that content.

  . . . .

  Consider the following example: A content provider with a library of movies wishes to serve content using a CDN. . . .

  Because of movie M1's popularity, copies of M1 will start to propagate to the CDN's edge servers. As users request M1, those users will be directed to edge servers in the CDN, and those edge servers will either have a copy of M1 or they will fetch a copy of M1 and serve it. Now suppose that a user requests movie M2 (an obscure and unpopular movie). That user will be directed to a particular edge serve (ES1) in the CDN which is supposed to serve that movie to the user. Suppose that this particular edge serve (ES1) already has local copies of lots of content,

including the popular movie M1. Since the movie M2 has never been requested before, the edge serve (ES1) will have to obtain a copy from somewhere (in the conventional manner). If the edge server (ES1) has no more storage, it will have to remove something that it already has stored (e.g., the popular movie M1).

So in this example, a non-popular movie (M2) has displaced a popular movie (M1) from the local storage of an edge server. As a consequence, the next request for movie M1 at that server will require the server to obtain the content in order to server it." Applicant Resp. to Non-Final Rejection for U.S. Patent App. No. 12/408,681 (Aug. 4, 2011) at 15-16.

- requesting the resource from a second server of the content delivery network [based at least on the popularity designation associated with the requested resource]
    - "Those of skill in the art will know and understand, upon reading this description, that information can be transferred between servers using, e.g., HTTP headers or the like." '573 patent, 8:5-7.
    - "While the invention has been described with reference to the HTTP protocol, those of skill in the art will know and understand, upon reading this description, that different and/or other protocols may be used and are contemplated by the inventors. HTTP is described in various documents, e.g., Hypertext Transfer Protocol—HTTP/1.1, RFC 2616, Network Working Group, the entire contents of which are incorporated herein by reference." '573 patent, 8:24-31.
    - "It is typically not feasible to store all objects on the edge servers. The main difficulty is due to the fact that many such objects are very large (typically on the order of 10 MB (10,000,000 bytes)—in the neighborhood of 500 MB for movies). The storage and rack space required to accommodate often large and sometimes rarely requested

objects at every edge server can be cost prohibitive as the number of customers grows and the number of their objects increases. It may not even be possible to store a good working set of objects, for example a set of objects thought to be requested often and/or better suited to be served from an edge server, because of the size and changing demand for objects in the working set." '938 App. at [0011].

- "Other solutions fetch objects on demand. In such schemes, when a requested object is not available on a handling edge server, a connection is made between a parent server having the requested object and the handling edge server to fetch the requested object from the parent server." '938 App. at [0013].
- "In the typical network, the parent servers and edge servers are maintained by a network provider, wherein the parent servers are primarily used for storing and managing one or more objects and edge servers are primarily used for serving objects to clients. In some embodiments, all the objects are retrieved from origin servers and stored over one or more parent servers before any end-users can access each such object as the object is stored on the parent servers. Accordingly, in these embodiments, the origin servers play no significant role in the managed object replication and delivery method except to supply new and/or updated objects for storage on the parent servers. Moreover, only the parent servers communicate with the origin servers. In other embodiments, each requested object is replicated from one or more origin servers to one or more parent servers (and/or one or more edge servers) when the requested object becomes popular (as described in more detail below). In these embodiments, the origin servers play a more significant role in the managed object replication and delivery method to supply objects to parent and/or edge servers when requested. So, in these

embodiments, the origin servers and parent servers communicate between each other and the origin servers and clients may also communicate between each other. In all of these embodiments, the communications relationships between origin servers and parent servers may be one-to-one, one-to-many or many-to-many." '938 App. at [0021].

- "As discussed in more detail below, the edge servers act as the primary source of serving objects but if a requested object is not available at the edge server a parent server that has the requested object will serve the requested object to the clients." '938 App. at [0022].
- "FIG. 1 shows a single layer or level of parent servers and origin servers. As will be apparent to those skilled in the art, more than one layer or level of parent servers and/or origin servers may be used." '938 App. at [0022].
- "Outten [U.S. Patent No. 7,024,466] generally describes a system in which a main server publishes instructions that label one or more content items as hold or cold (cold. 13, lines 58-64). Furthermore, the main server may issue instructions that classify content items in more than two levels (col. 13, lines 65-67). The main server may then issue instructions, based on marketing or operational considerations, to have some content items always available in some or all edge cache server (col. 14, lines 30-34). In col. 6, lines 4-27, Outten discusses how content items may be supplied to the main server by content owners or holders, and that copies of content items are stored again on parent servers and edge servers." Appeal Br. for U.S. Patent App. No. 12/880,324 (Nov. 11, 2014) at 12.
- "In a caching CDN, content that is served may also be cached on some or all of the CDN servers, either before being served or in response to

specific requests for that content. Thus, when a typical CDN server serves some content to a user it may also cache that content.

. . . .

Consider the following example: A content provider with a library of movies wishes to serve content using a CDN. . . .

Because of movie M1's popularity, copies of M1 will start to propagate to the CDN's edge servers. As users request M1, those users will be directed to edge servers in the CDN, and those edge servers will either have a copy of M1 or they will fetch a copy of M1 and serve it. Now suppose that a user requests movie M2 (an obscure and unpopular movie). That user will be directed to a particular edge serve (ES1) in the CDN which is supposed to serve that movie to the user. Suppose that this particular edge serve (ES1) already has local copies of lots of content, including the popular movie M1. Since the movie M2 has never been requested before, the edge serve (ES1) will have to obtain a copy from somewhere (in the conventional manner). If the edge server (ES1) has no more storage, it will have to remove something that it already has stored (e.g., the popular movie M1).

So in this example, a non-popular movie (M2) has displaced a popular movie (M1) from the local storage of an edge server. As a consequence, the next request for movie M1 at that server will require the server to obtain the content in order to server it." Applicant Resp. to Non-Final Rejection for U.S. Patent App. No. 12/408,681 (Aug. 4, 2011) at 15-16.

- a redirect instruction from the second server of the content delivery network to obtain the resource from a content server of the content delivery network
  - "the popularity service sends the edge server an instruction (e.g., HTTP 302) to redirect the client's request to the origin server (or to the CDN origin cache) (if origin redirects are enabled) . . . ." '573 patent, 6:66-7:2.

- "the popularity service sends the edge server an instruction (e.g., HTTP 302) to redirect the client's request to a parent server (if mid-tier redirects are enabled) . . . ." '573 patent, 7:5-8.
- "the popularity service sends the edge server a redirect (HTTP 302) with a 'follow me' flag set, to the origin server or, if there is one, to the parent tier." '573 patent, 7:22-24.
- "Those of skill in the art will know and understand, upon reading this description, that information can be transferred between servers using, e.g., HTTP headers or the like." '573 patent, 8:5-7.
- "While the invention has been described with reference to the HTTP protocol, those of skill in the art will know and understand, upon reading this description, that different and/or other protocols may be used and are contemplated by the inventors. HTTP is described in various documents, e.g., Hypertext Transfer Protocol—HTTP/1.1, RFC 2616, Network Working Group, the entire contents of which are incorporated herein by reference." '573 patent, 8:24-31.
- "To provide redirection for the streaming of Windows Media objects, the uniform resource identifier (URI) hyperlinks at the customer's site for such streaming Windows Media objects are modified. URis as used herein generally have the following form (defined in detail in T. Berners-Lee et al, Uniform Resource Identifiers (URI), IETF RFC 2396, August 1998, located at 'http://www.ietf.org/rfc/rfc2396.txt', incorporated by reference herein):

  scheme://host[port]/uri-path

  where 'scheme' can be a symbol such as 'http' (see Hypertext Transfer Protocol---HTTP/1.l, IETF RFC 2616, located at 'http://www.ietf.org/rfc/rfc2616.txt', incorporated by reference herein) for an object on a Web server or 'rtsp' (see Real Time Streaming

Protocol (RTSP), IETF RFC 2326, located at 'http://www.ietf.org/rfc/rfc2326.txt', incorporated by reference herein) for an object on a streaming server. Other schemes can also be used and new schemes may be added in the future. . . . In a preferred embodiment, the HTTP protocol is used to effect the redirection of WindowsMedia objects. Therefore, the 'scheme' field of the URIs of the WindowsMedia objects is changed from 'mms' to 'http'. For example, the URI for a sample object 'sample.asf' in the Windows Media Advanced Streaming Format (ASF) will have a new URI of the form 'http://host/path/sample.asf'. For objects using Windows Media ASX scripting, a sample URI for the 'meta.asx' object will be in the form 'http://host/?www.customer.com/path/meta.asx', where 'customer' is the name of the content provider of 'meta.asx'. All URIs contained within the 'meta.asx' object remain unchanged." '938 App. at [0051]-[0052].

- "Another component is a Real/QuickTime redirector 730, 770 which is an application that processes RealTime Streaming Protocol (RTSP) requests from a Real or QuickTime player for one or more objects and performs the redirection of the method for Real and QuickTime objects. The Real/QuickTime redirector is provided on edge servers and parent servers. The RTSP, described in detail in the IETF RFC 2326, is used for streaming Real and QuickTime objects, and the 'REDIRECT' method supported in that protocol is used to effect redirection. A redirect request informs the client that it must reconnect to another server location and provides for the client the URI of that new server in the redirect request." '938 App. at [0054].

- caching content / receiving an additional request for a resource

- "In a caching CDN, content that is served may also be cached on some or all of the CDN servers, either before being served or in response to specific requests for that content." '573 patent, 2:33-36.
- "A typical content delivery network (CDN) operator deploys one or more parent servers, hosting a plurality of objects, in a network and one or more edge servers at the edge of the network to facilitate more cost-effective and efficient delivery of such objects to an end-user (client). . . . It is typically desirable to serve objects from edge servers because the edge servers are typically closer (by various measures of distance) to end-users. For example, streaming content data from edge servers saves parent-to-edge bandwidth. Furthermore, the less the distance objects must travel can also mean reduced network congestion and packet losses, which can lead to a better experience for the end-user through faster response times and better quality of service." '938 App. at [0010].
- "It is typically not feasible to store all objects on the edge servers. The main difficulty is due to the fact that many such objects are very large (typically on the order of 10 MB (10,000,000 bytes)—in the neighborhood of 500 MB for movies). The storage and rack space required to accommodate often large and sometimes rarely requested objects at every edge server can be cost prohibitive as the number of customers grows and the number of their objects increases. It may not even be possible to store a good working set of objects, for example a set of objects thought to be requested often and/or better suited to be served from an edge server, because of the size and changing demand for objects in the working set." '938 App. at [0011].
- "One obvious solution is to pre-populate edge servers with objects for which there will likely be a significant or high demand." '938 App. at [0012].

- "Other solutions fetch objects on demand. In such schemes, when a requested object is not available on a handling edge server, a connection is made between a parent server having the requested object and the handling edge server to fetch the requested object from the parent server." '938 App. at [0013].
- "In the typical network, the parent servers and edge servers are maintained by a network provider, wherein the parent servers are primarily used for storing and managing one or more objects and edge servers are primarily used for serving objects to clients. In some embodiments, all the objects are retrieved from origin servers and stored over one or more parent servers before any end-users can access each such object as the object is stored on the parent servers. Accordingly, in these embodiments, the origin servers play no significant role in the managed object replication and delivery method except to supply new and/or updated objects for storage on the parent servers. Moreover, only the parent servers communicate with the origin servers. In other embodiments, each requested object is replicated from one or more origin servers to one or more parent servers (and/or one or more edge servers) when the requested object becomes popular (as described in more detail below). In these embodiments, the origin servers play a more significant role in the managed object replication and delivery method to supply objects to parent and/or edge servers when requested. So, in these embodiments, the origin servers and parent servers communicate between each other and the origin servers and clients may also communicate between each other. In all of these embodiments, the communications relationships between origin servers and parent servers may be one-to-one, one-to-many or many-to-many." '938 App. at [0021].

- "As discussed in more detail below, the edge servers act as the primary source of serving objects but if a requested object is not available at the edge server a parent server that has the requested object will serve the requested object to the clients." '938 App. at [0022].
- "Outten [U.S. Patent No. 7,024,466] generally describes a system in which a main server publishes instructions that label one or more content items as hold or cold (cold. 13, lines 58-64). Furthermore, the main server may issue instructions that classify content items in more than two levels (col. 13, lines 65-67). The main server may then issue instructions, based on marketing or operational considerations, to have some content items always available in some or all edge cache server (col. 14, lines 30-34). In col. 6, lines 4-27, Outten discusses how content items may be supplied to the main server by content owners or holders, and that copies of content items are stored again on parent servers and edge servers." Appeal Br. for U.S. Patent App. No. 12/880,324 (Nov. 11, 2014) at 12.
- "In a caching CDN, content that is served may also be cached on some or all of the CDN servers, either before being served or in response to specific requests for that content. Thus, when a typical CDN server serves some content to a user it may also cache that content.

  . . . .

  Consider the following example: A content provider with a library of movies wishes to serve content using a CDN. . . .

  Because of movie M1's popularity, copies of M1 will start to propagate to the CDN's edge servers. As users request M1, those users will be directed to edge servers in the CDN, and those edge servers will either have a copy of M1 or they will fetch a copy of M1 and serve it. Now suppose that a user requests movie M2 (an obscure and unpopular movie). That user will be directed to a particular edge serve (ES1) in the

CDN which is supposed to serve that movie to the user. Suppose that this particular edge serve (ES1) already has local copies of lots of content, including the popular movie M1. Since the movie M2 has never been requested before, the edge serve (ES1) will have to obtain a copy from somewhere (in the conventional manner). If the edge server (ES1) has no more storage, it will have to remove something that it already has stored (e.g., the popular movie M1).

So in this example, a non-popular movie (M2) has displaced a popular movie (M1) from the local storage of an edge server. As a consequence, the next request for movie M1 at that server will require the server to obtain the content in order to server it." Applicant Resp. to Non-Final Rejection for U.S. Patent App. No. 12/408,681 (Aug. 4, 2011) at 15-16.

- providing the [obtained/cached] resource [from the first server of the first tier of servers]
    - "While the invention has been described with reference to the HTTP protocol, those of skill in the art will know and understand, upon reading this description, that different and/or other protocols may be used and are contemplated by the inventors. HTTP is described in various documents, e.g., Hypertext Transfer Protocol—HTTP/1.1, RFC 2616, Network Working Group, the entire contents of which are incorporated herein by reference." '573 patent, 8:24-31.
    - "A typical content delivery network (CDN) operator deploys one or more parent servers, hosting a plurality of objects, in a network and one or more edge servers at the edge of the network to facilitate more cost-effective and efficient delivery of such objects to an end-user (client). . . . It is typically desirable to serve objects from edge servers because the edge servers are typically closer (by various measures of distance) to end-users. For example, streaming content data from edge servers saves

parent-to-edge bandwidth. Furthermore, the less the distance objects must travel can also mean reduced network congestion and packet losses, which can lead to a better experience for the end-user through faster response times and better quality of service." '938 App. at [0010].

- "Other solutions fetch objects on demand. In such schemes, when a requested object is not available on a handling edge server, a connection is made between a parent server having the requested object and the handling edge server to fetch the requested object from the parent server." '938 App. at [0013].
- "In the typical network, the parent servers and edge servers are maintained by a network provider, wherein the parent servers are primarily used for storing and managing one or more objects and edge servers are primarily used for serving objects to clients. In some embodiments, all the objects are retrieved from origin servers and stored over one or more parent servers before any end-users can access each such object as the object is stored on the parent servers. Accordingly, in these embodiments, the origin servers play no significant role in the managed object replication and delivery method except to supply new and/or updated objects for storage on the parent servers. Moreover, only the parent servers communicate with the origin servers. In other embodiments, each requested object is replicated from one or more origin servers to one or more parent servers (and/or one or more edge servers) when the requested object becomes popular (as described in more detail below). In these embodiments, the origin servers play a more significant role in the managed object replication and delivery method to supply objects to parent and/or edge servers when requested. So, in these embodiments, the origin servers and parent servers communicate between each other and the origin servers and clients may also

communicate between each other. In all of these embodiments, the communications relationships between origin servers and parent servers may be one-to-one, one-to-many or many-to-many." '938 App. at [0021].

- "As discussed in more detail below, the edge servers act as the primary source of serving objects but if a requested object is not available at the edge server a parent server that has the requested object will serve the requested object to the clients." '938 App. at [0022].
- "In a caching CDN, content that is served may also be cached on some or all of the CDN servers, either before being served or in response to specific requests for that content. Thus, when a typical CDN server serves some content to a user it may also cache that content." Applicant Resp. to Non-Final Rejection for U.S. Patent App. No. 12/408,681 (Aug. 4, 2011) at 15-16.

- accessing a popularity service associated with the [content delivery network / first server of the first tier of the content delivery network]
  - "Those of skill in the art will know and understand, upon reading this description, that in a multi-tier CDN, the popularity service may be located at any tier, or there may be popularity services at more than one tier." '573 patent, 8:8-11.
  - "It is typically not feasible to store all objects on the edge servers. The main difficulty is due to the fact that many such objects are very large (typically on the order of 10 MB (10,000,000 bytes)—in the neighborhood of 500 MB for movies). The storage and rack space required to accommodate often large and sometimes rarely requested objects at every edge server can be cost prohibitive as the number of customers grows and the number of their objects increases. It may not even be possible to store a good working set of objects, for example a set

of objects thought to be requested often and/or better suited to be served from an edge server, because of the size and changing demand for objects in the working set." '938 App. at [0011].

- "One obvious solution is to pre-populate edge servers with objects for which there will likely be a significant or high demand." '938 App. at [0012].
- "In the typical network, the parent servers and edge servers are maintained by a network provider, wherein the parent servers are primarily used for storing and managing one or more objects and edge servers are primarily used for serving objects to clients. . . . In other embodiments, each requested object is replicated from one or more origin servers to one or more parent servers (and/or one or more edge servers) when the requested object becomes popular (as described in more detail below). In these embodiments, the origin servers play a more significant role in the managed object replication and delivery method to supply objects to parent and/or edge servers when requested. So, in these embodiments, the origin servers and parent servers communicate between each other and the origin servers and clients may also communicate between each other. In all of these embodiments, the communications relationships between origin servers and parent servers may be one-to-one, one-to-many or many-to-many." '938 App. at [0021].
- "Outten [U.S. Patent No. 7,024,466] generally describes a system in which a main server publishes instructions that label one or more content items as hold or cold (cold. 13, lines 58-64). Furthermore, the main server may issue instructions that classify content items in more than two levels (col. 13, lines 65-67). The main server may then issue instructions, based on marketing or operational considerations, to have some content

items always available in some or all edge cache server (col. 14, lines 30-34). In col. 6, lines 4-27, Outten discusses how content items may be supplied to the main server by content owners or holders, and that copies of content items are stored again on parent servers and edge servers." Appeal Br. for U.S. Patent App. No. 12/880,324 (Nov. 11, 2014) at 12.

- Receiving an instruction to not cache / receiving an instruction to cache
  - "Outten [U.S. Patent No. 7,024,466] generally describes a system in which a main server publishes instructions that label one or more content items as hold or cold (cold. 13, lines 58-64). Furthermore, the main server may issue instructions that classify content items in more than two levels (col. 13, lines 65-67). The main server may then issue instructions, based on marketing or operational considerations, to have some content items always available in some or all edge cache server (col. 14, lines 30-34). In col. 6, lines 4-27, Outten discusses how content items may be supplied to the main server by content owners or holders, and that copies of content items are stored again on parent servers and edge servers." Appeal Br. for U.S. Patent App. No. 12/880,324 (Nov. 11, 2014) at 12.

3. Admitted Prior Art for the '517 Patent

- name server network / domain name server
  - "[C]onventional web servers and mirrored server farms." '517 patent, 2:6–7.
  - "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." '517 patent, 3:51–56.
  - *See also, e.g.*, '517 patent, 30:27–53; 31:4–22.
- domain name service (DNS)

- "[T]he DNS (Domain Name Service) component of a Content Delivery Network itself." '517 patent, 2:17–18.
- "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." '517 patent, 4:15–21.
- "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." '517 patent, 4:35–51.
- "[S]tandard DNS round-robin techniques." '517 patent, 26:7–8.
- *See also, e.g.*, '517 patent, 30:27–53; 31:4–22.

- content delivery networks (CDNs)
  - "[S]ervers (or server collections) outside the organization's control . . . include[], for example, Content Delivery Networks (CDNs), as well as local load-balancing servers . . . ." '517 patent, 2:13–16.

- "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." '517 patent, 9:8–12.
- "Typically, the overflow server is a CNAME, and DNS answers of this type should not be combined with any other record type." '517 patent, 10:42–44.
- "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." '517 patent, 14:67–15:4.
- "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)." '517 patent, 24:51–54.
- "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.

  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." '517 patent, 28:12–20.
- *See also, e.g.*, '517 patent, 30:27–53; 31:4–22.

- Universal Resource Locator (URL)
  - "[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." '517 patent, 3:60–4:15.

- "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." '517 patent, 4:35–37.
- "[L]ocations may be specified as a Uniform Resource Locator (URL) and may be accessed through an HTTP request." '517 patent, 23:16–18.
- *See also, e.g.*, '517 patent, 30:27–53; 31:4–22.

- decision criteria
  - "Branches can be selected based upon different criteria. . . . [B]ranches 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).

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." '517 patent, 9:16–29.

- *See also, e.g.*, '517 patent, 30:27–53; 31:4–22.

- resource types/nodes
  - "[T]here 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.

    Those skilled in the art will understand, upon reading this description, that different and/or other resource nodes may be used." '517 patent, 9:36–46.
- IP addresses
  - "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)." '517 patent, 4:39–42.
  - "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." '517 patent, 8:16–22.
  - "IP addresses (Internet Protocol addresses)." '517 patent, 9:38.

- "IP address(es) are used when the current decision tree leaf points to one or more fixed IP addresses." '517 patent, 9:47–48.
- "[A] managed server may hold either an IP address or a CNAME." '517 patent, 12:7–8.
- "[C]orresponding IP address(es) or the CNAME of the selected servers are then returned to the resolver **116**." '517 patent, 19:21–23.
- *See also, e.g.*, '517 patent, 30:27–53; 31:4–22.

- canonical name (CNAME)
  - "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)." '517 patent, 4:39–42.
  - "CNAME records (Canonical Name records)." '517 patent, 9:39.
  - "CNAME records are used when the current decision tree leaf points to a destination whose CNAME is known." '517 patent, 9:48–50.
  - "[A] managed server may hold either an IP address or a CNAME." '517 patent, 12:7–8.
  - "[C]orresponding IP address(es) or the CNAME of the selected servers are then returned to the resolver **116**." '517 patent, 19:21–23.
  - "Typically, the overflow server is a CNAME, and DNS answers of this type should not be combined with any other record type." '517 patent, 10:42–44.
  - "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." '517 patent, 14:67–15:4.
  - "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)." '517 patent, 24:51–54.

- *See also, e.g.*, ’517 patent, 30:27–53; 31:4–22.

- mail exchange (MX) records
  - “Other DNS answer types (e.g., MX record, NS record, etc.) are also possible . . . .” ’517 patent, 4:42–43.
  - “MX records (Mail Exchange records).” ’517 patent, 9:40.
  - “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.” ’517 patent, 9:51–54.
  - *See also, e.g.*, ’517 patent, 30:27–53; 31:4–22.
- name server (NS) records
  - “Other DNS answer types (e.g., MX record, NS record, etc.) are also possible . . . .” ’517 patent, 4:42–43.
  - “NS records (Name Server records).” ’517 patent, 9:41.
  - “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.” ’517 patent, 9:64–67.
  - *See also, e.g.*, ’517 patent, 30:27–53; 31:4–22.
- load sharing server sets (LSSS)
  - “Typically the load may be specified according to the capacity of each server.” ’517 patent, 7:25–26.
  - “Load sharing server sets (LSSS)—consisting of Managed, Dynamic, Static and Overflow servers.” ’517 patent, 9:42–43.
  - “There are presently four different types of load sharing server resources, namely static servers, managed servers, dynamic servers, and overflow servers. . . . Load sharing server sets (LSSS) are necessary to utilize the load share, tiered/overflow and failover rules.” ’517 patent, 10:7–14.

- "Typically, the overflow server is a CNAME, and DNS answers of this type should not be combined with any other record type." '517 patent, 10:42–44.
- "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." '517 patent, 14:67–15:4.
- "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)." '517 patent, 24:51–54.
- *See also, e.g.*, '517 patent, 30:27–53; 31:4–22.

- graphical user interface (GUI)
  - "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." '517 patent, 6:57-60.
  - "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." '517 patent, 21:59-62.
  - *See, e.g.*, '517 patent, 30:27–53; 31:4–22.
- generating reports based on information gathered from the name server network; and . . . providing said reports
  - "A status report may be constructed using some standard language such as extendible Markup Language (XML)." '517 patent, 23:40–41.
  - *See also, e.g.*, '517 patent, 30:27–53; 31:4–22.
- extendible markup language (XML)
  - "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. . . . 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." '517 patent, 21:59–67.

- "A status report may be constructed using some standard language such as extendible Markup Language (XML)." '517 patent, 23:40–41.
- "[S]ubscriber policies may also be constructed or specified in an XML file." '517 patent, 29:17–18.
- *See also, e.g.*, '517 patent, 30:27–53; 31:4–22.

4. Admitted Prior Art for the '112 Patent

- Content delivery networks
  - "To address these problems, many networking product and service providers have developed solutions that distribute Web site content across the network in some manner. One class of solutions involves replicating Web servers at multiple locations and directing traffic (by modifying the URL and forwarding, or using HTTP re-direct) to the 'best' server based on a predefined selection policy, e.g., load balancing, network topology. Another class of solutions distributes content strategically and/or geographically, and often uses some type of centralized or hierarchical Domain Name System (DNS)-based site selection." '112 patent, 1:42–52.
- Origin server
  - "FIG. 1 shows a conventional content delivery Web transaction **10**. The transaction **10** involves a Web server **12** (also referred to as an "origin server") . . . . The Web server **12** is a computer system containing content (e.g., Web pages) for a content provider, with the ability to provide this content in response to a Web request via the HTTP protocol." '112 patent, 3:13–21.
- Content providers
  - "'Content provider' refers to an entity having a Web site on a network. Generally, the entity produces the content for the Web site. The entity may

operate a Web server system or may use the services of a hosting provider." '112 patent, 2:60–62.

- causing said plurality of CDN DNS servers to be authoritative for a hostname
  - "'Domain Name System' (DNS) refers to a collection of systems available on the public Internet that can resolve a domain name to a specific Internet Protocol (IP) address, as is known in the art." '112 patent, 3:1–4.
  - "FIG. 1 shows a conventional content delivery Web transaction **10**. The transaction **10** involves a Web server **12** (also referred to as an 'origin server'), an authoritative DNS system **14**, an end-user system **16** and an end-user DNS system **18**, all of which are coupled to a network **20**, for example, the public Internet. The Web server **12** is a computer system containing content (e.g., Web pages) for a content provider, with the ability to provide this content in response to a Web request via the HTTP protocol. The authoritative DNS system **14** is a DNS system that can resolve domain names within the content provider's namespace." '112 patent, 3:13–23.
  - The end-user DNS system **18** determines which of the DNS systems that make up the DNS for the network **20** can resolve this host name by sending a DNS request to the authoritative DNS system **14** ("DNS Req **24**"). The authoritative DNS system **14** resolves the name to an IP address and returns a response containing the IP address to the end-user **16** system via the end-user DNS system **18** ("DNS Resp **26**"). '112 patent, 3:38–44.
- providing a plurality of Domain Name System (DNS) servers associated with a Content Delivery Network (CDN), said plurality of CDN DNS servers sharing a common anycast address
  - "[T]he APAR routing system of McCanne utilizes a specially designed CDN DNS server situated within an ISP that is configured with an anycast address per each associated CDN." SANDPIPER-G-00012345, at -

00012491 ('112 patent history, 2009.11.09 Amendment and Response to Non-Final Office Action at 10).

- "McCanne teaches, in one embodiment disclosed in paras. [0110]-[0190], CDN-DNS servers that use Anycast addressing . . . ." SANDPIPER-G-00012345, at -00012656 ('112 patent history, 2010.07.29 Amendment and Response to Non-Final Office Action at 12).

- configuring each DNS server and respective plurality of content servers to support content delivery for a plurality of content providers
  - "Another class of solutions distributes content strategically and/or geographically, and often uses some type of centralized or hierarchical Domain Name System (DNS)-based site selection. The distributed sites include servers that perform reverse proxy with (or without) caching. One such technique routes traffic to a content distribution site nearest the requestor by modifying URLs in the top-level Web page. Other DNS techniques use a round robin traffic distribution to distribute load to the content sites, but do not take into account the location of the requester relative to those content sites." '112 patent, 1:49–59.
- Anycast addresses
  - "An anycast address is a unicast address that is used in multiple places. Various Internet Engineering Task Force (IETF) Internet Requests for Comments (RFCs) describe implementations of anycast addresses in IP networks." '112 patent, 5:32–37.
  - "The anycast identifier is used to specify one of many possible anycast addresses on a particular subnet. A unicast address, or conventional IP address, specifies a single interface on a computer network. In contrast, an anycast address may specify more than one interface. For example, anycast addresses may be used to specify a group of one or more servers on a computer network. These servers may provide a redundant service. Routers

forward packets destined to anycast addresses to the closest anycast destination for a particular address. Thus, anycast addresses provide a way to distribute load across one or more servers[.]" '112 patent, 5:48–58.

- Hostnames
  - "A network path to a server is identified by a so-called Uniform Resource Locator (URL) having a special syntax for defining a network connection. Use of a Web browser at a client (end user) system involves specification of a link via the URL. In response, the client system makes a request to the server (sometimes referred to as a 'Web site') identified in the link and, in return, receives content from the Web server." '112 patent, 1:26–33.
- ISP DNS Server
  - "However, the cited text beginning at column 3 discusses having the DNS-LBs maintain current knowledge of the ISP's DNS address and notify the DNS-B machines of the addresses. Also, the DNS-LB performs the function of a caching engine. The cited text at column 10 discusses having the lowest network latency." SANDPIPER-G-00012345, at -00014175-76 ('112 patent history, 2013.12.06 Office Action Response at 10-11).
  - "Moreover, there is no reason to insert an internet service provider DNS server into the system of McCanne. McCanne' s system is able to direct a request directly to N* without the need of the ISP DNS server. The addition of Bahl' s ISP DNS server would be a superfluous feature, if added to McCanne." SANDPIPER-G-00012345, at -00014217 ('112 patent history, 2025.01.23 Appeal Brief at 13).
- wherein at least one of said plurality of CDN DNS servers and respective plurality of content servers is grouped as a cluster
  - "Goldzmidt generally discloses a client-based system that provides fault tolerance and load balancing for real-time data streaming (e.g., see Abstract). In particular, a control server can distribute client requests among

servers in a cluster of servers (e.g., see FIG. l(a) and col. 4, lines 54-65)." SANDPIPER-G-00012345, at -00014110 ('112 patent history, 2013.05.13 Office Action Response at 13).

- "In addition, the Web caches, i.e., the cache systems **80** each can be implemented to include multiple caches servers connected, for example, in a cluster configuration. There may be multiple servers available to support one customer (origin server) or, alternatively, one or more cache servers available to support multiple customers' content cached at one node (site). In yet another alternative, the cache server clusters can include a switch to select from among the cache servers in a given node/cluster based on a predetermined selection policy, for example, content-aware selection (which enables the clustered servers store different content, and maps requested objects to the appropriate servers), load balancing, and so forth, using known techniques." '112 patent, 8:46–58.

- by at least one switch, selecting the content server from said respective plurality of content servers associated with said resolving CDN DNS.
  - "In yet another alternative, the cache server clusters can include a switch to select from among the cache servers in a given node/cluster based on a predetermined selection policy, for example, content-aware selection (which enables the clustered servers store different content, and maps requested objects to the appropriate servers), load balancing, and so forth, using known techniques." '112 patent, 8:52–58.
  - "McCanne teaches, . . . in another embodiment disclosed in paras. [0233]-[0237], a switch that selects a content server from a plurality of content servers." SANDPIPER-G-00012345, at -00012656 ('112 patent history, 2010.07.29 Office Action Response at 12).
  - "In paragraph [0233], McCanne discloses a particular configuration wherein 'the HTTP redirection agent is replaced with a Web server ... ' and '[t]o

scale this configuration, *the Web server may optionally be loadbalanced with a layer 4 switch.*' (emphasis added)." SANDPIPER-G-00012345, at -00014012 ('112 patent history, 2011.02.18 Office Action Response at 11).

- if a valid version of the content is available on the content server, serving the content; otherwise, obtaining the content from a content source and then serving the content
  - "Typically, as is known in the art, Web content can be marked with certain caching attributes, for example, whether or not the content is at all cacheable, how long the content may be held in cache. In the case of the former attribute, if the content is marked as uncacheable (e.g., dynamic or content containing sensitive information), the cache server discards the content after serving it to the requester. Otherwise, if the content is cacheable, the cache server will store the content in local storage and maintain the cached content according to any other cache attributes. Content can be localized, for example, using ad insertions with local content. Content in the caches can be pre-loaded (all the cache servers receiving the same content). That is, the content can be replicated on all cache servers so that even the first request will have a fast response time." '112 patent, 7:33–47.

5. Admitted Prior Art for the '322 Patent

- content delivery networks
  - "Thousands or even tens of thousands of content providers (publishers) now use the Internet (and, particularly, the Web) to provide all sorts of content to numerous clients all over the world. In order to offload the job of serving some or all of their content, many content providers now subscribe to content delivery networks (CDNs)." '322 patent, 1:23-29.
  - "Software updates and patches, once only provided on disc and mailed to recipients, are now routinely distributed to devices using only network

connections. All of these forms of content may be distributed using CDNs." '322 patent, 1:46-50.

- "Claim 12 is directed to a content distribution network and, itself, includes multiple elements that are firmly rooted in the computer networking arts and cannot be considered abstract, including, *inter alia*: 'providing an application programming interface (API); at the API, receiving, from an origin system that is separate from the content delivery network, an embedded resource and at least one parameter associated with the embedded resource; generating a modified embedded resource providing a direct link to a node within the content delivery network for obtaining content associated with the embedded resource; delivering, by the content delivery network, the modified embedded resource to the origin system; receiving, at the node, a request from a client device to obtain the content; and providing the content to the client device.'" SANDPIPER-G-00014262, at -SANDPIPER-G-00014425 ('322 file history, 2018.03.15 Applicant Remarks).

- an application programming interface (API)
  - "Aspects of the present disclosure involve an alternative to using conventional domain name system (DNS) servers for edge selection by instead calling an API or otherwise querying the CDN when constructing a uniform resource locator (URL) for the resource to be delivered from the CDN." '322 patent, 3:9-14.
- at the API, receiving, from an origin system that is separate from the content delivery network, an embedded resource and at least one parameter associated with the embedded resource
  - "The API call may include a name of the resource, a location of the client requesting the resource and/or an IP address for the client which may be used to determine the location of the client, and/or the popularity of the resource being requested (or embedded within a resource)." '322 patent, 3:14-19.

- generating a modified embedded resource
  - "In some instances, only an API is referenced but it should be recognized that such reference includes not only the interface but also the associated compute routine, function, and the like for processing inputs to the API and generating a modified embedded resource." '322 patent, 5:7-12.
  - "Traditionally, an origin server might modify links to such content in the web page to point to a name server for the CDN. When the user then clicks on such links in the web page, the client is directed to the name server, which then provides the client the address of a particular node within the CDN from which to retrieve the content." SANDPIPER-G-00014262, at -00014429 ('322 file history, 2018.03.15 Applicant Remarks).
- providing a direct link to a node within the content delivery network for obtaining content associated with the embedded resource
  - "Using a CDN, content can be served to clients from the CDN (e.g., from one or more servers in the CDN) instead of from the content provider's server(s). In a caching CDN, content may also be cached on some or all of the CDN servers, either before being served or in response to specific requests for that content." '322 patent, 1:29-34.
- receiving, at the node, a request from a client device to obtain the content
  - "Using a CDN, content can be served to clients from the CDN (e.g., from one or more servers in the CDN) instead of from the content provider's server(s)." '322 patent, 1:29-31.
- providing the content to the client device
  - "The Internet and the World Wide Web (the 'Web') have become ubiquitous. Thousands or even tens of thousands of content providers (publishers) now use the Internet (and, particularly, the Web) to provide all sorts of content to numerous clients all over the world." '322 patent, 1:22-26.

III. ANTICIPATION AND OBVIOUSNESS UNDER 35 U.S.C. §§ 102 AND 103

Google contends that all the Asserted Claims are invalid as anticipated under 35 U.S.C. § 102 and/or obvious under 35 U.S.C. § 103. Google relies on and incorporates all prior art references cited on the cover of the Asserted Patents and in their prosecution histories, including for supporting Google's arguments regarding the obviousness of the Asserted Claims. Google further relies on and incorporates by reference, as if originally set forth herein, all invalidity positions, and all associated prior art and claim charts, disclosed to Plaintiff in the Related Cases and Related IPRs or by potential or actual licensees to any of the Asserted Claims. Google hereby discloses and identifies as if originally set forth herein all prior art references listed and/or asserted in the above as invalidating prior art against each of the Asserted Claims. In addition, Google identifies prior art patents, publications, products, and systems that disclose the elements of the Asserted Claims explicitly, inherently, or as part of an obvious combination, and also may be relied on to show the state of the art in the relevant timeframes and/or reasons or motivations to combine prior art references.

In those instances in which Google asserts that an Asserted Claim is invalid under 35 U.S.C. § 112, Google has applied the prior art in accordance with its assumption Plaintiff contends such Asserted Claim (1) has sufficient supporting written description, (2) is enabled, (3) is not indefinite, and (4) sets forth what the inventor(s) regarded as their invention. Google's Invalidity Contentions should not be construed as an admission that any Asserted Claim meets the requirements of § 112.

A. Exhibits to Google's Invalidity Contentions

Google contends that the prior art references listed in Tables 1–3 above anticipate and/or render obvious each of the Asserted Claims of those patents under the proper construction of those claims and/or under Plaintiff's apparent interpretation

of the claims as set forth in its First Amended Complaint and Infringement Contentions.

In addition, Google has prepared Claim Chart Exhibits of prior art references that render the Asserted Claims anticipated and/or obvious under the proper construction of those claims and/or under Plaintiff's apparent interpretation of the claims as set forth in its First Amended Complaint and Infringement Contentions. Charts identifying where each element of each Asserted Claim is found in each of these prior art references are attached as Exhibits A-2 to A-22 for the '903 patent, Exhibits B-2 to B-22 for the '573 patent, Exhibits C-2 to C-17 for the '517 patent, Exhibits D-2 to D-10 for the '112 patent, and Exhibits E-2 to E-10 for the '322 patent (collectively, the "Claim Chart Exhibits").

Section B of each of Exhibits A-1, B-1, C-1, D-1, and E-1 sets forth exemplary combinations of the charted prior art references that render obvious the Asserted Claims of the '903, '573, '517, '112, and '322 patents, respectively, in light of the express and/or inherent disclosures of the references, as well as in view of the knowledge of a person of ordinary skill in the art, the state of the prior art, and/or the admitted prior art described in the Invalidity Contentions. Google reserves the right to rely on any combinations of the references as reflected in the corresponding claim charts to demonstrate the obviousness of the Asserted Claims of the Asserted Patents. For at least the reasons described above, in Exhibits A-1, B-1, C-1, D-1, and E-1, and in the Claim Chart Exhibits, it would have been obvious to one of ordinary skill in the art to combine any of a number of prior art references, including any combination of those identified in the Claim Chart Exhibits, to meet the limitations of the Asserted Claims with a reasonable expectation of success. As such, Google's inclusion of exemplary combinations does not preclude Google from identifying other invalidating combinations as appropriate.

Section C of each of Exhibits A-1, B-1, C-1, D-1, and E-1 sets forth Google's further contentions that a person of ordinary skill in the art at the time of the claimed

inventions had reason to modify each reference listed and charted in Google's Claim Chart Exhibits or combine that reference with one or more of the other references and disclosures detailed in Tables 1–3 of these Invalidity Contentions in light of the knowledge of a person of ordinary skill at the time and information in the prior art references cited herein. The prior art references identified above that have not been charted show the state of the art at the times of or prior to the purported inventions of the Asserted Patents, and/or show reasons or motivations to combine prior art references. The motivations to combine discussed in Section C of each of Exhibits A-1, B-1, C-1, D-1, and E-1 are exemplary and subject to further investigation and discovery, including third-party and expert discovery. Further rationale and support for motivations to combine various types of references can be found in at least the specifications of the Asserted Patents, their prosecution histories, and the prior art identified above. The same is true for reasonable expectation of success.

The Claim Chart Exhibits may cite and incorporate by reference prior art references, other relevant material, and/or sections of other charts. These citations are intended to incorporate the referenced information in its entirety. The identification of any patent or patent publication shall be deemed to include any counterpart patent or application filed, published, or issued anywhere in the world. The citations to any specifications, guidelines, or reports published by standard-setting organizations shall be deemed to include any product that implements such specifications, guidelines, or reports and that would qualify as prior art under 35 U.S.C. § 102.

The references discussed in the Claim Chart Exhibits may disclose the elements of the Asserted Claims explicitly or inherently, or they may be relied upon to show the state of the art in the relevant time frame. In addition, statements in the Claim Chart Exhibits that it would be obvious to modify the teachings of a reference are not meant to exclude arguments that it would also be obvious to combine the reference with other prior art.

The Claim Chart Exhibits cite exemplary portions of identified references. Nothing in the Claim Chart Exhibits should be construed as an admission that the identified references do not disclose any claim limitation. The identified references may contain additional disclosures for a particular claim limitation, and Google reserves all rights to rely on other portions of the identified references to support its contentions. Persons of ordinary skill in the art generally read a prior art reference as a whole and in the context of other publications and literature. Google may rely on uncited portions of the prior art references, other prior art references incorporated into such references, other publications, and percipient and/or expert testimony to provide context and as aids to understanding and interpreting the portions of the cited prior art references. Disclosures relating to elements of dependent claims are disclosed in connection with the claims from which they depend, even though they are not repeated for each dependent claim.

Google may also rely on uncited portions of the prior art references, other publications, and expert testimony to establish that a person of ordinary skill in the art would have been motivated to modify or combine certain cited references and/or would have applied its or her general knowledge and common sense so as to render the claims obvious. Where Google cites to a particular figure, table, chart, annex, or appendix in a prior art reference, the citation should be understood to encompass the caption and description of the figure, table, chart, annex, or appendix; any text relating to the figure, table, chart, annex, or appendix; and the figure, table, chart, annex, or appendix itself. Similarly, where a portion of text refers to a figure, chart, annex, appendix, or other part of a reference, the citation should be understood to include the figure, chart, annex, appendix, or other part of the reference as well.

The U.S. and foreign patents, publications, products, and systems disclosed in the Claim Chart Exhibits qualify as prior art under various provisions of the Patent Act, including 35 U.S.C. §§ 102 and/or 103. Google also may rely on persons identified as inventors of the patents and authors of the publications cited in the Claim

Chart Exhibits, as well as individuals identified in any of the parties' initial disclosures and discovery responses, and others as they become identified through further discovery, as prior inventors, as persons of ordinary skill in the art, or as persons having knowledge of, or having previously used, publicly disclosed, published, offered for sale, or sold, the alleged inventions claimed in the Asserted Patents. Discovery is ongoing, and Google continues to investigate and analyze the prior art. Google reserves the right to supplement and/or amend these contentions based on the results of such investigation and analysis. Google further reserves the right to rely on the system described in any prior art publication(s) cited herein in addition to, or in place of, relying on the publications themselves.

All items of prior art contained in the Claim Chart Exhibits, either alone or in combination, render one or more of the Asserted Claims obvious. Google's contention in the Claim Chart Exhibits that a reference discloses a limitation also means that Google contends that the reference renders that limitation obvious alone, in combination with the knowledge of a person of ordinary skill in the art, and in combination with other references.

Some of the disclosures cited in certain of the Claim Chart Exhibits are based on Google's understanding of how Plaintiff is interpreting the Asserted Claims for the purpose of its Infringement Contentions (to the extent Plaintiff's contentions can be understood). Google does not intend to and does not adopt Plaintiff's claim interpretations or concede that Plaintiff's claim interpretations are correct. Nothing stated herein or in any Claim Chart Exhibit should be treated as an admission or suggestion that Google agrees with Plaintiff regarding either the scope of any of the Asserted Claims, or any express or implied claim constructions advanced by Plaintiff in its Infringement Contentions or anywhere else, or that any of Google's accused instrumentalities meet any limitation of the Asserted Claims. Nothing stated herein or in any Claim Chart Exhibit should be construed as an admission or waiver of any particular construction of any claim term. Nothing stated herein or in any Claim Chart

Exhibit should be construed as a waiver of any argument available under 35 U.S.C. § 112. Google reserves all rights to challenge any of the Asserted Claims under 35 U.S.C. § 112, including by arguing that they are not supported by the written description, not enabled, indefinite, and/or do not set forth what the inventors regarded as the invention, notwithstanding the disclosure in any Claim Chart Exhibit corresponding to that claim. Nothing stated herein or in any Claim Chart Exhibit should be construed as an admission or waiver with respect to the effective filing date of any of the Asserted Claims.

B. Motivations to Combine

To the extent a finder of fact finds that any primary prior art reference does not disclose one or more limitations of an asserted claim, the asserted claim is nevertheless obvious because the allegedly missing limitations contain nothing beyond ordinary improvements. In other words, the Asserted Claim combines known elements to achieve predictable results or chooses between clear alternatives known to those of skill in the art, particularly in view of the state of the art as reflected in the relevant prior art.

Moreover, as explained above, it would have been obvious to a person of skill in the art at the time of the alleged inventions recited in the Asserted Claims to combine any primary reference with any combination of other primary references or secondary references so as to practice the Asserted Claims. To the extent that Plaintiff contends that any concept claimed in the Asserted Claims is not disclosed in a primary reference, it would, at a minimum, have been obvious to adapt the primary reference to include the concept or combine it with other primary references or secondary references that disclose the concept. Each concept described and claimed in the Asserted Patents was known to those of skill in the art as available design choices.

The Supreme Court has held that "[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007). "When

a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one." *Id.* at 417. As the Supreme Court made clear, "[f]or the same reason, if a technique has been used to improve one device, and a [POSA] would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill." *Id.*

To determine whether there is an apparent reason to combine the known elements in the fashion claimed by the patent at issue, a court can "look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art." *Id.* at 418. For example, obviousness can be demonstrated by showing "there existed at the time of invention a known problem for which there was an obvious solution encompassed by the patent's claims." *Id.* at 420. "[A]ny need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed." *Id.* Common sense also teaches that "familiar items may have obvious uses beyond their primary purposes, and in many cases a person of ordinary skill will be able to fit the teachings of multiple patents together like pieces of a puzzle." *Id.*

The Supreme Court in *KSR* held that a claimed invention can be obvious even if there is no explicit teaching, suggestion, or motivation for combining the prior art to produce that invention. In summary, *KSR* holds that patents that are based on new combinations of elements or components already known in a technical field may be found to be obvious. *See generally KSR*, 550 U.S. 398. Specifically, the Court in *KSR* rejected a rigid application of the "teaching, suggestion, or motivation [to combine]" test. *Id.* at 418–19. "In determining whether the subject matter of a patent claim is obvious, neither the particular motivation nor the avowed purpose of the patentee controls. What matters is the objective reach of the claim." *Id.* at 419. "Under the correct analysis, any need or problem known in the field of endeavor at the time of

invention and addressed by the patent can provide a reason for combining the elements in the manner claimed." *Id.* at 420. A key inquiry is whether the "improvement is more than the predictable use of prior art elements according to their established functions." *Id.* at 417.

The rationale to combine or modify prior art references is significantly stronger when, as here, the references seek to solve the same problem, come from the same field, and correspond well to each other. *In re Inland Steel Co*., 265 F.3d 1354, 1362 (Fed. Cir. 2001). The Federal Circuit has held that two references may be combined as invalidating art under similar circumstances, namely "[the prior art] focus[es] on the same problem that the . . . patent addresses: enhancing the magnetic properties of . . . steel. Moreover, both [prior art references] come from the same field . . . . Finally, the solutions to the identified problems found in the two references correspond well." *Id.* at 1364 (concerning patents and prior art relating to improving the magnetic and electrical properties of steel).

In view of the Supreme Court's *KSR* decision, the PTO issued a set of Examination Guidelines. Examination Guidelines for Determining Obviousness Under 35 U.S.C. §103 in view of the Supreme Court Decision in *KSR International Co. v. Teleflex, Inc*., 72 Fed. Reg. 57526 (October 10, 2007). Those Guidelines summarized the *KSR* decision and identified various rationales for finding a claim obvious, including those based on other precedents. Those rationales include:

(A) Combining prior art elements according to known methods to yield predictable results;

(B) Simple substitution of one known element for another to obtain predictable results;

(C) Use of known technique to improve similar devices (methods, or products) in the same way;

(D) Applying a known technique to a known device (method, or product) ready for improvement to yield predictable results;

(E) "Obvious to try" – choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success;

(F) Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations would have been predictable to one of ordinary skill in the art;

(G) Some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention.

Id. at 57529. The above rationales likewise apply in rendering obvious the Asserted Claims of the Asserted Patents.

Further, the Federal Circuit has held that a motivation to combine references may be implicit for patents based on improvements:

> [A]n implicit motivation to combine exists not only when a suggestion may be gleaned from the prior art as a whole, but when the "improvement" is technology- independent and the combination of references results in a product or process that is more desirable, for example because it is stronger, cheaper, cleaner, faster, lighter, smaller, more durable, or more efficient. Because the desire to enhance commercial opportunities by improving a product or process is universal—and even common-sensical—we have held that there exists in these situations a motivation to combine prior art references even absent any hint of suggestion in the references themselves. In such situations, the proper question is whether the ordinary artisan possesses knowledge and skills rendering him *capable* of combining the prior art references.

DyStar Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick Co., 464 F.3d 1356, 1368 (Fed. Cir. 2006).

Additional evidence establishing that there would have been a motivation to modify and/or combine the prior art references identified above and herein includes the interrelated teachings of multiple prior art references; the effects of demands known to the design community or present in the marketplace; the existence of a known problem for which there was an obvious solution encompassed by the Asserted Claims; the existence of a known need or problem in the field of the endeavor at the time of the invention; and the background knowledge that would have been possessed by a person having ordinary skill in the art.

Furthermore, the prior art references identified in these contentions explicitly or implicitly refer to other prior art references, share common authors or inventors, were published in the same journals, presented at the same conferences or meetings, submitted or proposed to standards development study groups or task groups with overlapping contributors, members, or attendees, and/or were developed at common companies, schools, or organizations, all of which would motivate one of skill in the art to combine them. These references are also within the field(s) of the Asserted Patents and are directed to similar subject matter or problems within the field(s). Additionally, any products, devices, or processes described in the references existed and/or were invented before or during the period in which the claimed inventions were developed, providing further motivation to combine them.

Thus, the motivations to combine the teachings of the prior art references disclosed herein are found in the references themselves and: (1) the nature of the problem being solved, (2) the express, implied, and inherent teachings of the prior art, (3) the knowledge of persons of ordinary skill in the art, (4) the fact that the prior art is generally directed toward similar subject matter, problems, or goals, and (5) the predictable results obtained in combining the different elements of the prior art—e.g., using known techniques.

Google may rely on cited or uncited portions of the prior art, other documents, and/or percipient and expert testimony to establish that a person of ordinary skill in the art would have had a reason to or been motivated to modify or combine the prior art so as to render the claims invalid as obvious.

C. Lack of Secondary Indicia of Non-Obviousness

Google is not aware of any evidence that would tend to establish any secondary considerations of non-obviousness. This lack of evidence further renders the Asserted Claims obvious. Proving any such secondary considerations is Plaintiff's burden. *See, e.g.*, *ZUP, LLC v. Nach Mfg., Inc.*, 896 F.3d 1365, 1373 (Fed. Cir. 2018) ("[A] patentee bears the burden of production with respect to evidence of secondary

considerations of nonobviousness."). Accordingly, Google reserves all rights regarding its full contention in this respect until after Plaintiff completes its final and binding disclosure of any such evidence and contentions.

IV. DOUBLE PATENTING

The '903 patent is invalid under 35 U.S.C. § 101, which provides that, "[w]hoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain ***a patent***," that is, a single patent. 35 U.S.C. § 101 (emphasis added). The '903 patent is also invalid under the judicially created doctrine of obviousness-type double patenting (ODP). ODP "is intended to prevent a patentee from obtaining a time-wise extension of patent for the same invention or an obvious modification thereof" and prevents an inventor from claiming a second patent for claims that are not patentably distinct from the claims of a first patent. *In re Cellect, LLC*, 81 F.4th 1216, 1226 (Fed. Cir. 2023) (quoting *In re Lonardo*, 119 F.3d 960, 965 (Fed. Cir. 1997)). The Asserted Claims of the '903 patent recite the same invention as, or an obvious modification of, the claims recited in the following reference patents:

- U.S. Patent No. 6,654,807
- U.S. Patent No. 7,054,935
- U.S. Patent No. 8,291,046
- U.S. Patent No. 8,296,396
- U.S. Patent No. 8,572,208
- U.S. Patent No. 8,572,210

All the reference patents listed above are in the same patent family as the '903 patent and all have expired.

Google provides the following non-limiting examples of how the Asserted Claims of the '903 patent are rendered obvious by the claims of U.S. Patent No.

8,291,046 (the "'046 patent"), alone or in combination with the prior art references listed in Tables 1–3 above:

'903 Claim	'046 Claim
28[PRE] A method, in a content delivery system operative in a computer network for delivering content to client machines, the computer network comprising a plurality of origin servers, each of said origin servers having resources associated therewith, and the content delivery system comprising at least one shared repeater server operable to replicate resources associated with the plurality of origin servers, the method comprising:	1[PRE] A method of processing requests for resources in a system in which a plurality of content providers provide multiple resources, the method comprising 1[A] (A) responsive to a first request from a first client for a first resource, said first resource being associated with a first content provider, said first content provider being a subscriber to a shared content delivery network (CDN) including a plurality of repeater servers, each of the repeater servers being configured to serve resources on behalf of subscribers to the CDN, said first request including at least a first name identifying said first content provider, [21PRE and 21A] A method of processing resource requests in a computer network, the method comprising: (A) providing a shared content delivery network including a plurality of repeater servers, wherein each of the plurality of repeater servers is configured to serve resources on behalf of a plurality of subscribers to the shared content delivery network;
28[A] associating the at least one repeater server with a first alias name, wherein requests for a first resource located on a first origin server are directed, based at least in part on said first alias name, to the at least one repeater server for delivery of the first	1[A] (A) responsive to a first request from a first client for a first resource, said first resource being associated with a first content provider, said first content provider being a subscriber to a shared content delivery network (CDN) including a plurality of repeater servers, each of the repeater servers being

’903 Claim	’046 Claim
resource from said at least one repeater server;	configured to serve resources on behalf of subscribers to the CDN, said first request including at least a first name identifying said first content provider, 1[Ai] (a1) serving said first resource to the first client from a first repeater server in the shared CDN, said first repeater server having been selected based at least in part on (i) load on said repeater servers in said CDN, and (ii) a location corresponding to said first client; and [10] A method as in any one of claims 1-**6** and **7**-**8** wherein the system comprises the Internet, and wherein the first request is based at least in part on a first Uniform Resource Locator (URL) that includes said first name, and wherein the second request is based, at least in part, on a second URL that includes said second name. [14] A method as recited in claim 1, wherein the first request comprises an HTTP Request and the first name is contained in an HTTP header associated with the first request, and wherein the second request comprises an HTTP Request and the second name is contained in an HTTP header associated with the second request. [15] A method as recited in claim 14, wherein: the first repeater server uses at least the first name and the first table on the first repeater server to identify the first

’903 Claim	’046 Claim
	origin server as an origin server from which to retrieve the first resource; and the second repeater server uses at least the second name and the table on the second repeater server to identify the second origin server as an origin server from which to retrieve the second resource. [16] A method as recited in claim 15, wherein the first name comprises a first hostname associated with the first content provider and the second name comprises a second hostname associated with the second content provider. [21B] responsive to a first request from a first client for a first resource, said first resource being associated with a first content provider, said first content provider being a subscriber to the shared content delivery network, at a first repeater server in the shared content delivery network, said first repeater server having been selected based at least in part on (i) load on said repeater servers in said shared content delivery network, and (ii) a location corresponding to said first client [23] A method as in any one of claims 21-22 wherein the computer network comprises the Internet, and wherein the first request is based at least in part on a first Uniform Resource Locator (URL) that includes a first hostname, and wherein the second request is based, at least in part, on a second URL that includes a second hostname.

’903 Claim	’046 Claim
	[29] A method as recited in claim 21, wherein the first request comprises an HTTP header having a first name associated with the first content provider, and wherein the second request comprises an HTTP header having a second name associated with the second content provider.
28[B] associating the at least one repeater server with a second alias name, wherein requests for a second resource located on a second origin server are directed, based at least in part on said second alias name, to the at least one repeater server for delivery of the second resource from said at least one repeater server, wherein the second origin server is distinct from the first origin server;	[1B] (B) responsive to a second request from a second client for a second resource, said second resource being associated with a second content provider distinct from said first content provider, said second content provider being a subscriber to the shared CDN, and said second request including at least a second name distinct from said first name, said second name identifying said second content provider, [1Bi] (b1) serving said second resource to the second client from a second repeater server in the shared CDN, said second repeater server having been selected based at least in part on (i) load on said repeater servers in said CDN, and (ii) a location corresponding to said second client; and [10] A method as in any one of claims 1-**6** and **7**-**8** wherein the system comprises the Internet, and wherein the first request is based at least in part on a first Uniform Resource Locator (URL) that includes said first name, and wherein the second request is based, at least in part, on a second URL that includes said second name.

’903 Claim	’046 Claim
	[14] A method as recited in claim 1, wherein the first request comprises an HTTP Request and the first name is contained in an HTTP header associated with the first request, and wherein the second request comprises an HTTP Request and the second name is contained in an HTTP header associated with the second request. [15] A method as recited in claim 14, wherein: the first repeater server uses at least the first name and the first table on the first repeater server to identify the first origin server as an origin server from which to retrieve the first resource; and the second repeater server uses at least the second name and the table on the second repeater server to identify the second origin server as an origin server from which to retrieve the second resource. [16] A method as recited in claim 15, wherein the first name comprises a first hostname associated with the first content provider and the second name comprises a second hostname associated with the second content provider. [20] A method as recited in claim 1, wherein the first origin server is located in a network operated by the first content provider distinct from the shared CDN and wherein the second origin server is located in a network operated by the second content provider

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	distinct from the first content provider network and the shared CDN. [21C] responsive to a second request from a second client, the second request being for a second resource distinct from said first resource, and said second resource being associated with a second content provider distinct from said first content provider, said second content provider being a subscriber to the content delivery network, at a second repeater server in the shared content delivery network, said second repeater server having been selected based at least in part on (i) load on said repeater servers in said shared content delivery network, and (ii) a location corresponding to said second client
28[C] providing a table listing origin servers having content located thereon, wherein said content is authorized for delivery to client machines via the at least one shared repeater server, and wherein the origin servers comprise the first origin server and the second origin server; and	[1Aii] (a2) when the first repeater server does not have the first resource, the first repeater uses at least a first table on the first repeater server and information included with the first request for the first resource to determine a first origin server associated with the first resource, said first repeater server requesting a copy of the first resource from the first origin server, and [1Bii] (b2) when the second repeater server does not have the second resource, the second repeater uses at least a second table on the second repeater server and information included with the second request for the second resource to determine a second origin server associated with the second resource, said second repeater server

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	requesting a copy of the second resource from the second origin server. [14] A method as recited in claim 1, wherein the first request comprises an HTTP Request and the first name is contained in an HTTP header associated with the first request, and wherein the second request comprises an HTTP Request and the second name is contained in an HTTP header associated with the second request. [15] A method as recited in claim 14, wherein: the first repeater server uses at least the first name and the first table on the first repeater server to identify the first origin server as an origin server from which to retrieve the first resource; and the second repeater server uses at least the second name and the table on the second repeater server to identify the second origin server as an origin server from which to retrieve the second resource. [16] A method as recited in claim 15, wherein the first name comprises a first hostname associated with the first content provider and the second name comprises a second hostname associated with the second content provider. [21B1 and 21B2] (b1) if said first repeater server does not have said first resource, the first repeater uses at least a first table on the first repeater server and information included with the first

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	request to determine a first origin server associated with the first resource, and said first repeater server obtaining a copy of said first resource from the first origin server; and (b2) said first repeater server serving said first resource [21C1 and 21C2] (c1) if said second repeater server does not have said second resource, the second repeater uses at least a second table on the second repeater server and information included with the second request to determine a second origin server associated with the second resource, and said second repeater server obtaining a copy of said second resource from said second origin server; and (c2) said second repeater server serving said second resource.
28[D] wherein the at least one repeater server is further constructed and adapted to analyze, using the table, an alias name received with a client request for a particular resource to determine an origin server associated with the particular resource.	[1Aii] (a2) when the first repeater server does not have the first resource, the first repeater uses at least a first table on the first repeater server and information included with the first request for the first resource to determine a first origin server associated with the first resource, said first repeater server requesting a copy of the first resource from the first origin server, and [1Bii] (b2) when the second repeater server does not have the second resource, the second repeater uses at least a second table on the second repeater server and information included with the second request for the second resource to determine a second origin server associated with the second

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	resource, said second repeater server requesting a copy of the second resource from the second origin server. [14] A method as recited in claim 1, wherein the first request comprises an HTTP Request and the first name is contained in an HTTP header associated with the first request, and wherein the second request comprises an HTTP Request and the second name is contained in an HTTP header associated with the second request. [15] A method as recited in claim 14, wherein: the first repeater server uses at least the first name and the first table on the first repeater server to identify the first origin server as an origin server from which to retrieve the first resource; and the second repeater server uses at least the second name and the table on the second repeater server to identify the second origin server as an origin server from which to retrieve the second resource. [16] A method as recited in claim 15, wherein the first name comprises a first hostname associated with the first content provider and the second name comprises a second hostname associated with the second content provider. [21B1 and 21B2] (b1) if said first repeater server does not have said first resource, the first repeater uses at least a first table on the first repeater server

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	and information included with the first request to determine a first origin server associated with the first resource, and said first repeater server obtaining a copy of said first resource from the first origin server; and (b2) said first repeater server serving said first resource [21C1 and 21C2] (c1) if said second repeater server does not have said second resource, the second repeater uses at least a second table on the second repeater server and information included with the second request to determine a second origin server associated with the second resource, and said second repeater server obtaining a copy of said second resource from said second origin server; and (c2) said second repeater server serving said second resource.
[29] The method of claim 28, further comprising: in response to a request for the first resource issued by a particular client machine, identifying the at least one shared repeater server from a set of shared repeater servers based at least in part on a network cost of delivering resources to the particular client machine; and associating the first resource with the first alias name.	[1A] (A) responsive to a first request from a first client for a first resource, said first resource being associated with a first content provider, said first content provider being a subscriber to a shared content delivery network (CDN) including a plurality of repeater servers, each of the repeater servers being configured to serve resources on behalf of subscribers to the CDN, said first request including at least a first name identifying said first content provider, [1Ai] (a1) serving said first resource to the first client from a first repeater server in the shared CDN, said first repeater server having been selected based at least in part on (i) load on said repeater servers in said CDN, and (ii) a

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	location corresponding to said first client; and [2] A method as in claim 1 wherein said first repeater server was selected based at least in part on data corresponding to a cost of transmission between the first repeater server and the first client, and wherein the second repeater server was selected based at least in part on data corresponding to a cost of transmission between the second repeater server and the second client. [12] A method as recited in claim 1, wherein the CDN comprises at least a first repeater selector mechanism and a second repeater selector mechanism, the method further comprising: by the first repeater selector mechanism, selecting the first repeater server to serve the first resource to the first client; and by the second repeater selector mechanism, selecting the second repeater server to serve the second resource to the second client. [13] A method as recited in claim 12, wherein: the step of selecting by the first repeater selector mechanism comprises a step for determining a Group Reduction Table and a Link Cost Table; wherein said Group Reduction Table and said Link Cost Table are operable for use in selecting the first repeater server to serve the first resource to the first client and a step for redirecting the first client to the first repeater server.

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	[14] A method as recited in claim 1, wherein the first request comprises an HTTP Request and the first name is contained in an HTTP header associated with the first request, and wherein the second request comprises an HTTP Request and the second name is contained in an HTTP header associated with the second request. [15] A method as recited in claim 14, wherein: the first repeater server uses at least the first name and the first table on the first repeater server to identify the first origin server as an origin server from which to retrieve the first resource; and the second repeater server uses at least the second name and the table on the second repeater server to identify the second origin server as an origin server from which to retrieve the second resource. [16] A method as recited in claim 15, wherein the first name comprises a first hostname associated with the first content provider and the second name comprises a second hostname associated with the second content provider. [22] A method as in claim 21 wherein said first repeater server was selected based at least in part on data corresponding to a cost of transmission between the first repeater server and the first client, and wherein the second repeater server was selected based at

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	least in part on data corresponding to a cost of transmission between the second repeater server and the second client.
[30] The method of claim 28, further comprising: in response to a request for the first resource issued by a particular client machine, identifying the at least one repeater server from a set of shared repeater servers based at least in part on load characteristics of the set of shared repeater servers; and associating the first resource with the first alias name.	[1A] (A) responsive to a first request from a first client for a first resource, said first resource being associated with a first content provider, said first content provider being a subscriber to a shared content delivery network (CDN) including a plurality of repeater servers, each of the repeater servers being configured to serve resources on behalf of subscribers to the CDN, said first request including at least a first name identifying said first content provider, [1Ai] (a1) serving said first resource to the first client from a first repeater server in the shared CDN, said first repeater server having been selected based at least in part on (i) load on said repeater servers in said CDN, and (ii) a location corresponding to said first client; and [2] A method as in claim 1 wherein said first repeater server was selected based at least in part on data corresponding to a cost of transmission between the first repeater server and the first client, and wherein the second repeater server was selected based at least in part on data corresponding to a cost of transmission between the second repeater server and the second client. [14] A method as recited in claim 1, wherein the first request comprises an HTTP Request and the first name is contained in an HTTP header associated

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	with the first request, and wherein the second request comprises an HTTP Request and the second name is contained in an HTTP header associated with the second request. [15] A method as recited in claim 14, wherein: the first repeater server uses at least the first name and the first table on the first repeater server to identify the first origin server as an origin server from which to retrieve the first resource; and the second repeater server uses at least the second name and the table on the second repeater server to identify the second origin server as an origin server from which to retrieve the second resource. [16] A method as recited in claim 15, wherein the first name comprises a first hostname associated with the first content provider and the second name comprises a second hostname associated with the second content provider. [21B] responsive to a first request from a first client for a first resource, said first resource being associated with a first content provider, said first content provider being a subscriber to the shared content delivery network, at a first repeater server in the shared content delivery network, said first repeater server having been selected based at least in part on (i) load on said repeater servers in said shared content

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	delivery network, and (ii) a location corresponding to said first client
[31] The method of claim 28, further comprising: in response to a request for the first resource issued by a particular client machine, identifying the at least one repeater server from a set of shared repeater servers based at least in part on a location of the particular client machine relative to the at least one shared repeater server; and associating the first resource with the first alias name.	[1A] (A) responsive to a first request from a first client for a first resource, said first resource being associated with a first content provider, said first content provider being a subscriber to a shared content delivery network (CDN) including a plurality of repeater servers, each of the repeater servers being configured to serve resources on behalf of subscribers to the CDN, said first request including at least a first name identifying said first content provider, [1Ai] (a1) serving said first resource to the first client from a first repeater server in the shared CDN, said first repeater server having been selected based at least in part on (i) load on said repeater servers in said CDN, and (ii) a location corresponding to said first client; and [2] A method as in claim 1 wherein said first repeater server was selected based at least in part on data corresponding to a cost of transmission between the first repeater server and the first client, and wherein the second repeater server was selected based at least in part on data corresponding to a cost of transmission between the second repeater server and the second client. [14] A method as recited in claim 1, wherein the first request comprises an HTTP Request and the first name is contained in an HTTP header associated with the first request, and wherein the

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	second request comprises an HTTP Request and the second name is contained in an HTTP header associated with the second request. [15] A method as recited in claim 14, wherein: the first repeater server uses at least the first name and the first table on the first repeater server to identify the first origin server as an origin server from which to retrieve the first resource; and the second repeater server uses at least the second name and the table on the second repeater server to identify the second origin server as an origin server from which to retrieve the second resource. [16] A method as recited in claim 15, wherein the first name comprises a first hostname associated with the first content provider and the second name comprises a second hostname associated with the second content provider. [21B] responsive to a first request from a first client for a first resource, said first resource being associated with a first content provider, said first content provider being a subscriber to the shared content delivery network, at a first repeater server in the shared content delivery network, said first repeater server having been selected based at least in part on (i) load on said repeater servers in said shared content delivery network, and (ii) a location corresponding to said first client

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[32] The method as recited in claim 28, wherein the resources comprise an HTTP-based resource.	[14] A method as recited in claim 1, wherein the first request comprises an HTTP Request and the first name is contained in an HTTP header associated with the first request, and wherein the second request comprises an HTTP Request and the second name is contained in an HTTP header associated with the second request. [25] A method as in claim 21 wherein: said first request is an HTTP request. [26] A method as in claim 25 wherein said HTTP request is directed to said first repeater server by an HTTP REDIRECT command. [29] A method as recited in claim 21, wherein the first request comprises an HTTP header having a first name associated with the first content provider, and wherein the second request comprises an HTTP header having a second name associated with the second content provider.
[36] A method as recited in claim 28, further comprising: rejecting the client request for the particular resource if the alias name received with the client request is not included the table.	[1Aii] (a2) when the first repeater server does not have the first resource, the first repeater uses at least a first table on the first repeater server and information included with the first request for the first resource to determine a first origin server associated with the first resource, said first repeater server requesting a copy of the first resource from the first origin server, and [1Bii] (b2) when the second repeater server does not have the second

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	resource, the second repeater uses at least a second table on the second repeater server and information included with the second request for the second resource to determine a second origin server associated with the second resource, said second repeater server requesting a copy of the second resource from the second origin server. [21B1 and 21B2] (b1) if said first repeater server does not have said first resource, the first repeater uses at least a first table on the first repeater server and information included with the first request to determine a first origin server associated with the first resource, and said first repeater server obtaining a copy of said first resource from the first origin server; and (b2) said first repeater server serving said first resource [21C1 and 21C2] (c1) if said second repeater server does not have said second resource, the second repeater uses at least a second table on the second repeater server and information included with the second request to determine a second origin server associated with the second resource, and said second repeater server obtaining a copy of said second resource from said second origin server; and (c2) said second repeater server serving said second resource.
37[PRE] A method, in a content delivery system operative in a computer network for delivering content to client machines and comprising at least one shared repeater server operable to	*See* 28[PRE], *supra*.

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replicate resources stored on a plurality of origin servers, the method comprising:	
37[A] associating a plurality of alias names with the at least one shared repeater server, each of said plurality of alias names being associated with an origin server, wherein a first alias name of said plurality of alias names is associated with a first origin server, and at least a second alias name of said plurality of alias names is associated with a second origin server distinct from said first origin server,	*See* 28[A], [B], [C] *supra*.
37[B] providing at least one table associating alias names with origin servers having content located thereon, wherein said content is authorized for delivery to client machines via the at least one shared repeater server, wherein the origin servers comprise the first origin server and the second origin server;	*See* 28[C], *supra*.
37[C] wherein requests for a first resource originating on the first origin server are directed, based at least in part on said first alias name, to the at least one shared repeater server for delivery of the first resource from said at least one repeater server; and	*See* 28[A], *supra*.
[37D] wherein requests for a second resource originating on the second origin server are directed, based at least in part on said second alias name, to the at least one shared repeater server for delivery of the second resource from said at least one repeater server; and	*See* 28[B], *supra*.
37[E] wherein the at least one repeater server uses the at least one table and an alias name received with a client	*See* 28[D], *supra*.

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request for a resource to determine an origin server associated with the requested resource.	
[38] The method as in claim 37, wherein a copy of the at least one table is located on each of a plurality of repeater servers.	[1Aii] (a2) when the first repeater server does not have the first resource, the first repeater uses at least a first table on the first repeater server and information included with the first request for the first resource to determine a first origin server associated with the first resource, said first repeater server requesting a copy of the first resource from the first origin server, and [1Bii] (b2) when the second repeater server does not have the second resource, the second repeater uses at least a second table on the second repeater server and information included with the second request for the second resource to determine a second origin server associated with the second resource, said second repeater server requesting a copy of the second resource from the second origin server. [15] A method as recited in claim 14, wherein: the first repeater server uses at least the first name and the first table on the first repeater server to identify the first origin server as an origin server from which to retrieve the first resource; and the second repeater server uses at least the second name and the table on the second repeater server to identify the second origin server as an origin server from which to retrieve the second resource.

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	[17] A method as recited in claim 1, wherein each of the plurality of repeater servers is configured to record activity related to serving resources therefrom on behalf of subscribers to the CDN, the method further comprising: responsive to the act of serving (a1), the first repeater recording at least information related to the serving of at least the first resource on behalf of the first content provider; and responsive to the act of serving (b1), the second repeater recording at least information related to the serving of at least the second resource on behalf of the second content provider. [21B1 and 21B2] (b1) if said first repeater server does not have said first resource, the first repeater uses at least a first table on the first repeater server and information included with the first request to determine a first origin server associated with the first resource, and said first repeater server obtaining a copy of said first resource from the first origin server; and (b2) said first repeater server serving said first resource [21C1 and 21C2] (c1) if said second repeater server does not have said second resource, the second repeater uses at least a second table on the second repeater server and information included with the second request to determine a second origin server associated with the second resource, and said second repeater server obtaining a copy of said second

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	resource from said second origin server; and (c2) said second repeater server serving said second resource.
[39] A method as recited in claim 37, further comprising: rejecting the client request for the resource if the alias name received with the client request is not included the table.	*See* [36], *supra*.

Google provides the following non-limiting examples of how the Asserted Claims of the ’903 patent are rendered obvious by the claims of U.S. Patent No. 8,296,396 (the “’396 patent”), alone or in combination with the prior art references listed in Tables 1–3 above:

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28[PRE] A method, in a content delivery system operative in a computer network for delivering content to client machines, the computer network comprising a plurality of origin servers, each of said origin servers having resources associated therewith, and the content delivery system comprising at least one shared repeater server operable to replicate resources associated with the plurality of origin servers, the method comprising:	[1PRE] A method for delivering resources to clients in a framework in which a plurality of repeater servers form a shared content delivery network (CDN) operable to serve resources to clients on behalf of a plurality of content providers, wherein a first resource is associated with a first content provider of said plurality of content providers, and wherein said first resource references a second resource via at least a first hostname, the method comprising: [1A] (A) associating the first content provider with the shared CDN such that at least the second resource can be served from the shared CDN to clients on behalf of the first content provider, wherein the associating act (A) comprises: [12PRE] A method for delivering resources to clients on behalf of a

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	plurality of content providers, wherein at least a first resource maintained on an origin server associated with a first content provider of said plurality of content providers references a second resource via at least a first hostname, the method comprising: [1A] (A) providing a plurality of repeater servers distinct from the origin server; [31PRE and 31A] A method for delivering resources to clients on behalf of a plurality of content providers, wherein at least a first resource is maintained on at least a first origin server associated with a first content provider of said plurality of content providers, and wherein at least a second resource is maintained on at least a second origin server associated with a second content provider of said plurality of content providers, said second content provider being distinct from said first content provider, and wherein said first resource references a third resource and wherein said second resource references a fourth resource, the method comprising: (A) providing a plurality of repeater servers distinct from the first origin server and the second origin server
28[A] associating the at least one repeater server with a first alias name, wherein requests for a first resource located on a first origin server are directed, based at least in part on said first alias name, to the at least one repeater server for delivery of the first	[1PRE] A method for delivering resources to clients in a framework in which a plurality of repeater servers form a shared content delivery network (CDN) operable to serve resources to clients on behalf of a plurality of content providers, wherein a first

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resource from said at least one repeater server;	resource is associated with a first content provider of said plurality of content providers, and wherein said first resource references a second resource via at least a first hostname, the method comprising: [1A] (A) associating the first content provider with the shared CDN such that at least the second resource can be served from the shared CDN to clients on behalf of the first content provider, wherein the associating act (A) comprises: [1Ai] (a1) configuring each of the plurality of repeater servers with a table listing at least one identifier for each of the plurality of content providers; and [1B] (B) after at least a portion of the first resource is served to a client from a content source distinct from said plurality of repeater servers, providing at least a second hostname that is at least partially distinct from the first hostname, and after resolution of the second hostname, serving the second resource to the client from a particular repeater server in the shared CDN selected based, at least in part, on a relative location corresponding to said client and at least some of the plurality of repeater servers, and wherein the serving act (B) comprises: [2] A method as recited in claim 1, wherein a first uniform resource locator (URL) comprises the first hostname

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	and a second URL comprises the second hostname, the second hostname comprising at least an identifier associated with the first content provider in the table configured on the particular repeater server. [12A] (A) providing a plurality of repeater servers distinct from the origin server; [12B] (B) configuring each of the plurality of repeater servers with a table listing at least one identifier for each of the plurality of content providers; and [12C] (C) configuring each of the plurality of repeater servers to record activity related to serving resources therefrom on behalf of the content providers identified in the table; [12D] (D) after at least a portion of the first resource is served to a client from the origin server, providing at least a second hostname that is at least partially distinct from the first hostname, and after resolution of the second hostname, serving the second resource to the client from a particular repeater server of said plurality of repeater servers, and wherein the serving act (D) comprises: [12Di] (d1) if a copy of the second resource is available on the particular repeater server, serving the copy of the second resource to the client from the particular repeater server; otherwise,

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	[15] 5. A method as recited in claim 12, wherein the second resource is originally associated, via a first uniform resource locator (URL), with the origin server, said first URL including the first hostname, the first hostname being resolvable to said origin server, and wherein the method further comprises: causing the second resource to be associated with at least the particular repeater server via a second URL, wherein said second URL includes the second hostname, the second hostname being resolvable to identify at least the particular repeater server. [31PRE] A method for delivering resources to clients on behalf of a plurality of content providers, wherein at least a first resource is maintained on at least a first origin server associated with a first content provider of said plurality of content providers, and wherein at least a second resource is maintained on at least a second origin server associated with a second content provider of said plurality of content providers, said second content provider being distinct from said first content provider, and wherein said first resource references a third resource and wherein said second resource references a fourth resource, the method comprising: [31A, 31B, 31C] (A) providing a plurality of repeater servers distinct from the first origin server and the second origin server; (B) configuring each of the plurality of repeater servers

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	with a table listing at least one identifier for each of the plurality of content providers, including the first content provider and the second content provider, wherein the table configured on each of the plurality of repeater servers further comprises at least one origin server identifier corresponding to each of the content provider identifiers; (C) configuring each of the plurality of repeater servers to record activity related to serving resources therefrom on behalf of the content providers identified in the table [31D] after the first resource has been served to a first client from the first origin server, serving the third resource to the first client from a particular repeater server of said plurality of repeater servers, wherein the serving act comprises: (d1) if a copy of the third resource is available on the particular repeater server, serving the copy of the third resource to the client from the particular repeater server; otherwise, (d2) replicating the third resource on the particular repeater server and then serving the third resource to the client from the particular repeater server, the replicating act (d2) further comprising: referencing the table using at least the identifier of the first content provider to determine an origin server associated with the first content provider; and retrieving the third resource from the origin server associated with the first content provider, said particular repeater server having been selected to serve the third resource to the first

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	client based, at least in part, on a relative location corresponding to said first client and at least some of the plurality of repeater servers
28[B] associating the at least one repeater server with a second alias name, wherein requests for a second resource located on a second origin server are directed, based at least in part on said second alias name, to the at least one repeater server for delivery of the second resource from said at least one repeater server, wherein the second origin server is distinct from the first origin server;	[1PRE] A method for delivering resources to clients in a framework in which a plurality of repeater servers form a shared content delivery network (CDN) operable to serve resources to clients on behalf of a plurality of content providers, wherein a first resource is associated with a first content provider of said plurality of content providers, and wherein said first resource references a second resource via at least a first hostname, the method comprising: [1A] (A) associating the first content provider with the shared CDN such that at least the second resource can be served from the shared CDN to clients on behalf of the first content provider, wherein the associating act (A) comprises: [1Ai] (a1) configuring each of the plurality of repeater servers with a table listing at least one identifier for each of the plurality of content providers; and [1B] (B) after at least a portion of the first resource is served to a client from a content source distinct from said plurality of repeater servers, providing at least a second hostname that is at least partially distinct from the first hostname, and after resolution of the second hostname, serving the second resource to the client from a particular

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	repeater server in the shared CDN selected based, at least in part, on a relative location corresponding to said client and at least some of the plurality of repeater servers, and wherein the serving act (B) comprises: [12A] (A) providing a plurality of repeater servers distinct from the origin server; [12B] (B) configuring each of the plurality of repeater servers with a table listing at least one identifier for each of the plurality of content providers; and [1C] (C) configuring each of the plurality of repeater servers to record activity related to serving resources therefrom on behalf of the content providers identified in the table; [12D] (D) after at least a portion of the first resource is served to a client from the origin server, providing at least a second hostname that is at least partially distinct from the first hostname, and after resolution of the second hostname, serving the second resource to the client from a particular repeater server of said plurality of repeater servers, and wherein the serving act (D) comprises: [12Di] (d1) if a copy of the second resource is available on the particular repeater server, serving the copy of the second resource to the client from the particular repeater server; otherwise,

’903 Claim	’396 Claim
	[15] 5. A method as recited in claim 12, wherein the second resource is originally associated, via a first uniform resource locator (URL), with the origin server, said first URL including the first hostname, the first hostname being resolvable to said origin server, and wherein the method further comprises: causing the second resource to be associated with at least the particular repeater server via a second URL, wherein said second URL includes the second hostname, the second hostname being resolvable to identify at least the particular repeater server. [31PRE] A method for delivering resources to clients on behalf of a plurality of content providers, wherein at least a first resource is maintained on at least a first origin server associated with a first content provider of said plurality of content providers, and wherein at least a second resource is maintained on at least a second origin server associated with a second content provider of said plurality of content providers, said second content provider being distinct from said first content provider, and wherein said first resource references a third resource and wherein said second resource references a fourth resource, the method comprising: [31A, 31B, 31C] (A) providing a plurality of repeater servers distinct from the first origin server and the second origin server; (B) configuring each of the plurality of repeater servers

’903 Claim	’396 Claim
	with a table listing at least one identifier for each of the plurality of content providers, including the first content provider and the second content provider, wherein the table configured on each of the plurality of repeater servers further comprises at least one origin server identifier corresponding to each of the content provider identifiers; (C) configuring each of the plurality of repeater servers to record activity related to serving resources therefrom on behalf of the content providers identified in the table
28[C] providing a table listing origin servers having content located thereon, wherein said content is authorized for delivery to client machines via the at least one shared repeater server, and wherein the origin servers comprise the first origin server and the second origin server; and	[1A] (A) associating the first content provider with the shared CDN such that at least the second resource can be served from the shared CDN to clients on behalf of the first content provider, wherein the associating act (A) comprises: [1Ai] (a1) configuring each of the plurality of repeater servers with a table listing at least one identifier for each of the plurality of content providers; and [9] A method as recited in claim 1, wherein the table configured on each of the plurality of repeater servers further comprises at least one origin server identifier corresponding to each of the content provider identifiers, wherein the replicating act (b1) comprises: referencing the table using the identifier of the first content provider to determine an origin server associated with the first content provider; and

’903 Claim	’396 Claim
	retrieving the second resource from the origin server associated with the first content provider. [12B] (B) configuring each of the plurality of repeater servers with a table listing at least one identifier for each of the plurality of content providers; and [12C] (C) configuring each of the plurality of repeater servers to record activity related to serving resources therefrom on behalf of the content providers identified in the table; [19] A method as recited in claim 12, wherein the table configured on each of the plurality of repeater servers further comprises at least one origin server identifier corresponding to each of the content provider identifiers, wherein the replicating act (d2) comprises: referencing the table using the identifier of the first content provider to determine an origin server associated with the first content provider; and retrieving the second resource from the origin server associated with the first content provider. [31B] configuring each of the plurality of repeater servers with a table listing at least one identifier for each of the plurality of content providers, including the first content provider and the second content provider, wherein the table configured on each of the plurality of repeater servers further comprises at least one origin server identifier

’903 Claim	’396 Claim
	corresponding to each of the content provider identifiers
28[D] wherein the at least one repeater server is further constructed and adapted to analyze, using the table, an alias name received with a client request for a particular resource to determine an origin server associated with the particular resource.	[1A] (A) associating the first content provider with the shared CDN such that at least the second resource can be served from the shared CDN to clients on behalf of the first content provider, wherein the associating act (A) comprises: [1Ai] (a1) configuring each of the plurality of repeater servers with a table listing at least one identifier for each of the plurality of content providers; and [1B] (B) after at least a portion of the first resource is served to a client from a content source distinct from said plurality of repeater servers, providing at least a second hostname that is at least partially distinct from the first hostname, and after resolution of the second hostname, serving the second resource to the client from a particular repeater server in the shared CDN selected based, at least in part, on a relative location corresponding to said client and at least some of the plurality of repeater servers, and wherein the serving act (B) comprises: [1Bii] (b2) if a copy of the second resource is not available on the particular repeater server, [9] A method as recited in claim 1, wherein the table configured on each of the plurality of repeater servers further comprises at least one origin server identifier corresponding to each of the

’903 Claim	’396 Claim
	content provider identifiers, wherein the replicating act (b1) comprises: referencing the table using the identifier of the first content provider to determine an origin server associated with the first content provider; and retrieving the second resource from the origin server associated with the first content provider. [12B] (B) configuring each of the plurality of repeater servers with a table listing at least one identifier for each of the plurality of content providers; and [12C] (C) configuring each of the plurality of repeater servers to record activity related to serving resources therefrom on behalf of the content providers identified in the table; [19] A method as recited in claim 12, wherein the table configured on each of the plurality of repeater servers further comprises at least one origin server identifier corresponding to each of the content provider identifiers, wherein the replicating act (d2) comprises: referencing the table using the identifier of the first content provider to determine an origin server associated with the first content provider; and retrieving the second resource from the origin server associated with the first content provider. [31PRE] A method for delivering resources to clients on behalf of a plurality of content providers, wherein at least a first resource is maintained on

’903 Claim	’396 Claim
	at least a first origin server associated with a first content provider of said plurality of content providers, and wherein at least a second resource is maintained on at least a second origin server associated with a second content provider of said plurality of content providers, said second content provider being distinct from said first content provider, and wherein said first resource references a third resource and wherein said second resource references a fourth resource, the method comprising: [31A, 31B, 31C] (A) providing a plurality of repeater servers distinct from the first origin server and the second origin server; (B) configuring each of the plurality of repeater servers with a table listing at least one identifier for each of the plurality of content providers, including the first content provider and the second content provider, wherein the table configured on each of the plurality of repeater servers further comprises at least one origin server identifier corresponding to each of the content provider identifiers; (C) configuring each of the plurality of repeater servers to record activity related to serving resources therefrom on behalf of the content providers identified in the table
[29] The method of claim 28, further comprising: in response to a request for the first resource issued by a particular client machine, identifying the at least one shared repeater server from a set of shared repeater servers based at least in part on a network cost of delivering	[2] A method as recited in claim 1, wherein a first uniform resource locator (URL) comprises the first hostname and a second URL comprises the second hostname, the second hostname comprising at least an identifier associated with the first content

’903 Claim	’396 Claim
resources to the particular client machine; and associating the first resource with the first alias name.	provider in the table configured on the particular repeater server. [4] A method as in claim 2, wherein the particular repeater server is chosen from the plurality of repeater servers based at least in part on the relative location of the client, said relative location determined based at least in part on data corresponding to a cost of transmission between at least some of the repeater servers and the client. [12D] said particular repeater server having been selected based, at least in part, on a relative location corresponding to said client and at least some of the plurality of repeater servers; and [13] A method as recited in claim 12, further comprising: determining the relative location of the client based at least in part on data corresponding to a cost of transmission between at least some of the repeater servers and the client. [25] A method as recited in claim 24, wherein the software component uses at least a Group Reduction Table means and a Link Cost Table means for choosing the particular repeater server from the plurality of repeater servers.
[30] The method of claim 28, further comprising: in response to a request for the first resource issued by a particular client machine, identifying the at least one repeater server from a set of shared repeater servers based at least in part on	[5] A method as in claim 4, wherein the particular repeater server is further chosen, based at least in part on load measurements.

’903 Claim	’396 Claim
load characteristics of the set of shared repeater servers; and associating the first resource with the first alias name.	[14] A method as recited in claim 13, further comprising: using load measurements to select the particular repeater server from the repeater servers considered in the determining step. [26] A method as recited in claim 22, wherein selection of the particular repeater server is further based at least in part on load conditions on at least some of the plurality of repeater servers.
[31] The method of claim 28, further comprising: in response to a request for the first resource issued by a particular client machine, identifying the at least one repeater server from a set of shared repeater servers based at least in part on a location of the particular client machine relative to the at least one shared repeater server; and associating the first resource with the first alias name.	[4] A method as in claim 2, wherein the particular repeater server is chosen from the plurality of repeater servers based at least in part on the relative location of the client, said relative location determined based at least in part on data corresponding to a cost of transmission between at least some of the repeater servers and the client. [13] A method as recited in claim 12, further comprising: determining the relative location of the client based at least in part on data corresponding to a cost of transmission between at least some of the repeater servers and the client. [25] A method as recited in claim 24, wherein the software component uses at least a Group Reduction Table means and a Link Cost Table means for choosing the particular repeater server from the plurality of repeater servers. [31D] after the first resource has been served to a first client from the first origin server, serving the third resource

’903 Claim	’396 Claim
	to the first client from a particular repeater server of said plurality of repeater servers, wherein the serving act comprises . . . said particular repeater server having been selected to serve the third resource to the first client based, at least in part, on a relative location corresponding to said first client and at least some of the plurality of repeater servers [31F] after the second resource has been served to a second client from the second origin server, serving the fourth resource to the second client from the particular repeater server, wherein the serving act comprises . . . said particular repeater server having been selected to serve the fourth resource to the second client based, at least in part, on a relative location corresponding to said second client and at least some of the plurality of repeater servers; and
[32] The method as recited in claim 28, wherein the resources comprise an HTTP-based resource.	[1PRE] A method for delivering resources to clients in a framework in which a plurality of repeater servers form a shared content delivery network (CDN) operable to serve resources to clients on behalf of a plurality of content providers, wherein a first resource is associated with a first content provider of said plurality of content providers, and wherein said first resource references a second resource via at least a first hostname, the method comprising: [1B] (B) after at least a portion of the first resource is served to a client from a content source distinct from said

’903 Claim	’396 Claim
	plurality of repeater servers, providing at least a second hostname that is at least partially distinct from the first hostname, and after resolution of the second hostname, serving the second resource to the client from a particular repeater server in the shared CDN selected based, at least in part, on a relative location corresponding to said client and at least some of the plurality of repeater servers, and wherein the serving act (B) comprises: [12PRE] A method for delivering resources to clients on behalf of a plurality of content providers, wherein at least a first resource maintained on an origin server associated with a first content provider of said plurality of content providers references a second resource via at least a first hostname, the method comprising: [12D] (D) after at least a portion of the first resource is served to a client from the origin server, providing at least a second hostname that is at least partially distinct from the first hostname, and after resolution of the second hostname, serving the second resource to the client from a particular repeater server of said plurality of repeater servers, and wherein the serving act (D) comprises: [31PRE and 31A] A method for delivering resources to clients on behalf of a plurality of content providers, wherein at least a first resource is maintained on at least a first origin server associated with a first content

’903 Claim	’396 Claim
	provider of said plurality of content providers, and wherein at least a second resource is maintained on at least a second origin server associated with a second content provider of said plurality of content providers, said second content provider being distinct from said first content provider, and wherein said first resource references a third resource and wherein said second resource references a fourth resource, the method comprising: (A) providing a plurality of repeater servers distinct from the first origin ser
[36] A method as recited in claim 28, further comprising: rejecting the client request for the particular resource if the alias name received with the client request is not included the table.	[12PRE] A method for delivering resources to clients on behalf of a plurality of content providers, wherein at least a first resource maintained on an origin server associated with a first content provider of said plurality of content providers references a second resource via at least a first hostname, the method comprising: [12B] (B) configuring each of the plurality of repeater servers with a table listing at least one identifier for each of the plurality of content providers; and [12C] (C) configuring each of the plurality of repeater servers to record activity related to serving resources therefrom on behalf of the content providers identified in the table; [31A, 31B, 31C] (A) providing a plurality of repeater servers distinct from the first origin server and the second origin server; (B) configuring each of the plurality of repeater servers

’903 Claim	’396 Claim
	with a table listing at least one identifier for each of the plurality of content providers, including the first content provider and the second content provider, wherein the table configured on each of the plurality of repeater servers further comprises at least one origin server identifier corresponding to each of the content provider identifiers; (C) configuring each of the plurality of repeater servers to record activity related to serving resources therefrom on behalf of the content providers identified in the table
37[PRE] A method, in a content delivery system operative in a computer network for delivering content to client machines and comprising at least one shared repeater server operable to replicate resources stored on a plurality of origin servers, the method comprising:	*See* 28[PRE], *supra*.
37[A] associating a plurality of alias names with the at least one shared repeater server, each of said plurality of alias names being associated with an origin server, wherein a first alias name of said plurality of alias names is associated with a first origin server, and at least a second alias name of said plurality of alias names is associated with a second origin server distinct from said first origin server,	*See* 28[A], [B], [C] *supra*.
37[B] providing at least one table associating alias names with origin servers having content located thereon, wherein said content is authorized for delivery to client machines via the at least one shared repeater server, wherein the origin servers comprise the	*See* 28[C], *supra*.

’903 Claim	’396 Claim
first origin server and the second origin server;	
37[C] wherein requests for a first resource originating on the first origin server are directed, based at least in part on said first alias name, to the at least one shared repeater server for delivery of the first resource from said at least one repeater server; and	*See* 28[A], *supra*.
[37D] wherein requests for a second resource originating on the second origin server are directed, based at least in part on said second alias name, to the at least one shared repeater server for delivery of the second resource from said at least one repeater server; and	*See* 28[B], *supra*.
37[E] wherein the at least one repeater server uses the at least one table and an alias name received with a client request for a resource to determine an origin server associated with the requested resource.	*See* 28[D], *supra*.
[38] The method as in claim 37, wherein a copy of the at least one table is located on each of a plurality of repeater servers.	[1Ai] (a1) configuring each of the plurality of repeater servers with a table listing at least one identifier for each of the plurality of content providers; and [12B] (B) configuring each of the plurality of repeater servers with a table listing at least one identifier for each of the plurality of content providers; and [31A, 31B, 31C] (A) providing a plurality of repeater servers distinct from the first origin server and the second origin server; (B) configuring each of the plurality of repeater servers with a table listing at least one identifier for each of the plurality of content providers, including the first content

’903 Claim	’396 Claim
	provider and the second content provider, wherein the table configured on each of the plurality of repeater servers further comprises at least one origin server identifier corresponding to each of the content provider identifiers; (C) configuring each of the plurality of repeater servers to record activity related to serving resources therefrom on behalf of the content providers identified in the table
[39] A method as recited in claim 37, further comprising: rejecting the client request for the resource if the alias name received with the client request is not included the table.	*See* [36], *supra*.

As shown above, the claims of the ’046 and ’396 patents render the claims of the ’903 patent obvious. Obviousness-type double patenting analyses similar to those set forth above for the ’046 and ’396 patents could be made with respect to all the reference patents listed above.

During prosecution of the ’046 patent, the Examiner and the patent applicant discussed a potential double-patenting rejection over the claims of U.S. Patent No. 6,185,598, which issued from the earliest-filed application in the ’903 patent family. In response, the applicant filed a terminal disclaimer over the ’598 patent, which expired on February 10, 2018.

Similarly, during prosecution of the ’396 patent, the Examiner issued provisional rejections for obviousness-type double patenting over (1) the co-pending claims of U.S. Patent Application No. 11/441,253, the parent application of the ’396 patent that issued as U.S. Patent No. 8,281,035 (the “’035 patent”); and (2) the co-pending claims of U.S. Patent Application No. 11/806,154, which issued as the ’046 patent. In response, the applicant filed terminal disclaimers over the ’035 and ’046

patents. The ’035 patent expired on September 3, 2019, and the ’046 patent expired on March 30, 2021.

Because “a terminal disclaimer filed after the expiration of the earlier patent over which claims have been found obvious cannot cure obviousness-type double patenting,” *Boehringer Ingelheim Int’l GmbH v. Barr Labs., Inc.*, 592 F.3d 1340, 1348 (Fed. Cir. 2010), Plaintiff cannot now cure double patenting in the ’903 patent claims over the expired reference patents listed above. Moreover, the ’903 patent itself expired on September 24, 2023.

Google reserves the right to revise or amend its double patenting assertions against the Asserted Patents in light of, without limitation, information provided by Plaintiff concerning its infringement allegations, further investigation and discovery, the Court’s constructions of the claims at issue, positions taken by Plaintiff in this action or any other proceeding, review and analysis of expert witnesses, and/or as other circumstances warrant.

V. INVALIDITY UNDER 35 U.S.C. § 112

As detailed below, certain of the Asserted Claims lack written description or enablement, are indefinite, and/or fail to claim what the inventors regard as the invention under provisions of 35 U.S.C. § 112.[7] The § 112 invalidity contentions set forth below are subject to revision and amendment pursuant to Federal Rule of Civil Procedure 26(e) and the Orders of record in this matter to the extent appropriate in light of, without limitation, information provided by Plaintiff concerning its infringement allegations, further investigation and discovery, the Court’s constructions of the claims at issue, positions taken by Plaintiff in this action or any other proceeding, review and analysis of expert witnesses, and/or as other circumstances warrant.

[7] As most of the Asserted Patents claim priority to pre-AIA applications, the citations herein are to pre-AIA § 112 paragraphs 1, 2 and 6. Those provisions were replaced with newly designated §§ 112(a), (b), and (f), respectively, of the AIA.

A. Lack of Enablement/Written Description

35 U.S.C. § 112 ¶ 1 requires that the specification contain a written description of the invention. "[T]he hallmark of written description is disclosure." *Bos. Sci. Corp. v. Johnson & Johnson*, 647 F.3d 1353, 1361-62 (Fed. Cir. 2011) (citation omitted) (alteration in original). The test for whether a specification adequately describes an invention is "whether the disclosure of the application relied upon reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date . . . . [T]he test requires an objective inquiry into the four corners of the specification from the perspective of a person of ordinary skill in the art . . . [It] is a question of fact." *Ariad Pharms.,* 598 F.3d at 1351; *Bos. Sci.*, 647 F.3d at 1362. "Adequate written description means that the applicant, in the specification, must 'convey with reasonable clarity to those skilled in the art that, as of the filing date sought, he or she was in possession of the [claimed] invention.'" *Agilent Techs., Inc. v. Affymetrix, Inc.*, 567 F.3d 1366, 1379 (Fed. Cir. 2009). It is well settled that "one cannot disclose a forest in the original application, and then later pick a tree out of the forest and say here is my invention." *Purdue Pharma L.P. v. Faulding Inc.*, 230 F.3d 1320, 1326 (Fed. Cir. 2000). Rather, the specification must provide some guides or "blaze marks" that disclose the claimed invention "specifically, as something appellants actually invented." *Ariad,* 598 F.3d at 1348.

In addition, the enablement requirement of § 112 requires that the patent specification teach a skilled artisan how to "make and use" the claimed invention, which the Federal Circuit has held requires teaching "those skilled in the art how to make and use the full scope of the claimed invention without 'undue experimentation.'" *Genentech, Inc. v. Novo Nordisk A/S*, 108 F.3d 1361, 1365 (Fed. Cir. 1997) (quoting *In re Wright*, 999 F.2d 1557, 1561 (Fed. Cir. 1993)). "The scope of the claims must be less than or equal to the scope of the enablement." *Nat'l Recovery Tech., Inc. v. Magnetic Separation Sys., Inc.*, 166 F.3d 1190, 1196 (Fed. Cir. 1999).

Google also incorporates by reference and reserves the right to rely on the § 112 contentions served on Plaintiff by the defendant(s) in other cases, including the Related Cases.

1. Enablement/Written Description Contentions for the '903 Patent

Google reserves the right to argue that the Asserted Claims of the '903 patent, when read in light of the specification, prosecution history, and/or claim construction, infringement, and validity positions that Plaintiff has taken in this case or other cases, fail to reasonably convey to one of ordinary skill that the named inventor(s) had possession of the subject matter of the alleged invention and/or fail to enable a person of ordinary skill to make and use the alleged invention as claimed for at least the following reasons:

- Claim 28 of the '903 patent and any claims dependent therefrom are invalid for failure to satisfy the requirements of 35 U.S.C. § 112 because the specification as filed does not contain an adequate written description and/or enabling disclosure of "associating the at least one repeater server with a first alias name, wherein requests for a first resource located on a first origin server are directed, based at least in part on said first alias name, to the at least one repeater server for delivery of the first resource from said at least one repeater server."
- Claim 28 of the '903 patent and any claims dependent therefrom are invalid for failure to satisfy the requirements of 35 U.S.C. § 112 because the specification as filed does not contain an adequate written description and/or enabling disclosure of "associating the at least one repeater server with a second alias name, wherein requests for a second resource located on a second origin server are directed, based at least in part on said second alias name, to the at least one repeater server for delivery of the second resource from said at least one repeater server, wherein the second origin server is distinct from the first origin server."

- Claim 28 of the ’903 patent and any claims dependent therefrom are invalid for failure to satisfy the requirements of 35 U.S.C. § 112 because the specification as filed does not contain an adequate written description and/or enabling disclosure of “providing a table listing origin servers having content located thereon, wherein said content is authorized for delivery to client machines via the at least one shared repeater server, and wherein the origin servers comprise the first origin server and the second origin server.”
- Claim 29 of the ’903 patent and any claims dependent therefrom are invalid for failure to satisfy the requirements of 35 U.S.C. § 112 because the specification as filed does not contain an adequate written description and/or enabling disclosure of “in response to a request for the first resource issued by a particular client machine, identifying the at least one shared repeater server from a set of shared repeater servers based at least in part on a network cost of delivering resources to the particular client machine.”
- Claim 30 of the ’903 patent and any claims dependent therefrom are invalid for failure to satisfy the requirements of 35 U.S.C. § 112 because the specification as filed does not contain an adequate written description and/or enabling disclosure of “in response to a request for the first resource issued by a particular client machine, identifying the at least one repeater server from a set of shared repeater servers based at least in part on load characteristics of the set of shared repeater servers.”
- Claim 31 of the ’903 patent and any claims dependent therefrom are invalid for failure to satisfy the requirements of 35 U.S.C. § 112 because the specification as filed does not contain an adequate written description and/or enabling disclosure of “in response to a request for the first resource issued by a particular client machine, identifying the at least one repeater server from a set of shared repeater servers based at least in part on a location of the particular client machine relative to the at least one shared repeater server.”

- Claim 37 of the ’903 patent and any claims dependent therefrom are invalid for failure to satisfy the requirements of 35 U.S.C. § 112 because the specification as filed does not contain an adequate written description and/or enabling disclosure of “associating a plurality of alias names with the at least one shared repeater server, each of said plurality of alias names being associated with an origin server, wherein a first alias name of said plurality of alias names is associated with a first origin server, and at least a second alias name of said plurality of alias names is associated with a second origin server distinct from said first origin server.”
- Claim 37 of the ’903 patent and any claims dependent therefrom are invalid for failure to satisfy the requirements of 35 U.S.C. § 112 because the specification as filed does not contain an adequate written description and/or enabling disclosure of “providing at least one table associating alias names with origin servers having content located thereon, wherein said content is authorized for delivery to client machines via the at least one shared repeater server, wherein the origin servers comprise the first origin server and the second origin server.”
- Claim 37 of the ’903 patent and any claims dependent therefrom are invalid for failure to satisfy the requirements of 35 U.S.C. § 112 because the specification as filed does not contain an adequate written description and/or enabling disclosure of “wherein requests for a first resource originating on the first origin server are directed, based at least in part on said first alias name, to the at least one shared repeater server for delivery of the first resource from said at least one repeater server.”
- Claim 37 of the ’903 patent and any claims dependent therefrom are invalid for failure to satisfy the requirements of 35 U.S.C. § 112 because the specification as filed does not contain an adequate written description and/or enabling disclosure of “wherein requests for a second resource originating on the second origin server are directed, based at least in part on said second alias name, to

the at least one shared repeater server for delivery of the second resource from said at least one repeater server."

2. Enablement/Written Description Contentions for the '573 Patent

Google reserves the right to argue that the Asserted Claims of the '573 patent, when read in light of the specification, prosecution history, and/or claim construction, infringement, and validity positions that Plaintiff has taken in this case or other cases, fail to reasonably convey to one of ordinary skill that the named inventor(s) had possession of the subject matter of the alleged invention and/or fail to enable a person of ordinary skill to make and use the alleged invention as claimed for at least the following reasons:

- Claims 1 and 19 of the '573 patent and any claims dependent therefrom are invalid for failure to satisfy the requirements of 35 U.S.C. § 112 because the specification as filed does not contain an adequate written description and/or enabling disclosure of "accessing a popularity service associated with [the first server of the first tier of] the content delivery network to determine a popularity designation associated with the requested resource."
- Claim 1 of the '573 patent and any claims dependent therefrom are invalid for failure to satisfy the requirements of 35 U.S.C. § 112 because the specification as filed does not contain an adequate written description and/or enabling disclosure of "processing, at the first server of the first tier of servers, a redirect instruction from the second server of the content delivery network to obtain the resource from a content server of the content delivery network."
- Claims 1 and 19 of the '573 patent and any claims dependent therefrom are invalid for failure to satisfy the requirements of 35 U.S.C. § 112 because the specification as filed does not contain an adequate written description and/or enabling disclosure of "[a/the] content server."

- Claims 1 and 19 of the ’573 patent and any claims dependent therefrom are invalid for failure to satisfy the requirements of 35 U.S.C. § 112 because the specification as filed does not contain an adequate written description and/or enabling disclosure of “receiving an instruction to not cache the portion of the resource at the first server of the first tier of servers when the portion of the resource is obtained from the content server of the content delivery network.”
- Claims 1 and 19 of the ’573 patent and any claims dependent therefrom are invalid for failure to satisfy the requirements of 35 U.S.C. § 112 because the specification as filed does not contain an adequate written description and/or enabling disclosure of “the portion of the resource.”
- Claims 1 and 19 of the ’573 patent and any claims dependent therefrom are invalid for failure to satisfy the requirements of 35 U.S.C. § 112 because the specification as filed does not contain an adequate written description and/or enabling disclosure of “providing the obtained resource to the requesting device.”
- Claim 3 of the ’573 patent and any claims dependent therefrom are invalid for failure to satisfy the requirements of 35 U.S.C. § 112 because the specification as filed does not contain an adequate written description and/or enabling disclosure of “receiving an instruction to cache the resource at the first server of the first tier of servers when the resource is obtained from the content server of the content delivery network” when, as recited in claim 1 from which claim 3 depends, the method also comprises “receiving an instruction to not cache the portion of the resource at the first server of the first tier of servers when the portion of the resource is obtained from the content server of the content delivery network.”
- Claim 3 of the ’573 patent and any claims dependent therefrom are invalid for failure to satisfy the requirements of 35 U.S.C. § 112 because the specification as filed does not contain an adequate written description and/or enabling

disclosure of "the popularity designation associated with the requested resource indicates that the requested resource is popular" when, as recited in claim 1 from which claim 3 depends, the method also comprises "receiving an instruction to not cache the portion of the resource at the first server of the first tier of servers when the portion of the resource is obtained from the content server of the content delivery network."

3. Enablement/Written Description Contentions for the '517 Patent

Google reserves the right to argue that the Asserted Claims of the '517 patent, when read in light of the specification, prosecution history, and/or claim construction, infringement, and validity positions that Plaintiff has taken in this case or other cases, fail to reasonably convey to one of ordinary skill that the named inventor(s) had possession of the subject matter of the alleged invention and/or fail to enable a person of ordinary skill to make and use the alleged invention as claimed for at least the following reasons:

- Claim 1 of the '517 patent and any claims dependent therefrom are invalid for failure to satisfy the requirements of 35 U.S.C. § 112 because the specification as filed does not contain an adequate written description and/or enabling disclosure of "an adaptive traffic control name server network . . . constructed and adapted to provide adaptive policy-based domain name service."
- Claim 1 of the '517 patent and any claims dependent therefrom are invalid for failure to satisfy the requirements of 35 U.S.C. § 112 because the specification as filed does not contain an adequate written description and/or enabling disclosure of "using said GUI to obtain at least one policy . . . using a decision tree representing rules."
- Claim 1 of the '517 patent and any claims dependent therefrom are invalid for failure to satisfy the requirements of 35 U.S.C. § 112 because the specification as filed does not contain an adequate written description and/or enabling

disclosure of "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."

- Claim 1 of the '517 patent and any claims dependent therefrom are invalid for failure to satisfy the requirements of 35 U.S.C. § 112 because the specification as filed does not contain an adequate written description and/or enabling disclosure of "one or more criteria are selected from criteria related to: world zones, countries, states, time zones, and blocks of IP addresses, and wherein the one or more resource nodes are selected from: IP addresses, CNAMEs, MX records, NS records, and load sharing server sets; and wherein the answers are selected from: IP addresses and CNAMEs."

4. Enablement/Written Description Contentions for the '112 Patent

Google reserves the right to argue that the Asserted Claims of the '112 patent, when read in light of the specification, prosecution history, and/or claim construction, infringement, and validity positions that Plaintiff has taken in this case or other cases, fail to reasonably convey to one of ordinary skill that the named inventor(s) had possession of the subject matter of the alleged invention and/or fail to enable a person of ordinary skill to make and use the alleged invention as claimed for at least the following reasons:

- Claim 1 of the '112 patent and any claims dependent therefrom are invalid for failure to satisfy the requirements of 35 U.S.C. § 112 because the specification as filed does not contain an adequate written description and/or enabling disclosure of "wherein each CDN DNS server is associated with a respective plurality of content servers."

- Claim 1 of the ’112 patent and any claims dependent therefrom are invalid for failure to satisfy the requirements of 35 U.S.C. § 112 because the specification as filed does not contain an adequate written description and/or enabling disclosure of “causing said hostname to be resolved to said common anycast address by an Internet Service Provider (ISP) DNS server.”
- Claim 11 of the ’112 patent and any claims dependent therefrom are invalid for failure to satisfy the requirements of 35 U.S.C. § 112 because the specification as filed does not contain an adequate written description and/or enabling disclosure of “by at least one switch, selecting the content server from said respective plurality of content servers associated with said resolving CDN DNS.”
- Claim 13 of the ’112 patent and any claims dependent therefrom are invalid for failure to satisfy the requirements of 35 U.S.C. § 112 because the specification as filed does not contain an adequate written description and/or enabling disclosure of “wherein each DNS server is associated with a respective plurality of content servers.”
- Claim 13 of the ’112 patent and any claims dependent therefrom are invalid for failure to satisfy the requirements of 35 U.S.C. § 112 because the specification as filed does not contain an adequate written description and/or enabling disclosure of “a switch associated with said resolving DNS server.”
- Claims 13 of the ’112 patent and any claims dependent therefrom are invalid for failure to satisfy the requirements of 35 U.S.C. § 112 because the specification as filed does not contain an adequate written description and/or enabling disclosure of “attempting to serve said second content from the second content server.”

5. Enablement/Written Description Contentions for the ’322 Patent

Google reserves the right to argue that the Asserted Claims of the ’322 patent, when read in light of the specification, prosecution history, and/or claim construction, infringement, and validity positions that Plaintiff has taken in this case or other cases, fail to reasonably convey to one of ordinary skill that the named inventor(s) had possession of the subject matter of the alleged invention and/or fail to enable a person of ordinary skill to make and use the alleged invention as claimed for at least the following reasons:

- Claim 15 of the ’322 patent is invalid for failure to satisfy the requirements of 35 U.S.C. § 112 because the specification as filed does not contain an adequate written description and/or enabling disclosure of “at least one parameter associated with the embedded resource.”

* * *

Therefore, all the Asserted Claims are invalid for lacking sufficient written description and/or an enabling disclosure.

B. Indefiniteness

Claims are indefinite under 35 U.S.C. § 112 ¶ 2 when they “fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention.” *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 898–99 (2014). To the extent an asserted apparatus claim includes both apparatus and method limitations, that claim is invalid for indefiniteness under § 112 ¶ 2 because it fails to identify or notify the public of what constitutes direct infringement. *See IPXL Holdings, L.L.C. v. Amazon.com, Inc.*, 430 F.3d 1377 (Fed. Cir. 2005).

Section 112 ¶ 2 also requires that the claimed subject matter be what “the inventor or a joint inventor regards as the invention.” “Where it would be apparent to one of skill in the art, based on the specification, that the invention set forth in a claim is not what the patentee regarded as its invention, we must hold that claim invalid

under § 112, paragraph 2." *Allen Eng'g Corp. v. Bartell Indus., Inc.*, 299 F.3d 1336, 1349 (Fed. Cir. 2002).

Google expressly reserves the right to amend its Invalidity Contentions to pursue invalidity based on additional bases for indefiniteness as the case proceeds and after claim construction occurs, or in view of positions taken by Plaintiff regarding invalidity or infringement. Google notes that detailed arguments as to indefiniteness, if any, will be presented in the claim construction meet-and-confer and briefing processes. Google reserves the right to withdraw, modify, or refine any indefiniteness positions as the case progresses, including in light of the Court's claim construction, subsequent factual or expert discovery, or evolving positions taken by Plaintiff. Nothing herein should be construed as a waiver of Google's ability to assert or retract indefiniteness arguments to ensure consistency with its positions across various stages of this proceeding. For claim terms that are indefinite at their boundaries, Google contends that these claims are nevertheless invalid under §§ 102 and/or 103 because the prior art discloses the relevant subject matter that is undisputedly within the scope of these claims.

1. Indefiniteness Contentions for the '903 patent

Google reserves the right to argue that the limitations of the '903 patent listed below, when read in light of the specification, prosecution history, and/or claim construction, infringement, and validity positions that Plaintiff has taken in this case or other cases, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention. For instance, the written description does not use phrases that appear in these limitations, the claim language lacks antecedent basis, and/or the claim language, as phrased and read in context of other claim limitations, does not inform those skilled in the art about the scope of the invention with reasonable certainty. As one of ordinary skill would not understand the metes and bounds of the claims in which these limitations appear, each of the identified claims is invalid as indefinite pursuant to 35 U.S.C. § 112.

- "alias name" (claims 28, 29, 30, 31, 36, 37, and 39) of the '903 patent and any claims dependent therefrom)

In addition, claims 28 and 37 (and any claims dependent therefrom) of the '903 patent recite both a system/apparatus and method for using that system/apparatus, which "does not apprise a person of ordinary skill in the art of [their] scope" and renders them invalid under § 112. *IPXL Holdings*, 430 F.3d at 1384.

2. Indefiniteness Contentions for the '573 Patent

Google reserves the right to argue that the limitations of the '573 patent listed below, when read in light of the specification, prosecution history, and/or claim construction, infringement, and validity positions that Plaintiff has taken in this case or other cases, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention. For instance, the written description does not use phrases that appear in these limitations, the claim language lacks antecedent basis, and/or the claim language, as phrased and read in context of other claim limitations, does not inform those skilled in the art about the scope of the invention with reasonable certainty. As one of ordinary skill would not understand the metes and bounds of the claims in which these limitations appear, each of the identified claims is invalid as indefinite pursuant to 35 U.S.C. § 112.

- "receiving an instruction to cache the resource at the first server of the first tier of servers when the resource is obtained from the content server of the content delivery network" (claim 3 of the '573 patent and any claims dependent therefrom)
- "the popularity designation associated with the requested resource indicates that the requested resource is popular" (claim 3 of the '573 patent and any claims dependent therefrom)

In addition, claims 1 and 19 of the '573 patent and any claims dependent therefrom recite both a system/device and method for using that system/device, which

"does not apprise a person of ordinary skill in the art of [their] scope" and renders them invalid under § 112. *IPXL Holdings*, 430 F.3d at 1384.

In addition, claim 1 and any claims dependent therefrom do not recite what the inventors regarded as the invention, to the extent those claims do not require any relationship or dependency between the determination of a requested resource's popularity designation and other claimed steps, such as requesting the resource from a second server or receiving an instruction to not cache the portion of the resource at the first server.

3. Indefiniteness Contentions for the '517 Patent

Google reserves the right to argue that the limitations of the '517 patent, when read in light of the specification, prosecution history, and/or claim construction, infringement, and validity positions that Plaintiff has taken in this case or other cases, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention and are therefore invalid pursuant to 35 U.S.C. § 112. For instance, Google reserves the right to argue that the limitations of the '517 patent are indefinite where the written description does not use phrases that appear in these limitations, the claim language lacks antecedent basis, and/or the claim language, as phrased and read in context of other claim limitations, does not inform those skilled in the art about the scope of the invention with reasonable certainty, such that one of ordinary skill would not understand the metes and bounds of the claims in which those limitations appear.

In addition, claim 1 of the '517 patent and any claims dependent therefrom recite both a system/device and method for using that system/device, which "does not apprise a person of ordinary skill in the art of [their] scope" and renders them invalid under § 112. *IPXL Holdings*, 430 F.3d at 1384.

4. Indefiniteness Contentions for the '112 Patent

Google reserves the right to argue that the limitations of the '112 patent listed below, when read in light of the specification, prosecution history, and/or claim construction, infringement, and validity positions that Plaintiff has taken in this case

or other cases, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention. For instance, the written description does not use phrases that appear in these limitations, the claim language lacks antecedent basis, and/or the claim language, as phrased and read in context of other claim limitations, does not inform those skilled in the art about the scope of the invention with reasonable certainty. As one of ordinary skill would not understand the metes and bounds of the claims in which these limitations appear, each of the identified claims is invalid as indefinite pursuant to 35 U.S.C. § 112.

- "attempting to serve said second content from the second content server" (claim 13 of the '112 patent and any claims dependent therefrom)

5. Indefiniteness Contentions for the '322 Patent

Google reserves the right to argue that the limitations of the '322 patent, when read in light of the specification, prosecution history, and/or claim construction, infringement, and validity positions that Plaintiff has taken in this case or other cases, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention and are therefore invalid pursuant to 35 U.S.C. § 112. For instance, Google reserves the right to argue that the limitations of the '322 patent are indefinite where the written description does not use phrases that appear in these limitations, the claim language lacks antecedent basis, and/or the claim language, as phrased and read in context of other claim limitations, does not inform those skilled in the art about the scope of the invention with reasonable certainty, such that one of ordinary skill would not understand the metes and bounds of the claims in which those limitations appear.

VI. INVALID PATENT TERM ADJUSTMENT

35 U.S.C. § 282(c) states in relevant part that the "[i]nvalidity of the extension of a patent term or any portion thereof under section 154(b) . . . because of the material failure (1) by the applicant for the extension, or (2) by the Director, to comply with the requirements of such section shall be a defense in any action involving the infringement of a patent during the period of the extension of its term and shall be

pleaded." Section 282(c) thus provides an affirmative defense against patent infringement during the portion of the patent term that is invalid.

Here, the '903, '517, and '322 patents were accorded PTA under 35 U.S.C. § 154(b), extending their terms. Specifically, the '903 patent received 2,052 days of patent term adjustment ("PTA") under section 154(b); the '517 patent received 311 days of PTA; and the '322 patent received 290 days of PTA. *See* SANDPIPER-G-00000001, at -00011694 (1,341-day PTA determination for '322 patent), -00011809 (1,401-day PTA determination for '322 patent), -00011855 (2,052-day PTA determination for '322 patent); SANDPIPER-G-00011858, at -00012299 (319-day PTA determination for '517 patent), -00012342 (311-day PTA determination for '517 patent); SANDPIPER-G-00014262, at -00014501 (290-day PTA determination for '322 patent). Google contends that at least a portion of the extension of patent term accorded to the '903, '517, and '322 patents is invalid.

VII. INVALIDITY OF THE CLAIMS UNDER 35 U.S.C. § 101 FOR BEING DIRECTED TO PATENT-INELIGIBLE SUBJECT MATTER

Section 101 of the Patent Act defines the type of subject matter that is patent-eligible. 35 U.S.C. § 101. The Supreme Court has long interpreted § 101 to hold that "laws of nature, natural phenomena, and abstract ideas are not patentable." *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 573 U.S. 208, 216 (2014). These basic principles are excluded from patent eligibility because they are the very "building blocks of human ingenuity," *id.*, and should be "free to all men and reserved exclusively to none." *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 71 (2012).

The Supreme Court's *Alice* test sets forth a two-part standard for assessing subject-matter eligibility. In the first step, the court must determine whether the claims are "directed to" patent-ineligible subject matter, such as an abstract idea. *Alice,* 573 U.S. at 217. In deciding whether a claim is "directed to" an abstract idea, the court must look at the "focus of the claimed advance over the prior art to determine if the claim's character as a whole is directed to excluded subject matter." *Affinity Labs of*

Texas, LLC v. DIRECTV, LLC, 838 F.3d 1253, 1257 (Fed. Cir. 2016) (internal quotation marks omitted). Limiting the claims directed to an abstract idea to a particular "technological environment" or "field of use" does "not render the claims any less abstract." *Alice*, 573 U.S. at 222 ("the prohibition against patenting abstract ideas cannot be circumvented by attempting to limit the use of [the idea] to a particular technological environment") (internal quotation marks and citation omitted); *Smart Sys. Innovations, LLC v. Chicago Transit Auth.*, 873 F.3d 1364, 1373 (Fed. Cir. 2017) (citing *Affinity Labs,* 838 F.3d at 1259) (holding that claims applying abstract idea to particular field of use, namely mass transit, were not patent eligible); *ChargePoint, Inc. v. SemaConnect, Inc.*, 920 F.3d 759, 768 (Fed. Cir. 2019), *cert. denied*, 140 S. Ct. 983 (2020) (limiting abstract idea of "communication over a network for interacting with a device" to electric vehicle charging stations did not make claims patent eligible).

Under *Alice* step two, the court must determine whether the patent claims include an "inventive concept" that is "sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the [abstract idea] itself." *Alice*, 573 U.S. at 217-18 (internal quotation marks omitted). The inventive concept must be truly inventive; it is not sufficient to include "well-understood, routine, conventional" features. *Mayo*, 566 U.S. at 79-80. For example, merely reciting conventional computer elements "cannot transform a patent-ineligible abstract idea into a patent-eligible invention." *Alice*, 573 U.S. at 223. Moreover, "generic functional language" to achieve purported solutions to technical problems, without "any requirements for *how* the desired result is achieved" will not suffice for an inventive concept. *Two-Way Media Ltd. v. Comcast Cable Commc'ns, LLC*, 874 F.3d 1329, 1339 (Fed. Cir. 2017) (citation omitted).

These subject-matter eligibility contentions are subject to revision and amendment pursuant to Federal Rule of Civil Procedure 26(e) and the Orders in this matter to the extent appropriate in light of, without limitation, further investigation

and discovery, the Court's construction of the claims at issue, positions taken by Plaintiff in this action or any other proceeding, the review and analysis of expert witnesses, and/or as other circumstances warrant.

In support of its subject-matter eligibility contentions, Google relies on the prior art identified in Section II (Identification of Relevant Prior Art), *supra.* Google reserves the right to rely on percipient and/or expert testimony to supplement, summarize, and/or explain the state of the industry, and what was considered well understood, routine, and conventional, at the time the earliest applications to which the Asserted Patents claim priority were filed. Any such witnesses will be disclosed pursuant to the Federal Rules of Civil Procedure and any Order entered in this case for initial, additional, and expert disclosures.

A. Patent-Ineligibility of the '903 Patent Claims

The Asserted Claims of the '903 patent are invalid under 35 U.S.C. § 101. At *Alice* step 1, the claims are directed to the abstract ideas of, for example, (1) directing resource requests to a shared server using alias names and (2) using a table of alias names to determine an origin server corresponding to a request. The Federal Circuit has found that similar claims relating to requesting, sending, and directing information are directed to abstract ideas. *See, e.g.*, *Two-Way Media*, 874 F.3d at 1337; *PersonalWeb Techs. LLC v. Google LLC*, 8 F.4th 1310, 1317 (Fed. Cir. 2021). Nor do the Asserted Claims recite any technological improvements in computer functionality; instead, they rely on generic computing terms for performing the abstract idea. *See*, *e.g.*, '903 patent, 1:34-57, 2:4-58, 4:46-4:64, 6:22-27, 7:4-38. And they describe a method using "result-based functional language"—a telltale sign of abstraction. *Two-Way Media*, 874 F.3d at 1337. For example, the claims describe the functional results of "associating" an alias name with a server, wherein requests for a resource "are directed" to the server "based at least in part on" said alias name. *See* '903 patent, claim 28. The claims also use functional language to recite "providing a table listing origin servers" and "analyz[ing], using the table, an alias name . . . to

determine an origin server associated with a particular resource." The Asserted Claims recite data management functionality amounting to no more than automating human activity that could be "performed in the human mind" or "using a pencil and paper." *PersonalWeb*, 8 F.4th at 1316.

At *Alice* step 2, the Asserted Claims lack an inventive concept sufficient to transform the claimed abstract idea into a patent-eligible invention because each claim limitation recites routine computer functionalities that were well-understood and conventional before the earliest priority date. *See Elec. Power Grp., LLC v. Alstom S.A.*, 830 F.3d 1350, 1355 (Fed. Cir. 2016) (finding no inventive concept where "[n]othing in the claims, understood in light of the specification, requires anything other than off-the-shelf, conventional computer, network, and display technology"); *Two-Way Media*, 874 F.3d at 1339 ("Nothing in the claims or their constructions . . . requires anything other than conventional computer and network components operating according to their ordinary functions."). Moreover, nothing in the Asserted Claims, either individually or as an ordered combination, "transform[s] the nature of the claim[s] into a patent-eligible application of the abstract idea." *Hawk Tech. Sys., LLC v. Castle Retail, LLC*, 60 F.4th 1349, 1358 (Fed. Cir. 2023). Ultimately, the Asserted Claims simply describe an ordinary combination of steps for directing a resource request to a server and looking up a server using an alias name—processes that were well known at the time of the patent.

B. Patent-Ineligibility of the '573 Patent Claims

The Asserted Claims of the '573 patent are invalid under 35 U.S.C. § 101. At *Alice* step one, the claims are directed to the abstract idea of, for example, making caching decisions in a content delivery network that determines the popularity of requested content. The Federal Circuit has repeatedly found similar claims relating to data processing, such as collection, recognition, and storage, to be abstract. *See, e.g.*, *Content Extraction & Transmission LLC v. Wells Fargo Bank, Nat'l Ass'n*, 776 F.3d 1343, 1347 (Fed. Cir. 2014). Further, the Asserted Claims do not focus on a "specific

means or method that improves the relevant technology," but are instead focused on a "result or effect that itself is the abstract idea and merely invoke[s] generic processes and machinery." *Apple, Inc. v. Ameranth, Inc.*, 842 F.3d 1229, 1241 (Fed. Cir. 2016). For instance, the Asserted Claims are framed in broad, results-oriented language—e.g., "accessing a popularity service . . . to determine a popularity designation associated with the requested resource," "processing . . . a redirect instruction . . . to obtain the resource," "receiving an instruction to not cache the portion of the resource," and "providing the obtained resource to the requesting device," '573 patent, claim 1—which the Federal Circuit has explained is "a frequent feature of claims held ineligible under § 101." *Elec. Power Grp.*, 830 F.3d at 1356. And although the Asserted Claims invoke the use of computer hardware or software, they fail to recite any technological improvements to computer functionality. Indeed, the claimed invention is analogous to an age-old idea for businesses, in view of limited inventory or shelf space, to focus on distributing the most popular items to warehouses or stores close to customers that demand them; the '573 patent merely applies that idea on a content delivery network.

At *Alice* step 2, the Asserted Claims lack an inventive concept sufficient to transform the abstract idea into a patent-eligible invention because each claim limitation recites routine computer functionalities that were well understood and conventional long before the earliest-asserted priority date of April 4, 2008. *See Elec. Power Grp.*, 830 F.3d at 1355 (finding no inventive concept where "[n]othing in the claims, understood in light of the specification, requires anything other than off-the-shelf, conventional computer, network, and display technology . . . ."). For example, instructions to not cache, which were the purported point of novelty during prosecution of the '573 patent, were well understood and conventional before the purported invention. Likewise, the other asserted claim limitations relate to generic or well understood functionalities of content delivery networks that were commonly used, routine, and/or conventional before the '573 patent's priority date. In short,

nothing about the asserted claim limitations, either individually or as an ordered combination, transforms the nature of the Asserted Claims into a patent-eligible application of the abstract idea. *See Hawk Tech. Sys.*, 60 F.4th at 1358.

C. Patent-Ineligibility of the ’517 Patent Claims

The Asserted Claims of the ’517 patent are invalid under 35 U.S.C. § 101. At *Alice* step 1, the claims are directed to the abstract idea of, for example, managing network traffic based on rules or policies. The Federal Circuit has repeatedly held similar claims abstract. *See, e.g.*, *ChargePoint*, 920 F.3d at 766 (holding abstract “communicating requests to a remote server and receiving communications from that server, i.e., communication over a network”); *Intel. Ventures I LLC v. Capital One Bank (USA)*, 792 F.3d 1363, 1367 (Fed. Cir. 2015) (holding abstract “tracking financial transactions to determine whether they exceed a pre-set spending limit” [i.e., a policy]); *Bascom Glob. Internet Servs., Inc. v. AT&T Mobility LLC*, 827 F.3d 1341, 1348 (Fed. Cir. 2016) (“[F]iltering content on the Internet [based on “rules”] . . . is an abstract idea because it is a longstanding, well-known method of organizing human behavior.” (collecting cases)); *Bridge & Post, Inc. v. Verizon Commc’ns, Inc.*, 778 F. App’x 882, 892 (Fed. Cir. 2019) (“‘[I]ntercepting’ network traffic amounts to nothing more than [an abstract] idea.”). The Asserted Claims use result-based, functional language such as “providing” a graphical user interface (“GUI”), “using said GUI to obtain at least one policy,” and “providing said at least one policy to [a] name server network,” *see* ’517 patent, claim 1, but these limitations set forth “a method for routing information using result-based functional language” that “does not sufficiently describe *how* to achieve these results in a non-abstract way,” *Two-Way Media*, 874 F.3d at 1337 (emphasis added). That certain claims recite additional detail regarding the claimed “policy” (e.g., “wherein the at least one policy that relates to direction of network traffic . . . relates to one or more of the sub-domains: ‘ftp’, ‘download’, ‘www’, and ‘images’”) does not save them from abstraction. *See ChargePoint*, 920 F.3d at 772 (modifying electric flow “based on a demand response

business policy . . . merely adds one abstract concept to another"). Nor do the Asserted Claims recite any technological improvements in computer functionality. "An abstract idea on 'an Internet computer network' or on a generic computer," as here, "is still an abstract idea." *Bascom*, 827 F.3d at 1348; *see also In re LI Commc'ns LLC Patent Litig.*, 823 F.3d 607, 611 (Fed. Cir. 2016) (despite reciting "concrete, tangible components," claims were abstract where "the recited physical components merely provide[d] a generic environment in which to carry out the abstract idea").

At *Alice* step 2, the Asserted Claims lack an inventive concept because each claim limitation recites routine computer functionalities, including use of a GUI to obtain a policy, that were well-understood and conventional before the earliest priority date of the '517 patent. *See Elec. Power Grp.*, 830 F.3d at 1355 (finding no inventive concept where "[n]othing in the claims, understood in light of the specification, requires anything other than off-the-shelf, conventional computer, network, and display technology"). Nothing in the Asserted Claims, either individually or as an ordered combination, "transform[s] the nature of the claim[s] into a patent-eligible application of the abstract idea." *Hawk Tech. Sys.*, 60 F.4th at 1358. Even viewed collectively, the Asserted Claims "simply instruct the practitioner to implement the abstract idea"—e.g., implementing rules or policies to manage network traffic—"with routine, conventional activity"—e.g., by providing and using a GUI. *Ultramercial, Inc. v. Hulu, LLC*, 772 F.3d 709, 715 (Fed. Cir. 2014). The Asserted Claims recite nothing more than a routine, well-understood, and conventional combination of steps for managing network traffic based on rules or policies. *See Talent Broker Tech. LLC v. Musical.ly, Inc.*, No. CV 17-08532 SJO (MRWx), 2018 WL 3019641, at *7–10 (C.D. Cal. May 22, 2018) (claims directed to "the abstract concept of a multi-level . . . process wherein the highest rated content continues to the next round" were invalid where they were "implemented using generic computer and networking components arranged in a conventional manner").

D. Patent-Ineligibility of the ’112 Patent Claims

The Asserted Claims of the ’112 patent are invalid under 35 U.S.C. § 101. At *Alice* step 1, the claims are directed to the abstract idea of, for example, distributing requests for content based on hostnames. The Federal Circuit has found similar claims relating to “sending information” and “directing information” to be abstract. *See, e.g.*, *Two-Way Media*, 874 F.3d at 1337; *Nomula v. Hirshfeld*, 561 F. Supp. 3d 617, 625 (E.D. Va. 2021) (finding that “‘receiving’ a request to target [a] user with content, and ‘sending’ that user the targeted content” was an abstract idea). Nor do the Asserted Claims recite any technological improvements in computer functionality; instead, they rely on generic computing terms for performing the abstract idea. And they describe a method using “result-based functional language”—a telltale sign of abstraction. *Two-Way Media*, 874 F.3d at 1337. For example, the claims describe the functional results of “causing” DNS servers to be authoritative and “causing” a hostname to be resolved to an anycast address without describing how to achieve these results in a specific way. *See* ’112 patent, claim 1. The claimed method for directing requests for content in the ’112 patent also largely mimics the analog process of dialing an operator at a common number (e.g., 411) to obtain the specific number for a local business or service. The Asserted Claims take this well-known, abstract practice and apply it to the context of digital content delivery. But applying an abstract idea in a digital environment is not enough to “transform [the] patent-ineligible abstract idea into a patent-eligible invention.” *Alice*, 573 U.S. at 223.

At *Alice* step 2, the Asserted Claims lack an inventive concept sufficient to transform the claimed abstract idea into a patent-eligible invention because each claim limitation recites routine computer functionalities that were well-understood and conventional before the earliest priority date of October 18, 2001. *See Elec. Power Grp.*, 830 F.3d at 1355 (finding no inventive concept where “[n]othing in the claims, understood in light of the specification, requires anything other than off-the-shelf, conventional computer, network, and display technology”). Moreover, nothing in the

Asserted Claims, either individually or as an ordered combination, "transform[s] the nature of the claim[s] into a patent-eligible application of the abstract idea." *Hawk Tech.*, 60 F.4th at 1358. Ultimately, the Asserted Claims simply describe an ordinary combination of steps for directing a request for content via directories (DNS) and switches to a responsive content server—processes that were well known at the time of the patent.

E. Patent-Ineligibility of the '322 Patent Claims

Asserted claim 15 of the '322 patent is invalid under 35 U.S.C. § 101. At *Alice* step 1, claim 15 is directed to the abstract idea of, for example, data substitution and processing. The purely functional language of claim 15 further confirms that the claim is directed to an abstract idea. In *Two-Way Media*, 874 F.3d 1329, the Federal Circuit concluded that two patents claiming a method for routing "streams of audio and/or visual information" "over a communication network" were directed to an abstract idea. The Federal Circuit stated that "[t]he claim requires the functional results of 'converting,' 'routing,' 'monitoring,' and accumulating records,'" but "recite[s] only conventional computer components." *Id.* at 1337–38. As a result, the claim "manipulates data but fails to do so in a non-abstract way." *Id.* at 1338. Here, claim 15 likewise recites functional steps: "providing . . . an [API]," "receiving . . . an embedded resource," "generating a modified embedded resource," "delivering . . . the modified embedded resource," "receiving . . . a request," and "providing content." Without reciting how these results are accomplished, the '322 patent claims broad functional scope in abstract terms. Implementing an abstract idea in a computer environment does not render that idea a non-abstract improvement to computer functionality. *Simio, LLC v. FlexSim Software Prods., Inc.*, 983 F.3d 1353, 1360 (Fed. Cir. 2020).

At *Alice* step 2, claim 15 does not describe an inventive concept sufficient to transform the claimed abstract idea into a patent-eligible invention. Nothing in the '322 patent suggests that the claimed API functions any differently than conventional

software. Plaintiff asserts that the alleged invention of claim 15 "improve[s] the functioning of a CDN, including" by providing a way to bypass a DNS server "thereby reducing the number of components involved in servicing requests while improving response speeds while delivering content." Dkt. 57 (First Am. Compl.) at ¶¶ 46–49. While renaming embedded resources (e.g., URLs) might provide efficiency benefits—which were well-understood, routine, and conventional in the art—there is no indication in the '322 patent that such modification was novel or changed the functioning of the system in any way. Claim 15 of the '322 patent relies on a generic API and conventional computing techniques to modify URLs. Courts have found network traffic routing using generic computing elements to be insufficiently inventive, as in *Intellectual Ventures I*, 792 F.3d at 1368. There is no unconventional application of the claimed API—claim 15 simply takes inputs (e.g., client location, network topology) and returns a modified URL, which is a routine function in computing. The claim does not introduce a novel data structure, algorithm, or hardware configuration but merely applies standard API-based data processing. Even when viewed collectively, claim 15's steps "simply instruct the practitioner to implement the abstract idea"—i.e., data substitution and data processing—"with routine, conventional activity." *Ultramercial*, 772 F.3d at 715. Claim 15 implements a conventional ordering of steps—first receiving an embedded resource (such as an embedded URL in a web page) from an origin server, modifying it in some unspecified way, returning the results, and then serving up related content, in yet another unspecified way, in response to a request for the content associated with the modified embedded resource—using generic technology.

VIII. DOCUMENT PRODUCTION

Pursuant to N.D. Cal. Patent L.R. 3-4 and the Scheduling Order in this action, Google has produced documents required by Patent L.R. 3-4, as set forth below.

A. Patent L.R. 3-4(a)

Pursuant to the Protective Order in this case (Dkt. 66), Google has produced documents and made available for inspection source code sufficient to show the operation of any aspects or elements of the Accused Instrumentalities identified by Plaintiff in its Patent L.R. 3-1(c) charts for the Asserted Patents. These documents are contained in the Bates ranges GOOG-SANDP-00000098–GOOG-SANDP-00031657 and in the source code made available for inspection at the Los Angeles office of Munger, Tolles & Olson LLP pursuant to the terms of the Protective Order. As Google's investigation continues and as additional documents are identified, Google may supplement this initial production on a rolling basis.

As noted above in Section I.A (Plaintiff's Infringement Contentions), Patent L.R. 3-1 required Plaintiff in its Infringement Contentions to identify "*[s]eparately* . . . each accused apparatus, product, device, process, method, act, or other instrumentality," and to "identif[y] *specifically* where and how each limitation of each asserted claim is found within each Accused Instrumentality." P.L.R. 3-1(b)–(c) (emphasis added). Despite stating in its Infringement Contentions that it accuses "Google Cloud CDN and Google Media CDN, as well as Google's internal and external content delivery offerings provided by Google Cloud CDN and Google Media CDN"—which allegedly include "YouTube, YouTube TV, Gmail, Google Search, and Google Ads" (Infringement Contentions at 4)—Plaintiff's claim charts specifically identified only Cloud CDN, Media CDN, and Cloud DNS as allegedly infringing the Asserted Claims. Plaintiff's claim charts do not allege infringement by YouTube, YouTube TV, Gmail, Google Search, Google Ads, or any other "internal [or] external content delivery offerings." Google therefore understands the Accused Instrumentalities to be Cloud CDN, Cloud Media CDN, and Cloud DNS.

B. Patent L.R. 3-4(b)

Google has produced the prior art identified herein. These documents are contained in the Bates ranges GOOG-SANDP-PA-00000001–GOOG-SANDP-PA-

00041485. Google also incorporates by reference, as if fully set forth herein, all prior art references identified in the Related Cases and Related IPRs, as well as in any post-issuance review by the U.S. Patent and Trademark Office of any Asserted Patent or patent owned by Plaintiff and covering subject matter that overlaps in whole or in part with the Asserted Patents. Google also reserves the right to seek third-party discovery relevant to the accused instrumentalities and prior art.

C. Patent L.R. 3-4(c), (e)

Google is producing agreements known to date that it may contend are comparable to a license that would result from a hypothetical reasonable royalty negotiation and/or that may be used to support its damages case. These documents are contained in the Bates ranges GOOG-SANDP-00000001–GOOG-SANDP-00000097. Google also may rely on agreements already produced by Plaintiff, including, for example, the Patent Purchase Agreement, License and Release Agreement, and Assignment Agreement between Level 3 Communications, LLC, and Sandpiper CDN, LLC, including the amendments thereto. *See* SANDPIPER-G-00016549–16681. As Google's investigation continues and as additional documents are identified, Google may supplement this production on a rolling basis.

D. Patent L.R. 3-4(d)

Google is producing documents sufficient to show the sales, revenue, cost, and profits for the accused instrumentalities identified by Plaintiff in its Patent L.R. 3-1(c) charts for the Asserted Patents. These documents are contained in the Bates ranges GOOG-SANDP-00031658–GOOG-SANDP-00031660. As Google's investigation continues and as additional documents are identified, Google may supplement this initial production on a rolling basis.

DATED: April 22, 2025 MUNGER, TOLLES & OLSON LLP

By: */s/ Zachary M. Briers*
Zachary M. Briers

Attorneys for Defendant Google LLC

CERTIFICATE OF SERVICE

I certify that on April 22, 2025, a copy of the foregoing was served on all parties by electronic mail.

By: *_/s/ Heather E. Takahashi_*
Heather E. Takahashi