

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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LIMELIGHT NETWORKS, INC.,  
Petitioner,

v.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY,<sup>1</sup>  
Patent Owner.

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Case IPR2017-00249  
Patent 7,693,959 B2

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Before GREGG I. ANDERSON, JENNIFER MEYER CHAGNON, and  
GARTH D. BAER, *Administrative Patent Judges*.

ANDERSON, *Administrative Patent Judge*.

DECISION  
Institution of *Inter Partes* Review  
37 C.F.R. § 42.108

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<sup>1</sup> Massachusetts Institute of Technology is the owner of U.S. Patent No. 7,693,959 B2, and the caption has been updated accordingly. Paper 7, 2. Akamai Technologies, Inc., identified as a real-party-in-interest to this proceeding, is an exclusive licensee of the patent. *Id.*

## I. INTRODUCTION

Limelight Networks, Inc. (“Petitioner”) filed a Petition (“Pet.,” Paper 1) pursuant to 35 U.S.C. §§ 311–319 to institute an *inter partes* review of claims 1, 2, 4, 9–12, 15, 16, 26, 28, and 58 (“the challenged claims”) of U.S. Patent No. 7,693,959 B2 (“the ’959 patent,” Ex. 1001), which was filed on September 1, 2006.<sup>2</sup> Massachusetts Institute of Technology, owner of the ’959 patent (“Patent Owner”), filed a Preliminary Response (“Prelim. Resp.,” Paper 8). Akamai Technologies, Inc., is an exclusive licensee of the ’959 patent, was alleged to be the “Patent Owner” in the Petition as filed, and was identified as a real-party-in-interest to this proceeding by Patent Owner (*see* Paper 7, 2).

Pursuant to 35 U.S.C. § 314(a), the Director may not authorize an *inter partes* review unless the information in the petition and preliminary response shows a reasonable likelihood that Petitioner would prevail with respect to at least one challenged claim. *See* 37 C.F.R. § 42.4(a). We are persuaded that there is a reasonable likelihood that Petitioner would prevail in showing that at least one of the challenged claims is unpatentable and institute an *inter partes* review of the challenged claims. The Board has not made a final determination of the patentability of any claim.

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<sup>2</sup> The ’959 patent claims priority to U.S. Provisional Patent Application No. 60/092,710, which was filed on July 14, 1998. Ex. 1001, [60]. The ’959 patent is a continuation of application No. 10/417,607 (now U.S. Patent No. 7,103,645), which is a continuation of application No. 09/604,878 (now U.S. Patent No. 6,553,413), which is a continuation of application No. 09/314,863 (now U.S. Patent No. 6,108,703), which was filed May 19, 1999. *Id.* at [63].

*A. Related Proceedings*

The parties advise us that the '959 patent is involved in co-pending litigation captioned *Limelight Networks, Inc. v. XO Communications, LLC*, No. 3:15-cv-00720-JAG (E.D. Va. Nov. 30, 2015) (“District Court” or “District Court Lawsuit”). Pet. 1; Paper 3, 3–4.

*B. The '959 Patent (Ex. 1001)*

The '959 patent is directed to certain problems associated with known prior art methods of delivering web content using “a Web site to mirror its content at another server.” Ex. 1001, col. 1, ll. 46–47. In these prior art methods, content of a Content Provider from its Web site is placed on mirror sites on “machines that are located at Web hosting farms in different locations domestically and internationally.” *Id.* at col. 1, ll. 46–52. According to the '959 patent, mirror sites are expensive because providing “one primary site and one mirror site is more than twice the cost of a single primary site.” *Id.* at col. 1, ll. 52–56.

The '959 patent addresses these and other problems through “a network architecture or framework that supports hosting and content distribution on a truly global scale.” Ex. 1001, Abstract. “The inventive framework allows a Content Provider to replicate and serve its most popular content at an unlimited number of points throughout the world.” *Id.*

A Web page includes a markup language master or base document (e.g. HTML), and embedded objects, such as images, audio, video, or the like. Ex. 1001, col. 5, ll. 30–34, Fig. 2 (base document 28 and embedded images 30). “Typically, the URL has a hostname identifying the Content Provider’s site from where the object is conventionally served.” *Id.* at col. 6, ll. 41–43. The '959 patent explains that the embedded object URL is

modified “to condition the URL to be served by the global hosting servers” instead of the Content Provider’s site. *Id.* at col. 6, ll. 41–46.

Figure 3 of the '959 patent is reproduced below.

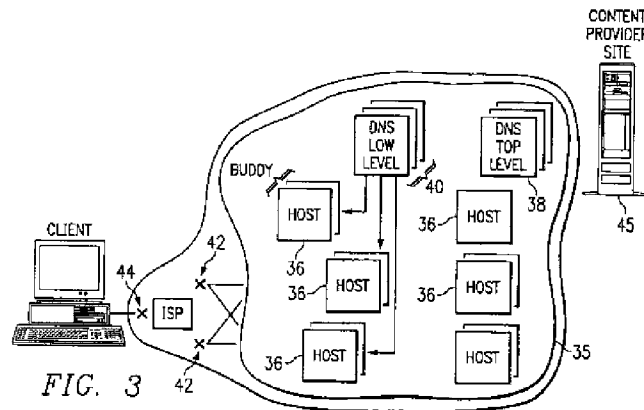


Figure 3 shows hosting system 35 of the invention. Ex. 1001, col. 5, ll. 48–49. The hosting system has hosting or ghost servers 36, top-level DNS servers 38, and low-level DNS servers 40. *Id.* at col. 5, ll. 57–60. The actual content to be served is preferably supported on the hosting or ghost servers. *Id.* at col. 3, ll. 15–18. The Content Provider receives requests for content, but instead of returning the usual page, the Web site returns a page with modified embedded object URLs. *Id.* at col. 7, ll. 49–55.

The top-level DNS servers “include appropriate control routines that are used to determine where in the network a user is located,” and then to direct the user to a low-level DNS server that is close-by. Ex. 1001, col. 9, ll. 30–38. An “overflow control” mechanism may redirect the client to the low-level DNS “in a region that is known to have sufficient capacity to serve the object.” *Id.* at col. 10, ll. 39–42. “The low-level DNS servers monitor the various ghost servers to take into account their loads while translating virtual ghost names into real addresses.” *Id.* at col. 11, ll. 31–33.

*C. Illustrative Claim*

Of the challenged claims, method claim 1 and system claim 58 are the only independent claims. Challenged claims 2, 4, 9–12, 15, 16, 26, and 28 each depend directly or indirectly from claim 1. Claim 1 is reproduced below:

1. A computer-implemented method of delivering text, graphics, images, downloads, audio or video on behalf of multiple content providers, comprising:

operating content delivery network (CDN) content servers in multiple locations, each location with connectivity to one or more networks;

operating multiple CDN name servers;

receiving a first domain name service (DNS) query at a first CDN name server, the first DNS query including a data string of the form “string1 string2 string3”, where:

string3 is a generic top level domain (gTLD),

string2 is separated from string3 by a period and is a name maintained by a service provider that operates the CDN content servers and the CDN name servers, and

string1 is separated from string2 by a period and comprises one or more sub-strings, where each sub-string is comprised of one of: letters, numbers, and combinations of letters and numbers, and any pair of substrings in string 1 are separated by a period;

having the first CDN name server respond to the first DNS query by sending a response that includes a first set of one or more IP addresses, where a first end user request for content directed to one of the IP addresses of the first set

causes the service provider to deliver the content to a first end user from a first CDN content server;

receiving a second DNS query at a second CDN name server, the second DNS query also including the same data string that is received by the first CDN name server; and

having the second CDN name server respond to the second DNS query by sending a response that includes a second set of one or more IP addresses, wherein a second end user request for content directed to one of the IP addresses of the second set causes the service provider to deliver the content to a second end user from a second CDN content server;

the second set of one or more IP addresses differing from the first set of one or more IP addresses based on where the first and second DNS queries originate.

Ex. 1001, col. 17, ll. 12–51.

*D. Asserted Ground of Unpatentability*

Petitioner challenges claims 1, 2, 4, 9–12, 15, 16, 26, 28, and 58 of the '959 patent as obvious under 35 U.S.C. § 103 over Ebrahim,<sup>3</sup> Rabinovich '427<sup>4</sup>, and Rabinovich Memo<sup>5</sup>. Pet. 18–70.

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<sup>3</sup> U.S. Patent No. 6,154,777, to Zahir Ebrahim, filed July 1, 1996, issued November 28, 2000 (“Ebrahim” (“Ebrahim-777” in the Petition), Ex. 1004).

<sup>4</sup> U.S. Patent No. 6,167,427, to Irina Rabinovich and Michael Rabinovich, filed November 28, 1997, issued December 26, 2000 (“Rabinovich '427” (“Rabinovich-427” in the Petition), Ex. 1006).

<sup>5</sup> Michael Rabinovich, Irina Rabinovich, and Rajmohan Rajaraman, *Dynamic Replication on the Internet Work Project No. 3116-17-7006*, March 5, 1998 (“Rabinovich Memo” (“Rabinovich-Memo” in the Petition), Ex. 1005).

The Petition also relies on the Declaration of Michael J. Freedman, Ph.D. (“Freedman Declaration” or “Freedman Decl.”, Ex. 1003) as support for the various contentions.

## II. ANALYSIS

### *A. Procedural Issues Raised in the Preliminary Response*

Patent Owner argues we should exercise our discretion under 35 U.S.C. § 325(d) to deny the Petition, because “[a]ll the references that Petitioner relies on were considered by the Patent Office, as evidenced on the face of the ’959 patent.” Prelim. Resp. 22 (citing Information Disclosure Statement (“IDS”) from the File History of ’959 patent (Ex. 1002), 379). We are not persuaded on this record that a citation to prior art in an IDS, without substantive discussion of the reference by the Examiner, is sufficient reason to exercise our discretion under 35 U.S.C. § 325(d) to decline to institute an *inter partes* review. As Patent Owner acknowledges, we have discretion as to whether to proceed. *See* Prelim. Resp. 23. On this record, we decline to exercise our discretion as Patent Owner urges.

Patent Owner argues Petitioner’s claim chart (Ex. 1010), which is referenced in the Freedman Declaration, when added to the Petition word count, exceeds the total permissible word count and is an improper incorporation by reference. Prelim. Resp. 24–29; *see* 37 C.F.R. § 42.24(a)(i) and 37 C.F.R. § 42.6(a)(3) respectively. We agree. The Petition violates the rule against incorporation by reference into a petition arguments made only in a supporting document. *See Cisco Sys., Inc. v. C-Cation Techs., LLC*, Case IPR2014-00454, Decision Denying Institution, slip op. at 7–10 (PTAB Aug. 29, 2014) (Paper 12) (informative). Accordingly, we have not considered Exhibit 1010 for purposes of this decision. We, therefore, need

not consider whether the combined words in Exhibit 1010 and the Petition violate the word count rule. *See* Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,764 (Aug. 14, 2012) (explaining that “[c]laim charts submitted as part of a petition . . . count towards applicable page limits”).

*B. Claim Construction*

In *inter partes* review, claim terms are given their broadest reasonable interpretation in light of the specification in which they appear. *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2144–46 (2016); 37 C.F.R. § 42.100(b). We presume that claim terms have their ordinary and customary meaning. *See Trivascular, Inc. v. Samuels*, 812 F.3d 1056, 1061–62 (Fed. Cir. 2016) (“Under a broadest reasonable interpretation, words of the claim must be given their plain meaning, unless such meaning is inconsistent with the specification and prosecution history.”) (internal citation omitted); *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). Any special definition for a claim term must be set forth in the specification with reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). In the absence of such a special definition or other consideration, “limitations are not to be read into the claims from the specification.” *In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993). Only those terms that are in controversy need to be construed and only to the extent necessary to resolve the controversy. *See Vivid Techs. Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999).

The papers filed identify two terms for claim construction, “content provider” and “service provider.” Pet. 15–18; Prelim. Resp. 6–11. The record includes a claim construction order from the District Court, which



does not directly address either term. *See* Ex. 1009, 13. Each term is analyzed below.

1. “*content provider*”

The term “content provider” appears only in the preamble of independent claims 1 and 58. Petitioner contends that “content provider” has a plain meaning: “‘an entity that provides content over a network,’ such as an entity that provides HTML files (e.g., a website), movies, images, and the like.” Pet. 16 (citing Freedman Decl. ¶ 69 (citing Ex. 1001, col. 5, ll. 30–47)).

Patent Owner specifically objects to inclusion of “over a network” in the construction. Prelim. Resp. 6–9. Patent Owner contends that “over a network” is confusing because the role of the “content provider” is to “provide (i.e.) source content.” *Id.* at 7. According to Patent Owner, providing content is distinct from “deliver[ing] it **over a network**,” which is a function performed by a separately recited “service provider.” *Id.* Patent Owner asserts that additional confusion is created by Petitioner’s proposed construction, because limitation [1a]<sup>6</sup> recites “one or more networks,” raising the question of “which network it is referring to.” *Id.* (citing Ex. 1001, claim 1). Patent Owner concludes by proposing that “content provider” means “an entity that provides content and that is distinct from the separately recited CDN, CDN service provider and/or service provider operating the CDN content servers and CDN name servers.” *Id.* at 8–9.

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<sup>6</sup> The reference to limitation [1a] references Petitioner’s numbering format for identifying the claim limitations, which we also adopt for purposes of this Decision. *See, e.g.*, Pet. 33.

Petitioner proceeds on the assumption that the preamble is limiting. *See* Pet. 28–32. As seen above, Patent Owner responds in kind. We are not persuaded that the preamble is limiting, but it is instead “simply an introduction to the general field of the claim.” *On Demand Mach. Corp. v. Ingram Indus.*, 442 F.3d 1331, 1343 (Fed. Cir. 2006). “Generally, . . . the preamble does not limit the claims.” *DeGeorge v. Bernier*, 768 F.2d 1318, 1322 n.3 (Fed. Cir. 1985). A preamble may be limiting if it provides an antecedent basis for any limitation in the body of the claim. *See Eaton Corp. v. Rockwell Int’l Corp.*, 323 F.3d 1332, 1339 (Fed. Cir. 2003). The preamble here does not provide an antecedent basis for the body of the claim because “content provider” does not appear outside the preamble. The preamble here merely introduces the general field of the claimed “computer-implemented method of delivering.” Because the language in the body of claims 1 and 58, standing alone, is clear and unambiguous there is no compelling reason to give the term “content provider” patentable weight.

2. “*service provider*”

The term “service provider” appears in limitations [1c-ii], [1d], and [1f]. *See* Pet. 46, 47, 51. Based on its plain meaning, Petitioner proposes that “service provider” means “an entity that provides network services,” such as an Internet Service Provider (“ISP”).” Pet. 16 (citing Freedman Decl. ¶ 70). Petitioner points out that “service provider” is described as an ISP in the ’959 patent. *Id.* (citing Freedman Decl. ¶ 70; Ex. 1001, col. 1, ll. 20–25, col. 5, ll. 64–65).

Patent Owner opposes Petitioner’s proposed construction on the basis that it is “entirely unbounded” because it includes “any” network services and not the claimed delivery of “text, graphics, images, downloads, audio or

video on behalf of multiple content providers.” Prelim. Resp. 10 (citing Ex. 1001, claim 1). In sum, Patent Owner contends it is “not any service, but rather is a particular service – operating the CDN content servers and name servers – as recited by the claims themselves.” *Id.* Patent Owner argues “service provider” should be construed as “a party, distinct from the content provider, that operates the recited content delivery network, including its content servers and name servers, to deliver content on behalf of multiple content providers.” *Id.* at 10–11.

The claim language Patent Owner seeks to incorporate into the definition appears, in part, in the preamble, which we have determined is not limiting. Even proceeding on an assumption that the preamble is limiting, however, would not support Patent Owner’s proposal. We are not persuaded that the claimed “service provider” necessarily would be required to be a separate entity from the “content provider,” as Patent Owner argues. Patent Owner also argues that “delivering text, graphics, images, downloads, audio or video on behalf of multiple content providers” is special kind of service, precluding a construction including “any service.” We disagree that the claim requires any particular type of service beyond that already expressly recited in the body of the claim.

For purposes of this Decision, we adopt Petitioner’s proposed meaning as the broadest reasonable interpretation of “service provider.”

### *C. Obviousness Analysis*

A claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said

subject matter pertains. *See KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

*1. Level of Ordinary Skill*

Petitioner contends a person of ordinary skill in the art, as of July 14, 1998, the earliest filing date claimed in the application for the '959 patent, “would have at least a Bachelor’s degree in Computer Science, Computer Engineering, or the equivalent, and several years’ experience in the field of distributed systems, name services, or Internet content delivery.” Pet. 14 (citing Freedman Decl. ¶¶ 20–29).<sup>7</sup> Patent Owner does not state a position. On this record and for purposes of this Decision, we adopt Petitioner’s proposed level of ordinary skill.

*2. Obviousness over Ebrahim, Rabinovich '427, and Rabinovich Memo*

Petitioner alleges claims 1, 2, 4, 9–12, 15, 16, 26, 28, and 58 would have been obvious to a person of ordinary skill in the art over Ebrahim, Rabinovich '427, and Rabinovich Memo. Pet. 3, 18–70. Petitioner provides

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<sup>7</sup> Patent Owner asserts that at the time of the invention Dr. Freedman was an undergraduate studying for his Bachelor of Science degree and was not a person of ordinary skill in the art. Prelim. Resp. 16–17 (citing Freedman Decl. ¶ 3). However, Dr. Freedman testifies that his opinions are based “on written materials and other information that was known in 1998.” Freedman Decl. ¶ 13; *see also* Freedman Decl., Appendix B, “Materials Considered,” including Exs. 1007, 1008 (Network Working Group RFCs 1034 and 1035 relating to Domain Names, November 1987).

a table that identifies specifically those limitations of claim 1 that are disclosed in each of the references. *Id.* at 19. Petitioner cites the Freedman Declaration in support of its positions. *See* Ex. 1003 ¶¶ 51–85 (exclusive of any citations to the claim chart, Ex. 1010).

*a. Ebrahim (Ex. 1004)*

Ebrahim describes a name resolution system connected to “either a requester’s system or a receiver’s system, or both.” Ex. 1004, Abstract. “Requests to a given Service or domain name are resolved to the appropriate IP address.” *Id.* Ebrahim’s invention “uses requester context-dependent intelligence” to identify which of several IP addresses should be used to resolve a given “name” request. *Id.* at col. 4, ll. 22–25.

An example of name resolution occurs “when a user wishes to view video, e.g. a movie, on his or her computer.” Ex. 1004, col. 3, ll. 37–47. “An application running on the computer is used to make a procedure call to the name resolver to determine which server can serve a movie” using the string “service\_handle=name\_service\_lookup(“movie”).” *Id.* The string is “passed to a server, which returns the name of the service providing that movie” or a list of services from which the user may select one. *Id.*

In another example, Ebrahim explains “multiple binding,” where there are several servers which may be selected and one is selected based on geographical location between where the request originates and the closest destination. Ex. 1004, col. 5, ll. 1–17, Fig. 3. Figure 3 of Ebrahim is reproduced below.

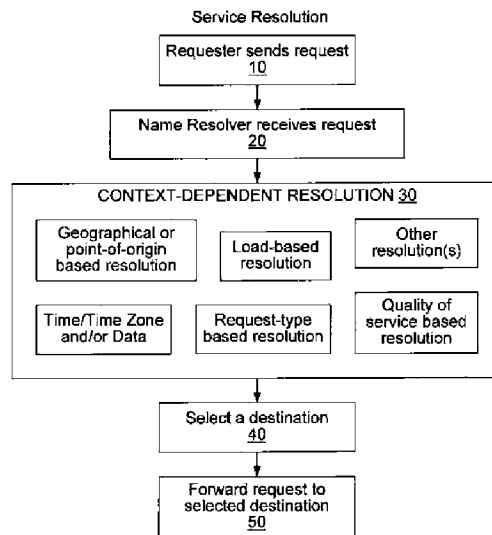


FIG. 3

Figure 3 “is a flow chart illustrating a method according to the system of the present invention.” *Id.* at col. 2, ll. 66–67. As shown in Figure 3 of Ebrahim, other context dependent resolutions, beyond “Geographical,” include Time Zone; Load- Based; Request-type; Quality of service; or “Other resolutions.”

Ebrahim teaches that an organization may have many database servers, and with multiple address resolution binding, multiple database servers may be made available under a single name. Ex. 1004, col. 6, ll. 30–44. A local service resolution server resolves a “request to any one of several to many IP addresses,” which as discussed above in connection with Figure 3, “can depend upon, for example, load at each of the servers.” *Id.*

*b. Rabinovich '427 (Ex. 1006)*

Rabinovich '427 describes a replication service system and method for efficiently “providing access by a large number of clients to objects located at a large number of information servers.” Ex. 1006, Abstract. “A non-bottleneck solution is provided to sharing load among servers by migrating or replicating objects over from highly loaded servers to less

highly loaded servers.” *Id.* “A naming service is provided to provide rapid access to a replica of a requested objects.” *Id.*

“The physical name of an object is the name by which the object can be accessed by the clients (in the Web context, this would be the object’s URL).” Ex. 1006, col. 5, ll. 64–67. “The symbolic name uniquely identifies the object.” *Id.* at col. 5, l. 67–col. 6, l. 1. The symbolic name is advertised to the users and is used to access the object. *Id.* at col. 6, ll. 4–6. The symbolic name resolves into the name service identity. *Id.* at col. 6, ll. 6–7. The name service “finds a corresponding physical name (due to replication, a symbolic name can map into multiple physical names) and sends it as a special ‘re-direct’ response to the client.” *Id.* at col. 6, ll. 9–13. The client uses the physical name received to access the object at the identified server. *Id.* at col. 6, ll. 13–15.

The system contains “Web servers [which] host objects and provide access to them” through known URLs. Ex. 1006, col. 12, l. 66–col. 13, l. 2. The object directly embeds the identity of its hosting server, protocol, and object of interest. *Id.* at col. 13, ll. 2–4. For example, in the string “http://www-db.marketing.abcd.com/foo.html,” the domain name is “www-db.marketing.abcd.com,” the protocol to be used to access the object is http, and the object of interest is “foo.html.” *Id.* at col. 13, ll. 5–9. “As the hosting server becomes overloaded, the replicator service described above will cause the creation of a replica of the object (replica-foo-1) on another available hosting server, say, server2.abcd.com.” *Id.* at col. 13, ll. 39–42.

*c. Rabinovich Memo (Ex. 1005)*

The Rabinovich Memo is a paper describing “dynamic replication and migration of Internet objects.” Ex. 1005, 1. An algorithm “attempts to place replicas in the vicinity of a majority of requests while ensuring at the same time that no servers be overloaded.” *Id.* Replication is the same as mirroring. *Id.* at 2. The Rabinovich Memo recognizes the increase in hosting series, i.e., “the service of maintaining and providing access to objects belonging to third-party information providers.” *Id.*

*d. Claim 1–Ebrahim, Rabinovich ’427, Rabinovich Memo*

The preamble of claim 1 recites “[a] computer-implemented method of delivering text, graphics, images, downloads, audio or video on behalf of multiple content providers, comprising.” “To the extent the preamble is considered limiting,” Petitioner identifies evidence, including highlighted versions of Figures 4, 5, and 6 from Ebrahim that teach a Content Delivery Network (“CDN”) that coordinates global content delivery using Requesters, Destinations, and Name Resolvers. Pet. 28–29 (citing Ex. 1004, Figs. 4–6). Ebrahim is also cited by Petitioner as disclosing the delivery of web, video, and database content. *Id.* at 29–30 (citing Ex. 1004, col. 3, ll. 30–47, col. 5, ll. 1–9, col. 7, ll. 62–67).

Petitioner argues that Ebrahim’s multiple “Destinations,” as shown in Figure 4, are the “multiple content providers” recited in the preamble. *See* Pet. 30–31 (citing Ex. 1004, col. 6, ll. 30–44). Petitioner cites to Exhibit 1010, which we have found was improperly incorporated by reference, for its assertion.<sup>8</sup> Absent this expert testimony, we are not persuaded by

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<sup>8</sup> References in the Petition to Exhibit 1010 are neither considered nor referenced in the remainder of this Decision.



Petitioner's showing in this regard. Petitioner, however, alternatively cites to the Rabinovich Memo's disclosure of "a hosting service, i.e., the service of maintaining and providing access to objects belonging to third-party information providers" as teaching the claimed the "multiple content providers." *Id.* at 31 (citing Ex. 1005, 2; Freedman Decl. ¶¶ 79–80). If the preamble is determined during trial to be limiting, on this record, Petitioner has shown sufficiently that the combination of Ebrahim and the Rabinovich Memo teaches the preamble of claim 1.

Limitation [1a] recites "operating content delivery network (CDN) content servers in multiple locations, each location with connectivity to one or more networks." Petitioner asserts Ebrahim's "'Destinations' are CDN content servers that deliver requested content to end users." Pet. 33 (citing Ex. 1004, col. 4, ll. 55–60, col. 5, ll. 14–17, Fig. 3). Petitioner contends Figure 3 shows how Ebrahim resolves content requests to a "Destination." *Id.* Petitioner cites to Ebrahim's Figures 4 and 5 for the recitation of multiple locations connected to "one or more networks." *Id.* at 34. Specifically, the organization "Sun" has "multiple Destinations (e.g., Destination 1 through N, such as the Sun (United States) and Sun (Europe) Destinations." *Id.* (citing Ex. 1004, Fig. 6). On this record, Petitioner has shown sufficiently that Ebrahim teaches limitation [1a].

Limitation [1b] recites "operating multiple CDN name servers." Ebrahim teaches that "a domain name service (DNS) call resolves a name." Ex. 1004, col. 1, ll. 10–12. Petitioner cites to the preceding disclosure and other instances where Ebrahim references, for example, "DNS name resolver." Pet. 36 (citing Ex. 1004, col. 1, ll. 21–22, col. 1, ll. 60–61). Again relying on Figures 4 and 5 and citing "Name Resolvers" 180 and 200,

Petitioner argues the multiple “Name Resolvers” shown are the claimed “multiple CDN name servers.” *Id.* at 36–37. Petitioner points to additional disclosures from Ebrahim to explain the “operation of the top and bottom level Name Resolvers in Ebrahim.” *Id.* at 37–41 (citing Ex. 1004, col. 4, ll. 50–54, col. 4, ll. 61–67, col. 5, ll. 1–7, col. 5, 23–38, col. 5, ll. 39–50, col. 6, ll. 6–17, col. 6, ll. 30–44, Fig. 3, Fig. 4 (numbers 210–230), Fig. 5, Fig. 6). Lastly, Petitioner notes that Ebrahim is “clear that many name resolvers would run within its system.” *Id.* at 38 n.9 (citing Ex. 1004, col. 2, ll. 39–42). On this record, Petitioner has shown sufficiently that Ebrahim teaches limitation [1b].

Limitation [1c] recites “receiving a first domain name service (DNS) query at a first CDN name server, the first DNS query including a data string of the form ‘string1 string2 string3’.” Petitioner argues Ebrahim discloses the first portion of limitation [1c] by disclosing receiving DNS queries at its name resolvers. Pet. 42 (citing Ex. 1004, Fig. 6, Resolver 1; additionally citing Ex. 1004, col. 2, ll. 7–54, col. 5, ll. 1–17, Fig. 3). Specifically, Petitioner argues the first part of the limitation is met when a URL, for example “http://www.sun.com” as disclosed in Ebrahim, is requested or entered into a browser. *Id.* (citing Ex. 1004, col. 5, ll. 3–8).

Petitioner also argues the symbolic object of Rabinovich ’427 “explained in more detail how a CDN such as the Ebrahim-777 CDN would identify objects so that requests for an object would be directed to a CDN’s name service (e.g., the Name Resolvers of Ebrahim-777), rather than to a physical server location.” *Id.* at 43 (citing Ex. 1006, col. 5, l. 64–col. 6, l. 6). Petitioner asserts that “Rabinovich-427 uses a symbolic name for web objects and maps those objects to a physical server using a naming service.”

*Id.*; *see also id.* at 44 (citing Ex. 1006, col. 13, ll. 20–45). Petitioner argues that “the format of these symbolic URLs could be used to organize content within a CDN’s domain by content provider” and the naming scheme of Rabinovich ’427 could take a “wide variety of naming forms.” *Id.* at 44 (citing Freedman Decl. ¶¶ 40–50, 63–65, 84). Petitioner concludes “[u]sing any of these naming schemes to supplement the basic ‘www.sun.com’ example in Ebrahim-777 would have been predictable and obvious to a POSITA in view of Rabinovich-427, and would have provided a clear organizational scheme for storing objects on behalf of multiple customers.” *Id.* at 45 (citing Freedman Decl. ¶¶ 83–85). On this record, Petitioner has shown sufficiently that the combination of Ebrahim and Rabinovich ’427 teaches the first part of limitation [1c]. The “data string of the form ‘string1 string2 string3’” portion is addressed below in our analysis of limitations [1c-i]–[1c-iii].

Limitation [1c-i] recites “string3 is a generic top level domain (gTLD).” Petitioner argues “Ebrahim-777 in view of Rabinovich-427 disclosed the use of the generic top level domain ‘com.’” Pet. 45 (citing Ex. 1004, col. 5, ll. 1–17). Relying on the Freedman Declaration, Petitioner concludes a person of ordinary skill in the art “would understand that top level domains are the last part (i.e., last ‘label’) of a domain name, such as ‘com’, ‘org’, ‘gov’, or ‘net.’” *Id.* at 45–46 (citing Freedman Decl. ¶ 36 as “explaining that the Internet Assigned Numbers Authority (‘IANA’) defines the list of generic top level domains on the Internet”). Thus, Petitioner contends that Ebrahim and Rabinovich ’427 both disclose string3 in “the DNS query ‘www.sun.com’, or alternatively queries like ‘abcd.sun.com’, ‘sun.abcd.com’, ‘symbfoo.sun.abcd.com’, or ‘symb-foo.abcd.com’, where

‘com’ is string3.” *Id.* at 46. On this record, Petitioner has shown sufficiently that Ebrahim in combination with Rabinovich ’427 teaches limitation [1c-i].

Limitation [1c-ii] recites “string2 is separated from string3 by a period and is a name maintained by a service provider that operates the CDN content servers and the CDN name servers.” Petitioner argues the combination of Ebrahim, Rabinovich-427, and the Rabinovich-Memo discloses this limitation. Pet. 46. Ebrahim discloses “an exemplary DNS query for ‘www.sun.com’ in which string2 is ‘sun’ and string3 is ‘com’, and string2 is separated from string3 by a period.” Petitioner cites alternatives previously cited including “abcd.sun.com”, “sun.abcd.com”, “symb-foo.sun.abcd.com”, and “symbfoo.abcd.com.” *Id.*; *see also* Freedman Decl. ¶¶ 63–65 (cited in connection with limitation [1c] discussing naming schemes based on Rabinovich ’427). In each case, “string2 is separated from string3 by a period.” Pet. 46.

Patent Owner argues Petitioner has failed to show that Ebrahim’s use of “sun” in www.sun.com is “a name maintained by a service provider that operates the CDN content servers and the CDN name servers.” Prelim. Resp. 20. Patent Owner’s argument regarding Ebrahim and Rabinovich ’427 is based on its proposed construction of “service provider.” *Id.* at 20–21. Patent Owner’s construction was rejected above and its argument here is, thus, unpersuasive.

Patent Owner argues that certain naming alternatives argued in the Petition are “*nowhere found* in the prior art and are instead made-up by Dr. Freedman.” Prelim. Resp. 21 (citing Freedman Decl. ¶ 84). We disagree. Dr. Freedman bases his testimony on the naming scheme in Rabinovich

'427. *See* Freedman Decl. ¶¶ 63–65, 84. The testimony is not conclusory, nor does Patent Owner argue that it is. Patent Owner may, if it chooses, counter the testimony with that of its own expert when it files its Patent Owner Response.

On this record, Petitioner has shown sufficiently that the combination of Ebrahim, Rabinovich '427, and the Rabinovich Memo teaches limitation [1c-ii].

Limitation [1c-iii] recites “string1 is separated from string2 by a period and comprises one or more sub-strings, where each sub-string is comprised of one of: letters, numbers, and combinations of letters and numbers, and any pair of substrings in string 1 are separated by a period.” Petitioner argues Ebrahim and Rabinovich '427 disclose exemplary DNS queries, as set forth above in connection with limitation [1c-ii], where “string1 is comprised of letters, numbers, or combinations of letters and numbers as required by this limitation.” Pet. 47. On this record, Petitioner has shown sufficiently that the combination of Ebrahim and Rabinovich '427 teaches limitation [1c-iii].

Limitation [1d] recites

having the first CDN name server respond to the first DNS query by sending a response that includes a first set of one or more IP addresses, where a first end user request for content directed to one of the IP addresses of the first set causes the service provider to deliver the content to a first end user from a first CDN content server.

Petitioner argues “Ebrahim-777 disclosed that a Name Resolver would receive a DNS query for ‘www.sun.com’, ‘sun.abcd.com’, ‘abcd.sun.com’, or the like, and resolve it to an IP address.” Pet. 47–48 (citing Ex. 1004, Fig. 5, Name Resolver 300). Name Resolver 300

“include[d] tables, program modules, or the like as desired to resolve a request to any one of several to many IP addresses.” *Id.* at 48 (citing Ex. 1004, col. 6, ll. 40–42, col. 2, ll. 7–54, claims 14, 18). Petitioner also cites Figure 3 of Ebrahim as showing a selected IP address of one of the “potentially-many Destinations available.” *Id.* at 50 (citing Ex. 1004, col. 6, ll. 30–44). On this record, Petitioner has shown sufficiently that Ebrahim teaches limitation [1d].

Limitation [1e] recites “receiving a second DNS query at a second CDN name server, the second DNS query also including the same data string that is received by the first CDN name server.” Ebrahim teaches that there are “[m]any instances of the name resolver may be running on different physical computers, . . . and the requester will access the name resolver closest to him.” Ex. 1004, col. 2, ll. 39–41. Petitioner relies on the preceding disclosure and Figure 6 of Ebrahim showing “different Name Resolvers capable of receiving DNS queries and shows that both may receive and respond to requests for ‘www.sun.com.’” Pet. 50–51 (citing Ex. 1004, col. 2, ll. 7–54, col. 5, ll. 1–17, Figs. 3, 6). On this record, Petitioner has shown sufficiently that Ebrahim teaches limitation [1e].

Limitation [1f] recites

having the second CDN name server respond to the second DNS query by sending a response that includes a second set of one or more IP addresses, wherein a second end user request for content directed to one of the IP addresses of the second set causes the service provider to deliver the content to a second end user from a second CDN content server.

Petitioner cites to its showing on limitation [1d] concerning a second CDN name server and a second DNS query. Pet. 51. Specific to limitation [1f], Petitioner contends “Figure 6 shows that the second Name Resolver

(Resolver 2) can respond to the second DNS query with an IP address for a Destination in the United States, as opposed to the Destination in Europe.” *Id.* at 51–52. Petitioner also cites to Figure 5 and claims 1, 7, 12, 14, and 18 of Ebrahim. *Id.* at 52. For example claim 7 of Ebrahim recites:

said name resolving unit is configured to *select said destination address* corresponding to said destination name of said service depending upon at least one of either a geographical location of said requester, a date of said request, and/or a time of said request.

Ex. 1004, claim 7 (emphasis added). Claim 12 of Ebrahim depends from claim 7 and requires that “wherein said *destination address* corresponding to said destination name of said service *is an IP address*.” *Id.* at claim 12 (emphasis added). On this record, Petitioner has shown sufficiently that Ebrahim teaches limitation [1f].

Limitation [1g] recites “the second set of one or more IP addresses differing from the first set of one or more IP addresses based on where the first and second DNS queries originate.” Petitioner cites to Ebrahim’s Figure 6 and discussion concerning selecting a particular server to respond to a request based on geographic proximity. Pet. 52 (citing Ex. 1004, col. 2, ll. 7–54, col. 5, l. 1–col. 6, l. 29, as “providing examples of name resolution based on criteria including the requester’s inferred geographic region, geography-related information, city/country info, area code, and address”, Fig. 6). Petitioner also cites other portions of Ebrahim in support. *Id.* (citing Ex. 1004, col. 3, ll. 18–34, col. 4, ll. 61–67, col. 6, ll. 30–44, Fig. 3, claims 1, 7, 12, 14, 18). Although Petitioner also references the Rabinovich Memo (Pet. 53), that reference is neither argued nor discussed as to its relevance to limitation [1g]. On this record, Petitioner has shown sufficiently that Ebrahim teaches limitation [1g].

*e. Claim 58 – Ebrahim, Rabinovich '427, Rabinovich Memo*

Petitioner's argument and evidence regarding claim 58 is based on "the reasons described above with respect to" the corresponding limitations in claim 1. *See, e.g.*, Pet. 67 (limitation [1a] compared to limitation [58a]). Petitioner's arguments regarding claim 58 appear at pages 66 through 70 of the Petition. Patent Owner presents arguments only with respect to limitation [58c-ii] on the basis that the Petition does not specify with particularity the ground for the challenge under 35 U.S.C. § 312(a)(3), nor "the evidence that supports the grounds for the challenge to each claim." Prelim. Resp. 21–22 (additionally citing 37 C.F.R. § 42.104(b)(4)). At this stage of the proceeding, we agree with Petitioner that claim 58, and particularly limitation [58c-ii], is not materially different from claim 1. For purposes of this Decision, we therefore rely on our analysis on claim 1 as representative of the issues presented. On this record, Petitioner has shown sufficiently that the combination of Ebrahim, Rabinovich '427, and the Rabinovich Memo teaches the limitations of claim 58.

*f. Dependent Claims 2, 4, 9–12, 15, 16, 26, 28 – Ebrahim, Rabinovich '427, Rabinovich Memo*

We have reviewed Petitioner's evidence and argument indicating the combination of Ebrahim, Rabinovich '427, and Rabinovich Memo renders obvious claims 2, 4, 9–12, 15, 16, 26, and 28. *See* Pet. 53–66. Patent Owner does not separately argue any of the dependent claims. On this record, Petitioner has shown sufficiently that the combination of Ebrahim, Rabinovich '427, and Rabinovich Memo teaches the limitations recited in claims 2, 4, 9–12, 15, 16, 26, and 28.



*g. Motivation to Combine Ebrahim, Rabinovich '427, Rabinovich Memo*

Petitioner first argues a person of ordinary skill in the art “would have been motivated to use the CDN service described in Ebrahim-777 to provide content hosting and delivery services on a global scale on behalf of multiple third-party content providers.” Pet. 25. Furthermore, Petitioner argues a person of ordinary skill in the art “would have known to use conventional domain name delegation and URL naming techniques to organize the content hosted by the CDN service, as well as to facilitate the CDN’s management of content distribution, load balancing, and content replication on behalf of its third-party content provider customers.” *Id.* (citing Freedman Decl. ¶ 77). “Further, the Rabinovich-Memo and Rabinovich-427 taught those skilled in the art how a service provider could name and identify objects that were served to end-users on behalf of multiple content providers.” *Id.* (citing Freedman Decl. ¶ 78). Thus, “all three references are related to providing efficient content delivery using DNS name resolution for directing end users to appropriate content delivery servers in a globally distributed network of such servers.” *Id.* (citing Freedman Decl. ¶ 78). At pages 26 through 27 of the Petition, citing to the Freedman Declaration, Petitioner lists several additional factors and obviousness arguments relating to content delivery in a DNS environment motivating a person of ordinary skill in the art to combine the references, including:

1. Serving multiple customers from a single CDN, and would have understood that this was the predictable and intended use for the Ebrahim CDN service. Freedman Decl. ¶ 80.
2. Serving content of Ebrahim for multiple content providers, as disclosed in the Rabinovich Memo, was impractical for many

content providers from a global network infrastructure because of expense and practicality. *Id.*

3. A POSITA would have found it obvious to use the Ebrahim CDN to serve content on behalf of multiple content providers, as disclosed and taught by the Rabinovich Memo. *Id.*
4. Using Ebrahim on behalf of multiple content providers uses well-known techniques to delegate “domain name(s) to a CDN service provider, create CNAME records that refer to the CDN service provider’s domain, or other equivalent techniques.” *Id.* at ¶ 81.
5. In Ebrahim, the CDN service used DNS name resolution techniques to direct the request to “www.sun.com” to a geographically close destination server providing an organized naming system on behalf of multiple content providers enabling the CDN to “maintain the domains and deliver end users’ requests for hosted content using its global infrastructure in a predictable and efficient way.” Freedman Decl. ¶¶ 81–83; *see also* ¶ 84 (Rabinovich ’427 examples about structuring domains based on physical and symbolic server names); Ex. 1004, col. 2, ll. 7–54.
6. “[U]sing the naming/organization techniques described in Rabinovich-427 would facilitate an efficient way for the CDN to organize and manage multiple content provider domains.” *Id.* ¶ 84.

Petitioner concludes that “[f]or at least these reasons, a POSITA would have found it obvious to use the CDN of Ebrahim-777 to serve multiple content providers, as per the Rabinovich-Memo, and to use a flexible URL naming system, as per Rabinovich-427, to facilitate storage and delivery of content to end-users.” Pet. 27. Patent Owner argues that the analysis of Petitioner is based on the uncorroborated “say-so” of Dr. Freedman. Prelim. Resp. 15. Patent Owner argues the preceding is insufficient, summarizing the argument by quoting a single sentence from

the Petition that “all three references are related to providing efficient content delivery using DNS name resolution for directing end users to appropriate content delivery servers in a globally distributed network of such servers.” *Id.* at 14. We disagree. Dr. Freedman details the teachings of each reference and why each would lead a person of ordinary skill in the art to make the combination based on, for example, practicality, cost, efficiency, and predictability.

*h. Summary*

Petitioner’s argument and evidence shows a reasonable likelihood that Petitioner would prevail in showing that claims 1, 2, 4, 9–12, 15, 16, 26, 28, and 58 would have been obvious over Ebrahim, Rabinovich ’427, and Rabinovich Memo.

III. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that *inter partes* review is *instituted* with respect to the following ground of unpatentability: claims 1, 2, 4, 9–12, 15, 16, 26, 28, and 58 as obvious under 35 U.S.C. § 103(a) over Ebrahim, Rabinovich ’427, and Rabinovich Memo.

FURTHER ORDERED that pursuant to 35 U.S.C. § 314(a), *inter partes* review of U.S. Patent No. Patent 7,693,959 B2 patent is hereby instituted commencing on the entry date of this Order, and pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of a trial.

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Patent 7,693,959 B2

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