

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GOOGLE LLC,
Petitioner

v.

SANDPIPER CDN, LLC,
Patent Owner

Case IPR2025-00826
U.S. Patent No. 9,021,112

**PATENT OWNER RESPONSE
UNDER 37 C.F.R. § 42.120**

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PATENT OWNER'S UPDATED EXHIBIT LIST

Exhibit No.	Description
2001	“Cloud CDN: content delivery network,” <i>Google Cloud</i> , accessed at https://cloud.google.com/cdn (last accessed July 2, 2025)
2002	Non-Final Office Action, U.S. Application No. 14/164,925 (Dec. 1, 2015)
2003	National Judicial Caseload Profile – United States District Courts (March 2025)
2004	<i>Sandpiper CDN, LLC v. Google LLC</i> , 2:24-cv-03951, ECF No. 1 (C.D. Cal. May 10, 2024)
2005	<i>Sandpiper CDN, LLC v. Google LLC</i> , No. 2:24-cv-03951, Invalidity Contentions (April 22, 2025)
2006	<i>Sandpiper CDN, LLC v. Google LLC</i> , No. 2:24-cv-03951, ECF No. 82 (C.D. Cal. June 24, 2025)
2007	<i>Sandpiper</i> , No. 2:24-cv-03951, ECF No. 28 (C.D. Cal. Sept. 16, 2024)
2008	FAQs for Interim Processes for PTAB Workload Management, accessed at https://www.uspto.gov/patents/ptab/faqs/interim-processes-workload-management
2009	<i>Gestures Tech. Partners LLC v. Apple Inc. et al.</i> , Petition for Writ of Certiorari, Case. No. 24- (filed June 11, 2025)
2010	<i>Intentionally Left Blank</i>
2011	<i>Intentionally Left Blank</i>
2012	Interim Processes for PTAB Workload Management Memorandum (March 26, 2025)
2013	Declaration of Samuel H. Russ, Ph.D.
2014	Curriculum Vitae of Samuel H. Russ, Ph.D.

Exhibit No.	Description
2015	“CDN Stands For Content Delivery Network: History and Evolution,” <i>BlazingCDN</i> , accessed at https://blog.blazingcdn.com/en-us/cdn-stands-for-content-delivery-network-history-and-evolution (last accessed August 7, 2025)
2016	“What is a CDN (Content Delivery Network)?” <i>Amazon Web Services</i> , accessed at https://aws.amazon.com/what-is/cdn/ (last accessed August 7, 2025)
2017	“How Anycast Works to Bring Content Closer to Your Visitors,” <i>Imperva</i> , accessed at https://www.imperva.com/blog/how-anycast-works/ (last accessed August 7, 2025)
2018	Declaration of Samuel Russ in Support of Patent Owner’s Response
2019	“DNS root server,” Cloudflare, accessed at https://www.cloudflare.com/learning/dns/glossary/dns-root-server/
2020	Lee <i>et al.</i> , “Availability and Effectiveness of Root DNS servers: A long term study,” IEEE (2010).
2021	Deposition Transcript of Todd C. Mowry
2022	Joint Claim Construction and Prehearing Statement, Sandpiper CDN, LLC v. Google LLC, Case No. 2:24-cv-03951 (C.D. Cal. June 20, 2025)
2023	“Enforcement and Non-Waiver of 37 C.F.R. § 42.104(B)(4) and Permissible Uses of General Knowledge in Inter Partes Reviews,” USPTO Memorandum (July 31, 2025)

I. INTRODUCTION

U.S. Patent No. 9,021,112 (“the ’112 patent”) is directed to methods and systems for delivering content to a client device over a network. *See* Section III.A. The ’112 patent discloses a novel content delivery network (“CDN”) architecture that leverages DNS infrastructure using anycast addressing to route content requests to a nearest content server. EX1001, 1:63-2:24. The ’112 patent faced seven Office Actions during prosecution. The claim amendments and arguments made by the Applicant during prosecution identified the same novel features that the Petition fails to demonstrate. The Petition fails to meet its burden to show that any of the independent claims of the ’112 patent are rendered obvious by the cited art.

For claim 1, the Board correctly determined that the Petition fails to invalidate the claim (and dependent claims 2-12) because Glines, with or without Gupta, does not teach element [1d]: “*causing said hostname to be resolved to said common anycast address by an Internet Service Provider (ISP) DNS server.*” *See* DI (Paper 15), 9-12, 20-21. For the remaining independent claims, the Petition fails to establish that the cited art renders obvious several claim limitations: (1) “*a second request for second content associated with a second content provider,*” as recited in independent claim 23; (2) the “*plurality of content providers*” limitation of independent claims 13, 18, 22, and 23; and (3) the “*switch*” limitations of

independent claims 13, 18, 19, 21, and 22. Additionally, Petitioner fails to establish that a person of ordinary skill in the art (“POSITA”) would have combined Glines and Gupta.

The Petition, therefore, fails to satisfy its burden of proof to demonstrate that any independent claim is obvious over Glines, alone or in combination with Gupta. The Board should find all challenged claims of the ’112 patent patentable.

II. BACKGROUND

The ’112 patent discloses pioneering technology within CDNs. CDNs provide critical services that enable content providers to efficiently deliver content to end-users over the Internet. EX2018, ¶26. In the early 1990s, a California start-up called Sandpiper Software Consulting, LLC, a predecessor of Patent Owner, improved the operation of CDNs through a series of innovations.

A typical server in the 1990s could only handle a limited number of simultaneous connections from the growing number of World Wide Web users before becoming overloaded. EX2018, ¶27. Moreover, end-users experienced sluggish load times and high latency due to problems such as congested network segments and geographic separation between the users and physical servers. EX2018, ¶27.

Sandpiper Software Consulting, LLC was among the first to develop services that allowed content providers to distribute their content over the Internet

using a decentralized architecture. The solution overcame the common congestion and performance issues that plagued Internet transmission by deploying CDN servers around the world. EX2018, ¶¶28-29. The solution replicated content from customers' origin servers to appropriate CDN servers and transparently rendezvoused end-users requesting that content to the best CDN server. *Id.* Others in the industry quickly imitated this service and architecture. *Id.*

Using these solutions, end-users would connect to an optimal edge server—i.e., a closest server having available capacity to serve their request. EX2018, ¶29. Distributing content across a network of servers alleviated data congestion issues and reduced latency. *Id.* The solution further involved propagating data from origin servers to edge servers (known as “caching”) based on network demand and seamlessly routing users to the optimal edge server with the correct content. Using this type of caching to perform the replication process within the CDN framework contrasted and improved conventional content retrieval architectures. *Id.*

In 1996, Sandpiper Networks Inc. (“Sandpiper Networks”) was founded in Thousand Oaks, California to further develop and commercialize their novel concept for a content delivery network. There, the inventors designed and built a CDN ultimately referred to as “Footprint.” By at least May 24, 1996, the Sandpiper Networks team had conceived techniques for delivering static and dynamic content, including streaming audio and video, using Sandpiper’s CDN.

By May 1998, Sandpiper Networks delivered cached content to end-users using its CDN. Sandpiper Networks' first paying customer was the L.A. Times, which paid Sandpiper Networks to host the report of Independent Counsel Ken Starr on his investigation of President Bill Clinton ("the Starr Report") beginning on September 11, 1998. Sandpiper Networks' CDN was capable of caching, and was used to cache and deliver Internet resources including, among other things, pictures, text files, dynamic resources, and streaming multimedia resources.

Sandpiper Networks labored not only to build and implement its CDN, but also to protect its groundbreaking innovations through the patent system. Recognizing that its inventions could revolutionize content delivery worldwide, Sandpiper Networks—and its successor companies, including Patent Owner—filed numerous patent applications directed to its foundational CDN technology, including the '112 patent.

In the early-to-mid 2000s, demand for CDNs exploded. EX2015, 7-8; EX2018, ¶30. Content providers like Google and YouTube use CDN technology to meet their enormous data streaming needs, as well as for video search results. EX2001, 1-3; EX2018, ¶30. As a result, techniques for controlling how users access content on a CDN became increasingly important. EX2018, ¶¶30-33.

III. THE '112 PATENT

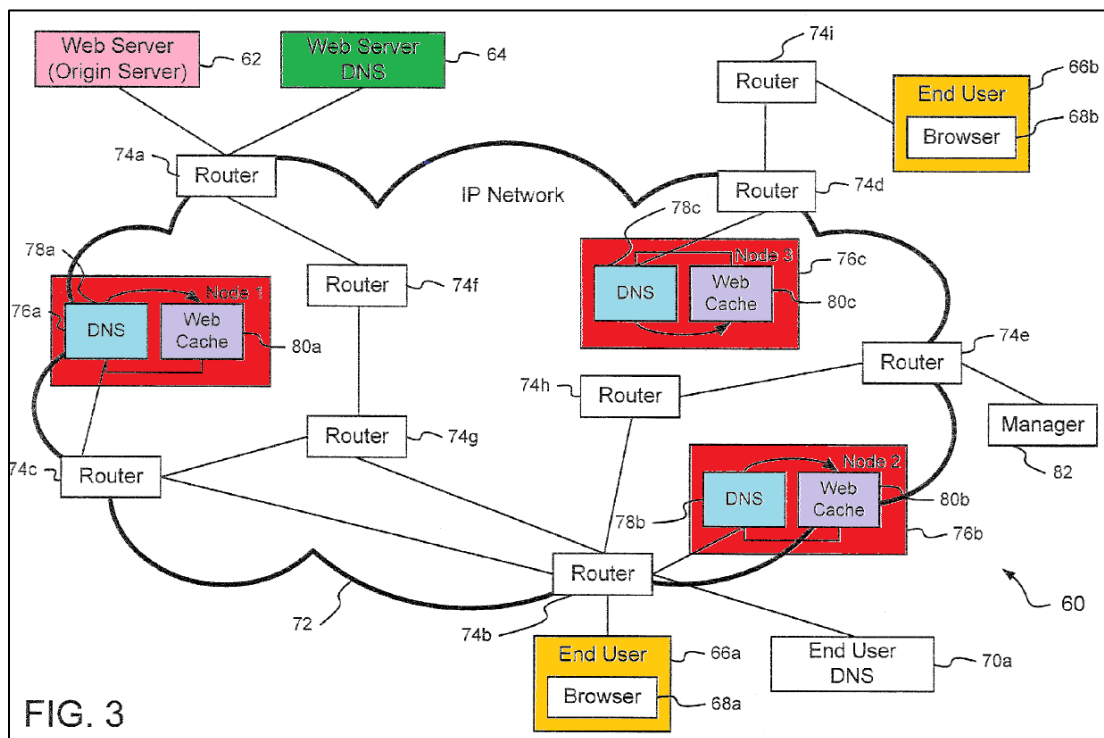
A. The '112 patent discloses a novel CDN architecture that leverages existing DNS infrastructure.

The '112 patent is a divisional of U.S. Patent Application No. 09/982,721, filed on October 18, 2001, and “relate[s] generally to information retrieval in a network and, more particularly, to hosting and distributing content on a content delivery network such as the Internet.” EX1001, 1:16-19; EX2018, ¶34. The '112 patent explains that “[a]s the Web server content provided by World Wide Web has continued to grow over time, so too has the number of users demanding access to such content.” EX1001, 1:36-38. “Unfortunately, the ever-increasing number of end users requesting Web content from Web sites has resulted in serious bandwidth and latency issues, which manifest themselves in delay to the end user.” *Id.*, 1:38-41; EX2018, ¶x34

Therefore, a need existed to respond to requests by providing content quickly and without routing unnecessary network traffic to more distant sources. EX2018, ¶35. Providers of CDN services, however, faced challenges in serving content in a timely manner while maintaining consistent user experience. *Id.*; EX1001, 1:36-59. One aspect of these challenges involved how best to leverage pre-existing routing infrastructure to deliver content from disparate content providers. *See* EX1001, 2:17-19.

The '112 patent sought to use existing DNS infrastructure through anycast addressing to route content requests to “a content site nearest the requestor” to serve the requested content. EX1001, 1:63-2:24. A DNS “refers to a collection of systems available on the public internet that can resolve a domain name to a specific [IP] address.” *Id.*, 3:1-4. This content distribution mechanism allows “the load from many end users [to be] distributed among multiple systems and across different parts of the network.” *Id.*, 2:14-17; EX2018, ¶36. “Because DNS uses a stateless protocol (UDP) for routing, the solution can handle anycast addressable caching without the problems associated with anycast service” EX1001, 2:19-24.

Figure 3 of the '112 patent illustrates CDN 60. EX1001, 4:18.



EX1001, FIG. 3 (annotated).

“CDN 60 includes at least one Web server, shown as a **Web server 62**, a **DNS system 64** for **Web server 62**, and **end-user stations 66a and 66b**, all connected to a network 72.” EX1001, 4:19-21. “Also connected to the network 72 are multiple **content distribution nodes 76a, 76b and 76c**, which support distributed content delivery services for one or more Web sites on the network 72.” *Id.*, 4:27-30; EX2018, ¶¶37-38.

“Each of the CDN nodes 76 includes a **DNS system 78** coupled to and associated with a **Web content server system or site 80**.” EX1001, 4:34-36. Nodes 76 are “geographically dispersed . . . so as to be as close as possible to various network entry points, exchanges or both.” *Id.*, 5:11-13. “The **caching servers 80** have unique IP addresses,” and “[t]he **DNS systems 78** share a common IP address as well as have unique IP addresses.” *Id.*, 5:19-21; EX2018, ¶39.

The ’112 patent notes that network 72 represents a “simplified view of the Internet” and that “[i]n actuality, the Internet is made up of many private ‘routing networks’ . . . , e.g., local, regional, and **centralized Internet Service Providers (ISPs)**, some of which are connected to Network Access Points (NAPs) or exchanges, or each other at public or private peering points.” EX1001, 4:56-67 (emphasis added). The ’112 patent recognizes that its “content distribution mechanism has particular utility . . . within the context of [such a] network infrastructure.” *Id.*, 2:55-58.

The '112 patent explains that “[o]ne way to implement this content distribution configuration is to use an anycast address as the common address.” EX1001, 5:32-35. This anycast address is advertised to end-user clients “using a dynamic routing protocol, the Border Gateway Protocol.” *Id.*, 5:59-61. When a content request is received, “the selected DNS system resolves to the address of the cache server in the DNS system’s node.” *Id.*, 6:27-31. In this manner, “DNS anycast routing, in essence, serves to select the local content site (cache) from which content will be served.” *Id.*, 6:27-31; EX2018, ¶39.

The '112 patent discloses balancing load across the CDN nodes—e.g., if a node “detects an overload condition through its internal monitoring, the node stops advertising its DNS address to the network so that no further requests will be directed to that node.” EX1001, 8:3-7. “Consequently, DNS requests that normally would have been routed to that node as a first choice are routed to the next closest active node.” *Id.*, 8:7-9.

B. Prosecution History

The '112 patent was filed as U.S. Application No. 12/050,648 (“the '648 application”) on March 18, 2008, as a divisional application of U.S. Application No. 09/982,721, filed October 18, 2001. The '648 application originally included 12 claims (“prosecution claims”).

During prosecution, the applicant filed seven information disclosure statements citing prior-art references including U.S. Patent Nos. 6,405,252 (EX1003, “Gupta”) and 6,006,264 (EX1006, “Colby”). EX1007, 5, 355. Petitioner’s grounds rely on both Gupta and Colby.

The Office thoroughly evaluated the ’112 patent, issuing seven Office Actions that considered multiple prior-art references. *See* EX1007, 64-75 (rejecting the claims under 35 U.S.C. §103 as unpatentable over U.S. Publication No. 2005/0010653 (“McCanne”) in view of U.S. Patent No. 7,653,700 (“Bahl”)), 104-113 (rejecting the claims under § 103 in view of McCanne and Bahl), 156-170 (rejecting prosecution claims 1-9 and 23 under 35 U.S.C. §102(e) as being anticipated by McCanne and prosecution claims 10-22 under § 103 over McCanne in view of U.S. Patent No. 6,195,680 (“Goldszmidt”), 191-202 (rejecting prosecution claims 1-21 in view of McCanne and Goldszmidt), 244-257 (rejecting prosecution claims 1-12 and 16-21 under § 103 in view of McCanne and Goldszmidt), 286-305 (rejecting prosecution claims 1-12 as anticipated by McCanne and prosecution claims 13-15 under § 103 over McCanne in view of “Application Layer Anycasting: A Server Selection Architecture and Use in a Replicated Web Service” August 2000, IEEE vol. 8, no. 4 (“Zegura”)), 338-348 (rejecting prosecution claims 1-12 as anticipated by McCanne).

The applicant advanced clarifying amendments to the claims during prosecution to address the rejections. For example, the applicant amended the claims to recite: **(1)** *an ISP DNS server*; and **(2)** *a second DNS server*. See EX1007, 132, 176-77, 324.

For **(1)**, on November 9, 2009, in response to a First Non-Final Office Action mailed on June 9, 2009, the applicant amended claim 1 to include a “*DNS server associated with an Internet Service Provider*”:

- | |
|---|
| <p>1. (Currently Amended) A method of content delivery in a network, the method comprising:</p> <p>(A) providing a plurality of Domain Name System (DNS) servers <u>associated with a Content Delivery Network (CDN)</u>, said DNS servers all sharing a common anycast address;</p> <p>(B) providing a plurality of content servers <u>associated with the CDN</u>, each of said content servers associated with at least one of said plurality of DNS servers, and each DNS server of said plurality of DNS servers having at least one content server associated therewith;</p> <p>(C) causing said plurality of DNS servers to be authoritative for at least one content provider domain by causing said common anycast address to be associated with said at least one content provider domain;</p> <p>(D) responsive to a request to resolve a hostname in said content provider domain,</p> <p>(d1) causing said hostname to be resolved to said common anycast address by at least one other DNS server <u>associated with an Internet Service Provider (ISP)</u>, said at least one other DNS server being authoritative for said content provider's domain; and then</p> <p>(d2) by one of said plurality of DNS servers sharing said common anycast address, resolving said hostname to identify at least one of said content servers ~~sites~~ associated with said one of said DNS servers.</p> |
|---|

EX1007, 324.

The applicant explained the amendment and discussed the advantages of such an approach over the asserted art:

From the onset, Applicant notes that the methods and systems described in the pending claims describe essentially a two-phase DNS process for routing a request to a content server: a) **using an ISP DNS server to resolve the initial request to the anycast address associated with the CDN DNS servers**, and b) using one of the CDN DNS servers (acting in accordance with the anycast scheme) to further resolve the request to at least one content server associated with that CDN DNS server (e.g., see FIG. 5). **The advantage of such a system is that existing ISP DNS servers do not have to be replaced or otherwise reconfigured with anycast addresses (and/or load balancing mechanisms) as is the case with the AP AR routing system described in McCanne.**

EX1007, 330 (emphasis added).

In a Second Final Office Action mailed on July 11, 2012, the Examiner discussed the above amendment, noting that the “claims merely recite ‘DNS server **associated with an ISP.**’” EX1007, 161 (emphasis added). The Examiner stated that the term “associated” does not “imply that the DNS Server is owned by the ISP.” *Id.* “It can mean that the DNS server is in communication or in link with the ISP.” *Id.*

On May 13, 2013, in response to the Examiner’s contentions in the July 11, 2012, Office Action, the applicant amended independent claim 1 to further clarify its operation:

1. (Currently Amended) A method of content delivery in a network, the method comprising:
- (A) 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, wherein each CDN DNS server is associated with a respective plurality of content servers;
 - (B) causing said plurality of CDN DNS servers to be authoritative for a hostname associated with a content provider by causing said common anycast address to be associated with said hostname;
 - (C) responsive to a request for content associated with the content provider and issued by a client, said request including at least said hostname,
 - (c1) causing said hostname to be resolved to said common anycast address by an Internet Service Provider (ISP) DNS server ~~associated with an Internet Service Provider (ISP)~~; and then
 - (c2) by one of said plurality of CDN DNS servers, resolving said hostname to identify an IP address for use by the client to retrieve the content from a content server.

EX1007, 132.

The applicant explained that independent claim 1 “includes: (c1) causing the hostname to be resolved to the common anycast address by an ISP DNS server; and then (c2) by one of said plurality of CDN DNS servers, resolving said hostname to identify an IP address for use by the client to retrieve the content from a content server.” EX1007, 139. Thus, as the applicant explained, “in response to a request associated with a content provider (the request including a hostname), the hostname is resolved to the common anycast address by an ISP DNS and then to an IP address for one of the content servers by one of the CDN DNS servers.” *Id.*, 140 (emphasis in original).

For **(2)**, on May 10, 2012, in response to the Non-Final Office Action mailed on November 10, 2011, the applicant amended prosecution claim 10 (issued claim 13) to clarify its operation over the asserted art by expressly reciting a “*second DNS server.*”

10. (Currently Amended) A method of content delivery for delivering content on behalf of a plurality of content providers, the method comprising:

- (A) providing a plurality of Domain Name System (DNS) servers, said plurality of DNS servers sharing a common anycast address, wherein each DNS server is associated with a respective plurality of content servers;
- (B) configuring each DNS server and respective plurality of content servers to support content delivery for a plurality of content providers, wherein each of the plurality of content providers has a respective hostname associated therewith;
- (C1) responsive to a first request for first content associated with a first content provider of said plurality of content providers, said first request including at least a first hostname associated with the first content provider,
 - (c11) by a first DNS server ~~one~~ of said plurality of DNS servers, resolving said first hostname to identify a first IP address to be used for retrieval of the first content from a first content server of said content servers associated with said first DNS server;
 - (c12) by a switch associated with said resolving DNS server of step (c11), selecting the first content server from said respective plurality of content servers associated with the DNS server of step (c11); and
 - (c13) attempting to serve said first content from the first content server; and
- (C2) responsive to a second request for said first ~~second~~ content associated with said first ~~a second~~ content provider of said plurality of content providers, said second request including at least a second ~~the first~~ hostname associated with the ~~second~~ first content provider,
 - (c21) by a second DNS server ~~one~~ of said plurality of DNS servers, resolving said ~~second~~ first hostname to identify a second IP address for retrieval of the ~~second~~ first content from a ~~second~~ content server associated with the second DNS server;
 - (c22) by a switch associated with said resolving DNS server of step (c21), selecting the second content server from said respective plurality of content servers associated with the DNS server of step (c21); and
 - (c23) attempting to serve said second content from the second content server.

EX1007, 176-77; *see also id.*, 14 (renumbering the claims).

The applicant explained:

Claim 10 recites a “plurality of DNS servers sharing a common anycast address.” As a consequence, DNS name resolution of the same hostname (associated with a content provider) may use different ones of the CDN DNS servers. **Claim 10 has been amended to clarify this that a first resolution request may use a first CDN DNS server and a second name resolution request for the same hostname may use a second CDN DNS server. Different requests for the same content from the same content provider may be resolved by different ones of the CDN DNS servers.**

EX1007, 184 (emphasis added). The applicant introduced new claim 23 that also recited the “*second DNS Server.*” *Id.*, 181.

The Office issued a Third Non-Final Rejection and a Third Final Rejection. *See* EX1007, 104-13, 64-75. On June 23, 2014, the applicant filed a Notice of Appeal. On January 23, 2015, the applicant filed an Appeal Brief that again pointed out the differences in the amended claims and the asserted prior art. *Id.*, 25-49. Specifically, highlighted the lack of any teaching in the asserted art of the “*ISP DNS server*” of claim 1. *Id.*, 36-39.

For claim 1, the applicant noted that “[n]either McCanne nor Bahl teaches two DNS servers performing two resolves.” EX1007, 36. The applicant elaborated:

[T]he Office has used hindsight to supply the ISP DNS server in order to reject the claim. But, the ISP DNS server is totally unnecessary for McCanne' s system. McCanne is able to retrieve its desired object

without the need of the ISP DNS server of Bahl. Therefore, the addition of a further DNS server would clearly be superfluous.

Id., 38.

The Appeal Brief distinguished claim 10 (issued claim 13) over the asserted art on the basis of [13e]: “(c12) by a switch associated with said resolving DNS server of step (c11), selecting the first content server from said respective plurality of content servers associated with the DNS server of step (c11).” EX1007, 39.

On March 10, 2015, the Examiner withdrew all rejections and issued a Notice of Allowance. EX1007, 10. The ’112 patent issued on April 28, 2015. EX1001, (45).

In summary, the ’648 application received heavy scrutiny during prosecution before the USPTO. The amendments and arguments advanced by the applicant during prosecution identified several deficiencies in the prior art that resulted in the case being allowed. Tellingly, the deficiencies identified during prosecution align with the deficiencies of the Petition discussed below.

C. Level of Ordinary Skill in the Art

A POSITA at the time of the ’112 patent would have had at least a bachelor’s degree in computer science, electrical engineering, or other suitable field, and at least two years of work or research experience related to the field of content delivery networks. EX2018, ¶25. Further professional experience could substitute for education, and vice versa. EX2018, ¶25.

D. Claim Construction

In the Institution Decision, the Board stated that “we determine that no claim term requires express construction.” DI, 8. Patent Owner agrees that no term requires express construction beyond its plain and ordinary meaning as understood by a POSITA at the time of the invention in light of the specification and the patent’s prosecution history.¹

IV. RELEVANT ASSERTED REFERENCES

A. Glines

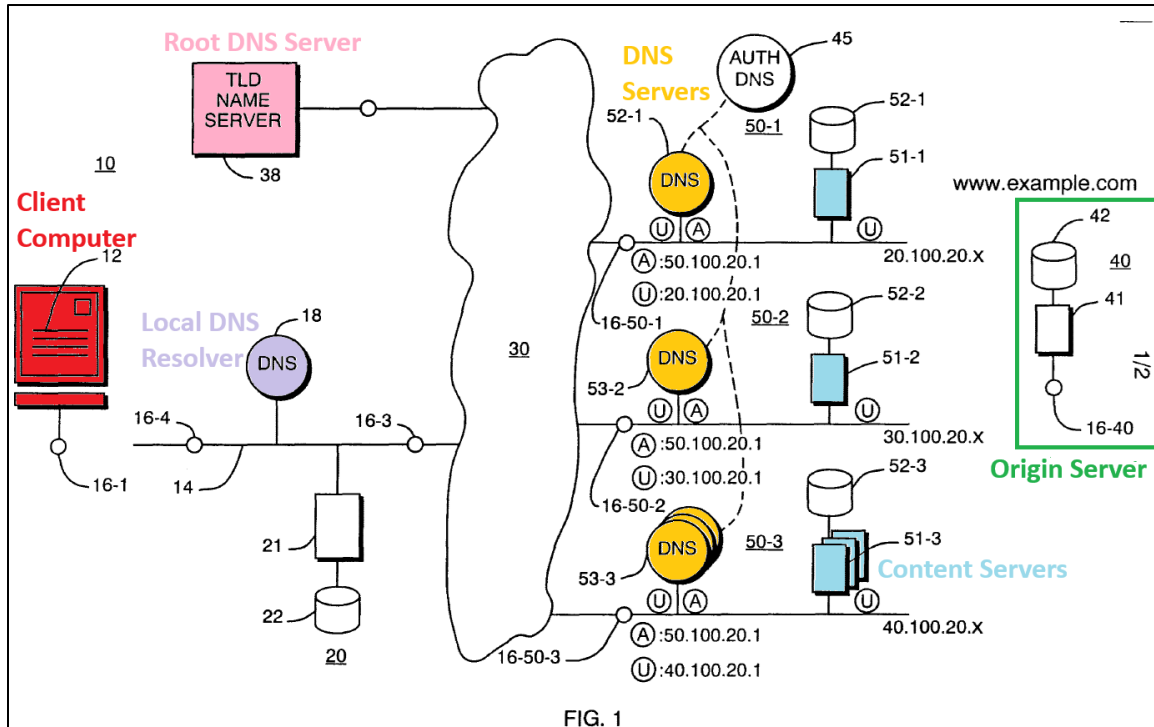
Glines discloses a “technique for redirecting client computer requests for content files to the closest replica of the requested content . . . using anycast messaging.” EX1002, Abstract. In Glines, name servers distributed throughout the network are “addressable via a common anycast address” and “individually

¹ This position is consistent with the position taken by Patent Owner in the United States District Court for the Central District of California, Western Division. *See* EX2022. In the Joint Claim Construction and Prehearing Statement, Patent Owner similarly relied on the plain and ordinary meaning of all claim terms of the ’112 patent, with the lone exception of [13j] in which Patent Owner clarified a typographical error in the claims recitation of “*said second content*” instead of “*said first content*.” EX2022, 2-4.

addressable via a unicast address unique to each such name server.” *Id.*, 6:8-11.

Glines pairs each name server with a content server “that contains (or can serve) desired content file replicas via unicast addressing.” *Id.*, 6:11-13. “Each name server also advertises itself as being authoritative for the domains associated with the content files stored (or to be served from) the associated content server.” *Id.*, 6:13-15.

Glines’s architecture is illustrated in Figure 1.



EX1002, FIG. 1 (annotated).

“[A] **client computer 12** runs a web browser program that enables a user to submit requests for content files that are nominally located at an **origin file server 40**.”

EX1002, 9:16-18. “For example, as the user types a Uniform Resource Locator

(URL) into a web browser and/or uses a pointing device, such as a mouse, to click on a hyperlink embedded in a previously viewed web page, the URL for a particular web site is specified to the browser 12.” *Id.*, 9:18-21. Glines “uses a particular addressing scheme to advertise the availability of alternative or replica name servers 53-1, 53-2, 53-3 for the domain located at the origin server 40,” and “[t]he name servers 53-1, 53-2, 53-3 are peered with content file servers 51-1, 51-2, 51-3 that contain replica copies of files stored at the origin server 40.” *Id.*, 10:19-25.

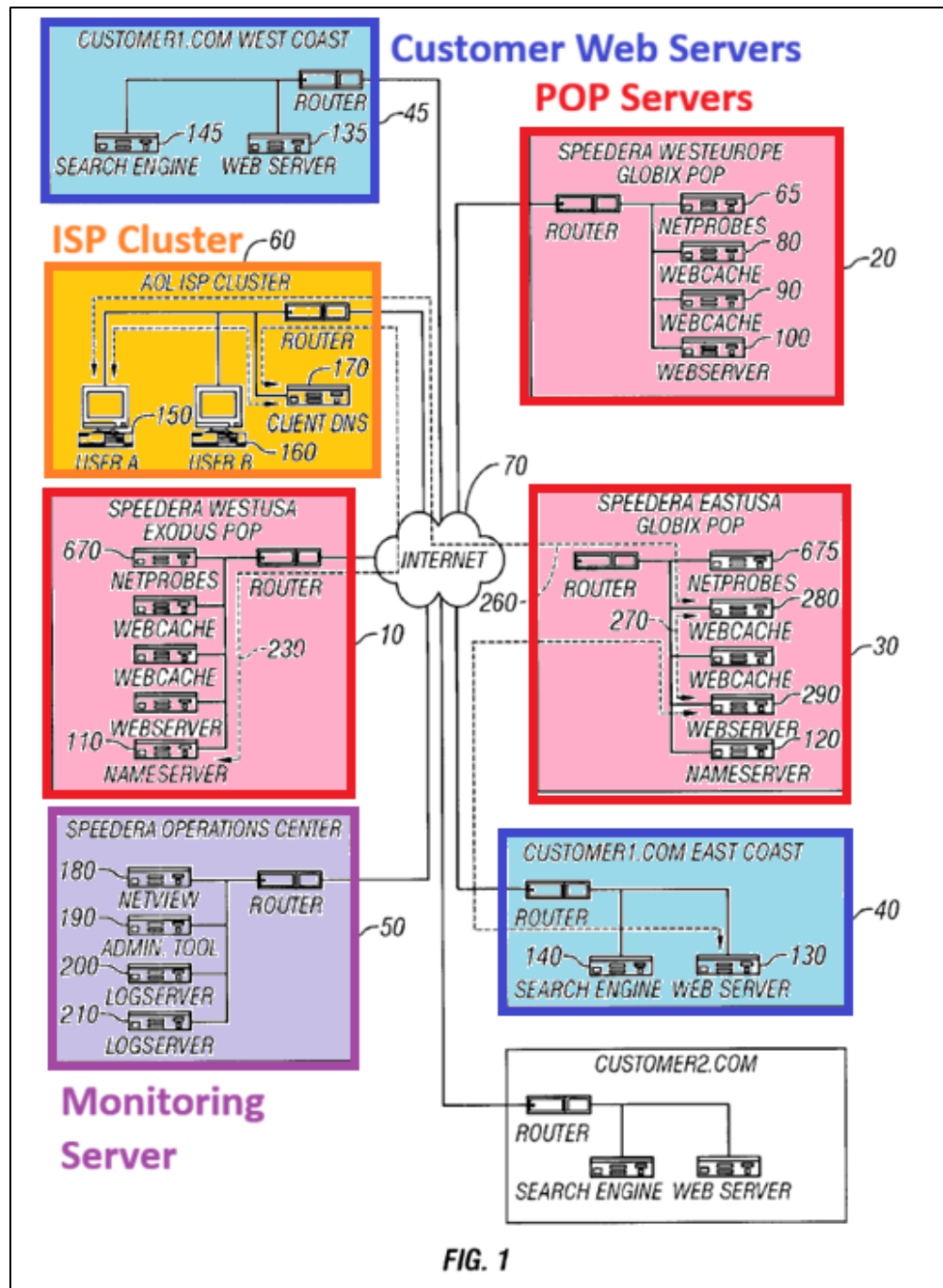
When a user enters a URL into the web browser, “[t]he DNS resolver 18 determines whether or not the requested content file is available locally.” EX1002, 13:27-14:1. “For example, it determines if ‘example.com’ is located in the local web server 20.” *Id.*, 14:1-2. If the content is not available locally, “a request to resolve the location of ‘example.com’ is then sent to a root DNS server 38,” which “will be recursively worked through multiple root servers associated with the Internet 30 (not shown in FIG. 1) to resolve the IP address for a DNS server authoritative for the requested domain name.” *Id.*, 14:8-12. The root DNS server returns the common anycast address for the authoritative name server, and “the browser then sends out a DNS request for the IP address of ‘www.example.com,’” which is “formulated as a UDP datagram specifying the common anycast address.” *Id.*, 15:6-10; *see also id.*, 7:6-12. “The server pair that receives the request then

responds by reporting the unique (unicast) address of the associated content replica server” *Id.*, 7:18-19, 15:26-16:2. The browser then sends a request to the unicast address of the content replica server to retrieve the requested content. *See id.*, 7:20-22, 16:3-8; EX2018, ¶¶45-48.

B. Gupta

Gupta “relates to an integrated load balancing and content delivery computer network.” EX1003, 1:65-67. To deliver content, Gupta deploys “a network of point of presence (POP) computers that provides a solution for integrated content hosting and traffic management.” EX1003, 2:5-8.

Gupta employs the architecture illustrated in Figure 1.



EX1003, FIG. 1 (annotated).

POP servers 10-30 “are typically distributed around the world and together they form a POP network.” EX1003, 4:54-56. The POP server may include a “NameServer” that includes DNS software. *Id.*, 4:64-67. “DNS software performs

a mapping from domain name to IP address. As an example, the DNS software is queried to resolve a hostname . . . and returns the IP address of a web server that has the bandwidth to respond to that request.” *Id.*, 4:33-38.

Customer web servers 40 and 45 provide static and non-static content. ISP 60 includes a client DNS server and “may be a conventional ISP such as Earthlink, AOL, or the like.” EX1003, 5:65-67. Monitoring POP server 50 may provide monitoring functionality. *Id.*, 6:10-32.

Unlike Glines, which resolves client requests to anycast IP addresses, Gupta employs unicast addressing in its DNS resolution. EX2018, ¶87; EX1003, 6:4-6. When a user requests a webpage with a domain within the POP network, “[t]he user’s computer sends a request for name resolution of the domain name they are requesting content from to the configured local DNS server (LDNS) for that users computer.” EX1003, 2:24-29. The LDNS resolves the IP address by sending a query to an authoritative DNS server (“ADNS”) for the domain name. *See id.*, 2:29-33.

The ADNS server identifies a subset of servers on the POP network addressable by the requested domain name and “selects the optimal server/servers for the user based on rules defined in the POP network configuration.” EX1003, 2:37-47. “These rules define how criteria such as POP/customer server health, latency from POP/customer servers to the user making the request, packet loss

experienced at each POP, cost associated with each POP/customer server, and the like.” *Id.*, 2:47-51. “These factors are then combined to define the optimal server for a given user making a request for a given domain name.” *Id.*, 2:52-54; EX2018, ¶¶49-50.

V. THE PETITION FAILS TO ESTABLISH OBVIOUSNESS OF ANY CHALLENGED CLAIM.

The Petition fails to establish that Glines, alone or in combination with Gupta, renders obvious any of independent claims 1, 13, 18, 19, 21, 22, and 23. First, the cited art does not teach “causing said hostname to be resolved to said common anycast address by an Internet Service Provider (ISP) DNS server” (claim 1, element [1d]). Second, the Petition fails to show that the cited art teaches “a second request for second content associated with a second content provider” (claim 23, element [23e]). Third, the Petition fails to show that the cited art renders obvious a system configured to support “a plurality of content providers” (independent claims 13, 18, 22, and 23). Fourth, the Petition fails to show that the cited art teaches the “at least one switch” limitations (independent claims 13, 18, 19, 21, and 22, dependent claim 11). Finally, beyond these substantive claim deficiencies, the Petition fails to establish that a POSITA would have combined Glines and Gupta. Therefore, the Board should uphold the patentability of all challenged claims.

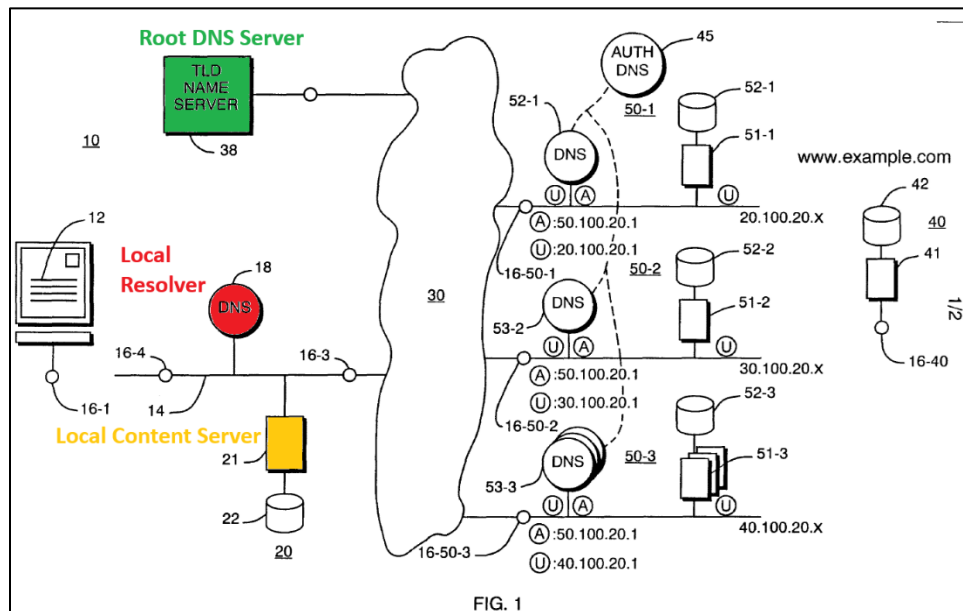
A. Glines, alone or in combination with Gupta, does not teach “causing said hostname to be resolved to said common anycast address by an Internet Service Provider (ISP) DNS server” (claim 1, element [1d]).

The Board correctly found that Petitioner did not establish obviousness of claims 1-12 based on Glines, alone or in combination with Gupta. DI, 9-12, 20-21. Claim 1 recites “(c1) causing said hostname to be resolved to said common anycast address by an Internet Service Provider (ISP) DNS server.” EX1001, 9:11-13 (element [1d]).

As the Board noted in its Institution Decision, Glines’s local DNS resolver 18—what Petitioner maps to the claimed “*Internet Service Provider (ISP) DNS server*”—does not resolve a hostname to a common anycast address, as required by claim 1. DI, 12. And the Petition’s proposed combination with Gupta does not address this flaw. Indeed, the applicant expressly argued during prosecution that the feature recited in [1d] was allowable over the asserted art—arguments that resulted in the Examiner issuing the Notice of Allowance. *See* Section III.B; EX1007, 140 (applicant arguing “in response to a request associated with a content provider (the request including a hostname), the hostname is resolved to the common anycast address by an ISP DNS and then to an IP address for one of the content servers by one of the CDN DNS servers” (emphasis in original)); *see also id.*, 132, 139, 161, 324, 330. Accordingly, as discussed further below, the Board should uphold the patentability of claims 1-12.

1. Glines alone does not teach element [1d].

Petitioner’s reliance on Glines for element [1d] is fundamentally flawed. The Petition identifies Glines’s local resolver 18 as the claimed “*ISP DNS Server*” but relies on the behavior of root DNS server 38 to teach the function of resolving of the hostname recited by [1d]. *See* Pet., 19-21.



EX1002, FIG. 1 (annotated).

Specifically, Petitioner asserts that Glines’s “**local DNS resolver 18 is an ISP DNS server**, as claimed.” Pet., 20; EX2018, ¶¶52-53. Petitioner then alleges, however, that Glines’s “root DNS server 38”—not Glines’s “local DNS resolver 18”—performs the resolution required by element [1d]. Pet., 20-21. In particular, Petitioner explains that when a user enters a URL, “local DNS resolver 18 sends a request to a root DNS server 38,” which “return[s] the anycast address” of an “authoritative name server[]” for the URL. *Id.* (citing EX1002, 13:21-15:4)

(emphasis added). Indeed, as Glines explains, Glines’s **root DNS server 38** receives “a request to resolve the location of ‘example.com’” and “**resolve[s] the IP address for a DNS server authoritative for the requested domain name.**”

EX1002, 14:8-12 (emphasis added); *see also id.*, 14:13-18 (“[T]he root DNS name server 38 has been programmed to instead return the anycast address 50.100.20.1.”).

Petitioner does not explain how Glines’s “local DNS resolver 18”—which Petitioner equates to the claimed “*Internet Service Provider (ISP) DNS server*”—resolves “*said hostname . . . to said common anycast address,*” as element [1d] requires. EX2018, ¶54. Nor does Petitioner assert that root DNS server 38 is an “*Internet Service Provider (ISP) DNS Server*” (because it is not). *Id.* Glines’s root DNS server 38 performs DNS resolution in the root domain. EX2018, ¶¶54-55; *see also* EX1002, 7:6-8 (“The root domain name servers defined, for example, by the Internic, may be programmed to return the common address of the group of name server/content server peers that share a common anycast address.”), FIG. 1 (labelling 38 as the top-level domain name server). Such a root server is not an “*ISP DNS Server*” because it operates at the highest (root) level of the DNS hierarchy. EX2018, ¶55. Such a root server is not under the control of, or in any way associated with, an *ISP*. *Id.*

As the Board correctly noted in the Institution Decision, “Glines’s local resolver 18 does not resolve a hostname to a common anycast address.” DI, 12. Instead, local resolver 18 is merely used to determine whether a content file is available at a local content server, in which case Glines discloses that a “local IP address”—not a common anycast address—“is returned to the browser program.” See EX1002, 13:27-14:5 (“For example, [local resolver 18] determines if ‘example.com’ is located in the local web server 20,” and “if the content is available locally, then the local IP address is returned to the browser program in step 106.”). The Board correctly recognized this flaw in its Institution Decision and should, therefore, find that Glines does not teach “*causing said hostname to be resolved to said common anycast address by an Internet Service Provider (ISP) DNS server.*” DI, 12 (“Because Glines’s local resolver 18 does not resolve a hostname to a common anycast address, it does not teach limitation [1d] regardless of whether it is an ISP DNS server, or if it would have been obvious for it to be an ISP DNS server.”).

2. Gupta does not cure the deficiencies of Glines with respect to [1d].

Recognizing Glines’s shortcomings, Petitioner hedges by also asserting that it would have been obvious to replace Glines’s local DNS resolver 18 with Gupta’s client DNS server 170. Pet., 23-24. Petitioner’s arguments fail for two reasons. First, as discussed below in Section V.E, Petitioner’s hindsight-driven rationales

would not have motivated a POSITA to combine Gupta with Glines. *See* Section V.E. Second, even if a POSITA were to undertake this insufficiently justified modification, any resolution of a hostname to an anycast address would still not be performed by the modified local resolver 18 of Glines under Petitioner’s theory.

As the Board correctly recognized, Gupta does not teach use of anycast addressing. *See* DI, 21 (citing EX2013, ¶¶60, 64). Thus, Gupta’s client DNS server does not resolve a hostname to an anycast address, as required by [1d]. *Id.*

Moreover, and even more to the point, Petitioner does not rely on Glines’s local DNS resolver 18 for performing the resolution recited in element [1d]. Pet., 20-22. Thus, if Gupta’s client DNS server were to be substituted for Glines’s local DNS resolver 18, the modified local DNS resolver 18 still would not perform the anycast address resolution required by [1d]. EX2018, ¶¶56-58. Instead, Petitioner relies on “root DNS server 38” for that purpose, as discussed above. Pet., 20-21.

As the Board succinctly stated in the Institution Decision: “Petitioner’s proposal to substitute Gupta’s ISP resolver ‘to perform the same function as Glines ascribes to local DNS resolver 18,’ does not cure this deficiency because the function of Glines’s DNS resolver 18 is not to resolve a hostname into an anycast address.” DI, 21. Limitation [1d] plainly requires the hostname “*to be resolved to said common anycast address by an Internet Service Provider (ISP) DNS server,*” EX1001, Claim 1; this feature is absent from Glines.

Accordingly, the Board correctly found that Petition does not demonstrate that claims 1-12 are obvious over Glines, alone or in combination with Gupta.

B. The Petition fails to establish that the cited art teaches “a second request for second content associated with a second content provider” (claim 23, element [23e]).

Claim 23 recites:

(B) responsive to a first request for first content associated with a first content provider of said plurality of content providers, said first request including at least a first hostname associated with the first content provider, by a first DNS server of said plurality of DNS servers, resolving said first hostname to identify a first IP address of a content server of the plurality of content servers associated with said first DNS server; and

(C) responsive to a second request for second content associated with a second content provider of said plurality of content providers, said second request including at least said first hostname associated with the first content provider, by a second DNS server of said plurality of DNS servers, resolving said first hostname to identify a second IP address associated with a content server of the plurality of content servers associated with the second DNS server.

EX1001, 12:33-49 (elements [23c]-[23f]). In other words, claim 23 requires performing actions in responsive to both “a first request for first content associated with a first content provider of said plurality of content providers” and “a second

request for second content associated with a second content provider of said plurality of content providers.” Id.; EX2018, ¶59.

To meet element [23c], Petitioner alleges—relying on evidence outside of its asserted grounds—that “it would have been obvious for Glines’s name servers to respond to an anycast message based on a request for a news aggregator website, such as Yahoo! News (e.g., <http://dailynews.yahoo.com>).” Pet., 54 (citing EX1024). Petitioner then alleges that “[t]he first content would have been the Yahoo! News webpage (e.g., a first content provider of said plurality of content providers).” *Id.*, 55. To meet element [23e], Petitioner equates the “*second content*” to “a news article” located at “http://dailynews.yahoo.com/h/nm/20010201/ts/congress_ashcroft_dc_71.html,” as shown in Exhibit 1025. Pet., 56. Petitioner then asserts that although “[t]he hostname is associated with the first content provider (Yahoo! News),” “the second content is associated with a second content provider (e.g., Reuters).” *Id.*; EX2018, ¶¶60-61.

Petitioner’s arguments fail for two reasons. First, Petitioner does not identify a “*first content provider*” and a different “*second content provider*,” as required by claim 23. EX2018, ¶62. Contrary to Petitioner’s allegations, both the “*first content*” and “*second content*” identified by Petitioner are from the same “*content provider*”: Yahoo News! Second, as the Board noted in its Institution Decision,

Petitioner does not establish that the techniques employed by Yahoo News! were general knowledge in the art at the time of the '112 patent and therefore cannot be used to establish obviousness in view of Glines and/or Gupta. DI, 24.

i. By its plain language, claim 23 requires a request for “*first content*” associated with “*a first content provider*” and a request for **different** “*second content*” associated with a **different** “*second content provider.*” EX1001, 12:33-49; EX2018, ¶63. As the Federal Circuit has held, “[w]here a claim lists elements separately, ‘the clear implication of the claim language’ is that those elements are ‘distinct component[s]’ of the patented invention.” *Becton, Dickinson & Co. v. Tyco Healthcare Grp., LP*, 616 F.3d 1249, 1254 (Fed. Cir. 2010) (quoting *Gaus v. Conair Corp.*, 363 F.3d 1284, 1288 (Fed. Cir. 2004)); *see also Engel Indus., Inc. v. Lockformer Co.*, 96 F.3d 1398, 1404–05 (Fed. Cir. 1996) (concluding that where a claim provides for two separate elements, a “second portion” and a “return portion,” these two elements “logically cannot be one and the same”); *Gillette Co. v. Energizer Holdings, Inc.*, 405 F.3d 1367, 1373 (Fed. Cir. 2005) (concluding for claim reciting “first, second, and third blades,” “these ordinal terms designate different blades”). That is the case here—claim 23 specifically requires a “*first request for first content associated with a first content provider*” and a different “*second request for second content associated with a second content provider.*” EX1001, 12:33-49; EX2018, ¶¶63-64. Indeed, when asked about whether claim 23

“would be interpreted to require the first content to be different than the second content,” Petitioner’s expert agreed that “the most natural interpretation, I think, would be that this is different content.” EX2021, 86:8-21.

A comparison to claim 13 further supports that claim 23 requires a different “*second content provider*” than the “*first content provider*.” EX2018, ¶64. For example, claim 13 recites “*a first request for first content associated with a first content provider of said plurality of content providers*” and “**a second request for said first content associated with said first content provider** of said plurality of content providers.” EX1001, 9:66-10:2, 10:15-17. In other words, claim 13 requires the first and second requests to be for the same content from the same content provider. *Id.* Thus, when the inventors expressly differentiated between requests for the same content from the same content provider (claim 13) and for different content from a different content provider (claim 23). *See Seachange Int’l, Inc. v. C-COR, Inc.*, 413 F.3d 1361, 1369 (Fed. Cir. 2005) (“[T]here is [] a presumption that two independent claims have different scope when different words or phrases are used in those claims.”). Therefore, a POSITA would have interpreted claim 23 to require a request for “*first content*” associated with “*a first content provider*” and a request for different “*second content*” associated with a different “*second content provider*.” EX1001, 12:33-49; EX2018, ¶64.

In its mapping to Exhibits 1024 and 1025, Petitioner improperly interprets the “*content*” of Exhibit 1024 as being associated with “Yahoo News!” but the “*content*” associated with Exhibit 1025 as being associated with “Reuters.” Pet., 56; EX2018, ¶¶65. As Petitioner’s expert clarified, the alleged “*second content*” is the Web page located at “http://dailynews.yahoo.com/h/nm/20010201/ts/congress_ashcroft_dc_71.html,” provided by Yahoo! News, not simply the article within the page. EX2021, 92:20-89:15 (referencing EX1008, ¶¶461).

The diagram illustrates the relationship between the content provider and the content. Two screenshots of the Yahoo! News website are shown, both dated Friday, February 2, 2001. The left screenshot (EX1024) shows the 'Top Story' section with the headline 'U.S. Senate Approves Ashcroft, 58-42'. The right screenshot (EX1025) shows the 'Top Stories' section with the headline 'U.S. Senate Approves Ashcroft, 58-42'. A green box labeled 'Content Provider' points to the 'Yahoo! NEWS' logo on both pages. A red box labeled 'Content' points to the main article text on both pages.

EX1024

EX1025

As shown above, Yahoo News! is the “*content provider*” of both Web pages, despite Petitioner’s arguments to the contrary. EX2018, ¶¶66. Such an interpretation is consistent with the description of “content provider” disclosed in the ’112 patent,

which states that “[c]ontent provider” refers to an entity having a Web site on a network.” EX1001, 2:60-61; EX2021, 87:20-88:12 (Petitioner’s expert agreeing that this disclosure is “consistent with [his] understanding of a content provider in the context of the ’112 Patent”). In the case of Petitioner’s mapping to Exhibits 1024 and 1025, Yahoo! News is the entity having the Web site on the network—not Reuters. EX2018, ¶66. That Yahoo! News displays as part of the Web page an article seemingly authored by Reuters is immaterial. EX2021, 92:20-93:15 (identifying the URL as the requested “*second content*”); Pet., 56; EX1008, ¶461; EX2018, ¶66. For at least these reasons, Petitioner fails to establish that the cited art renders obvious “*a second request for second content associated with a second content provider of said plurality of content providers,*” as required by element [23e] of claim 23.

ii. Petitioner further fails to establish that “[i]t would have been obvious for Glines’s name servers, alone or combined with Gupta, to respond to an anycast message based on a second request that includes a request for a particular news article via a news aggregator website, such as Yahoo! News.” Pet., 56. As the Board noted in its Institution Decision in the context of claim limitations [23c] and [23e]:

Petitioner has not provided sufficient support or explanation as to why this particular example represents the general knowledge in the art, rather than a singular feature of an individual website, such that it would

have been considered to be “a known prior art technique” that would be applied with “predictable results.” Pet. 55. Nor has Petitioner included any particular prior art describing this example as part of the asserted ground.

DI, 24.

Indeed, Petitioner does not include Exhibits 1024 and 1025 in its asserted obviousness grounds, instead ostensibly relying on these exhibits merely to establish general knowledge in the art. *See* Pet., 55 (“News aggregator websites, such as Yahoo! News, were known in the art.”). But Petitioner provides no explanation as to how this Yahoo! News example indicates that the claimed “*first request*” and “*second request*” were “within the common knowledge of those skilled in the art.” *See K/S HIMPP v. Hear-Wear Techs., LLC*, 751 F.3d 1362, 1365–66 (Fed. Cir. 2014); *cf. Randall Mfg. v. Rea*, 733 F.3d 1355, 1362–1363 (Fed. Cir. 2013) (finding persuasive “a party’s claim about what one of ordinary skill in the relevant art would have known” when, unlike here, the party “established [it as] a prevalent, perhaps even predominant method” by “citing to extensive references of record”). Especially where general knowledge is used to supply a missing claim limitation, as is the case here, the Board is not required “to accept a conclusory assertion from a third party about general knowledge in the art” without sufficient evidence.

Moreover, the Patent Office has emphasized that “general knowledge” “may not be used to supply a missing claim limitation.” EX2023 (Memorandum re Enforcement and Non-waiver of 37 C.F.R. § 42.104(b)(4) and Permissible Uses of General Knowledge in Inter Partes Reviews), 1. Here, Petitioner does just that, relying on evidence of supposed general knowledge in the art to fill claim limitations missing from the ground references. As the Patent Office has noted, such gap filling violates 37 C.F.R. § 42.104(b)(4) requiring a petition to “specify where each element of the claim is found in the prior art patents or printed publications relied upon.” 37 C.F.R. § 42.104(b)(4); EX2023, 2.

Accordingly, Petitioner fails to establish that the cited art renders obvious element [23e] of claim 23 for this additional reason.

C. The Petition fails to establish that the cited art renders obvious a system configured to support “a plurality of content providers” (independent claims 13, 18, 22, and 23).

Claims 13, 18, 22, and 23 recite a “*plurality of content providers*.” EX1001, claim 13 (element [13b] and [13c]), claim 18 (elements [18p] and [18b]), claim 22 (element [22b] and [22e]), claim 23 (element [23c] and [23e]). For example, independent claim 13 recites: “(B) *configuring each DNS server and respective plurality of content servers to **support content delivery for a plurality of content providers**, wherein **each of the plurality of content providers has a respective***

hostname associated therewith.” EX1001, 9:61-65 (element [13b]) (emphasis added). Independent claims 18, 22, and 23 recite similar features.

Petitioner has the burden to identify with particularity the support in the asserted references regarding the invalidity of independent claims 13, 18, 22, and 23. *See Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1369 (Fed. Cir. 2016) (“It is of the utmost importance that petitioners . . . adhere to the requirement that the initial petition identify ‘with particularity’ the ‘evidence that supports the grounds for the challenge to each claim.’”); *see also* 35 U.S.C. § 312(a)(3)). Petitioner “must ‘specify where each element of the claim is found in the [relied upon] prior art patents.’” *In-Depth Geophysical, Inc. v. ConocoPhillips Co.*, IPR2019-00850, Paper 56 at 27 (PTAB Sept. 3, 2020) (quoting 37 C.F.R. § 42.104(b)(4)).

1. Obviousness in view of Glines

Petitioner presents no theory as to how Glines’s system could or would have been configured to serve “*a plurality of content providers*,” as required by the claims. The Board cannot “deviate from the grounds in the petition and raise its own obviousness theory.” *Sirona Dental Sys. GmbH v. Institut Straumann AG*, 892 F.3d 1349, 1356 (Fed. Cir. 2018); *SAS Inst., Inc. v. Iancu*, 584 U.S. 357, 365-367 (2018).

Specifically, for claims 13, 18, and 23, Petitioner refers to its analysis of element [1b] with no further explanation. *See* Pet., 41, 48, 54. Claim 1 does not recite a “*plurality of content providers*.” In discussing element [1b], the Petition alleges that Glines’s discussion of “www.example.com” discloses the claimed *singular* “content provider.” Pet., 16-18 (citing EX1002, 6:23-7:13, 13:15-15:10). However, Petitioner offers no theory of how Glines’s discussion of the single provider “www.example.com” renders obvious the “*plurality of content providers*” required by claims 13, 18, 22, and 23. EX1001, 9:61-65, 10:41-49. Indeed, Petitioner fails to address this claim language in its analysis.

The Petition is similarly deficient in its analysis of independent claim 22. Petitioner points to element [13p] and argues that “Glines expressly discloses that its system may be used with either a ‘single provider’ or ‘multiple providers,’ and thus discloses content delivery on behalf of a plurality of content providers, as claimed.” *See* Pet., 53 (citing Pet., 39-41), 40 (citing EX1002, 17:3-9); EX2018, ¶68.

The cited portions of Glines do not refer to the claimed “*content providers*” but rather to network providers. EX2018, ¶68. The complete paragraph of Glines, of which Petitioner merely cites to a portion of, discloses:

The selection of routing protocol may have profound effects on the propagation [*sic*] and convergence of group membership changes. “Membership” in the group is contingent [*sic*] upon distributed routing

state. In the case of deployment **within a single provider, where the anycast routing is internal to that network** (and transparent to the outside - the Internet), and an internal routing protocol like iBGP or OSPF is used, propagation [sic] of changes should be fast. In the case of deployment across **multiple providers**, full fledged external BGP (“eBGP”) preferably would be used. Membership changes would be effected in such a scenario when the state change propagates at least half the way towards each other member in the anycast group, and that should cover all of external routers which would tag a particular anycast advertisement as “closest.” State changes would possibly take longer, but would not require flooding over the entire Internet.

EX1002, 17:3-14 (emphasis added). Here, Glines’s “provider” refers to a network provider, not the claimed “content provider” because it discloses, for example: (1) “deployment **within a single provider, where the anycast routing is internal to that network**” (e.g., deployment on a network); (2) “deployment **across multiple providers**,” (e.g., deployment across multiple networks); and (3) routing protocols (e.g., how messages are communicated within and across networks). EX1002, 17:3-14 (emphasis added); EX2018, ¶69.

The Petition further alleges that a POSITA “would have understood Glines’s disclosure of providing content from an origin source would have included supporting more than one origin source (e.g., more than one website or content provider)” because “[a]dding origin servers and content providers to Glines’s system . . . would have been nothing more than replicating Glines’s teaching of

storing and providing content associated with one origin server, with expected results.” Pet., 40 (citing EX1002, 12:11-22, 13:21-14:3). As the Board explained in its Institution Decision, “[t]hat statement [] is unsupported, and moreover, does not explain how such replication would occur or what results would be expected.” DI, 14-15; EX2018, ¶70. Tellingly, Petitioner’s citations to Glines, again, contain no discussion of multiple content providers. Rather, Petitioner’s citations refer to Glines’s existing “replica content servers”—not multiple origin servers or content providers. EX1002, 12:11-12; EX2018, ¶71.

At bottom, Petitioner does not explain how “Glines’s teaching of storing and providing content associated with one origin server” would operate, or why such a modification would achieve “expected results.” Pet., 40; EX2018, ¶71. Petitioner’s expert does not fill the gaps of the Petition, merely repeating the Petition’s conclusory assertions verbatim with no further reasoning or evidence. *Compare* Pet., 12, *with* EX1008, ¶93; *Xerox Corp. v. Bytemark, Inc.*, IPR2022-00624, Paper 9 at 15 (PTAB Aug. 24, 2022) (holding that testimony that “merely repeats, *verbatim*, the conclusory assertion for which it is offered to support ... is entitled to little weight”); *TQ Delta, LLC v. Cisco Systems, Inc.*, 942 F.3d 1352, 1359 (Fed. Cir. 2019) (“This court’s opinions have repeatedly recognized that conclusory expert testimony is inadequate to support an obviousness determination ...”).

Therefore, the Petition fails to establish that Glines renders obvious independent claims 13, 18, 22, and 23.

2. Obviousness in view of Glines and Gupta

Petitioner further asserts that “Gupta likewise discloses content delivery on behalf of a plurality of content providers, and for this additional reason, it would have been obvious to provide content delivery on behalf of a plurality of content providers in a combined Glines-Gupta system.” Pet., 40. Although Petitioner asserts that the combination “would have been nothing more than combining known elements in the prior art according to understood principles, with an expectation of success,” neither Petitioner nor its expert provide any explanation as to how the combination would operate or why a POSITA would have had a reasonable expectation of success in combining the teachings of the references. Pet., 41; EX1008, ¶267; EX2018, ¶73. Indeed, Petitioner’s expert again merely repeats the Petition almost verbatim without further explanation. *Compare* Pet., 41, *with* EX1008, ¶267; *Xerox*, IPR2022-00624, Paper 9 at 15; *TQ Delta*, 942 F.3d at 1359.

In its Institution Decision, the Board nevertheless found that “Gupta teaches multiple content providers, including ‘customer1 and customer2’ and that “Petitioner has shown persuasive reasons to have combined Petitioner’s relied-upon teachings of Glines and Gupta to teach a plurality of content providers.” DI,

23-24. In its analysis, the Board noted that Patent Owner’s expert “does not address the combinability of Gupta’s WebCache servers with Glines’s system to accommodate additional content providers.” DI, 23 (citing Pet., 8). Petitioner’s assertions with respect to incorporation of multiple WebCache servers, however, do not establish support for multiple content providers in the combined system of Glines-Gupta. EX2018, ¶¶74-75.

Specifically, Petitioner asserts that the combination of Glines and Gupta “would have involved, for example, applying Gupta’s use of multiple WebCache servers with each name server to Glines to yield a system with multiple content servers for each name server.” Pet., 8 (citing EX1008, ¶73). Petitioner’s expert contends that “doing so would have allowed more content to be stored in association with each name server, improving Glines’s ability to deliver content to a user via the closest name server.” EX1008, ¶73. But neither Petitioner nor its expert explain how additional storage capacity facilitates support for multiple content providers (nor do they contend that it does), as required by claims 13, 18, 22, and 23. Pet., 8; EX1008, ¶73; EX2018, ¶75. Indeed, Glines already discloses use of multiple “file server[s]” with each name server, for example illustrated by file servers 51-3 of Figure 1. EX1002, 12:11-23, FIG. 1; EX2018, ¶75.

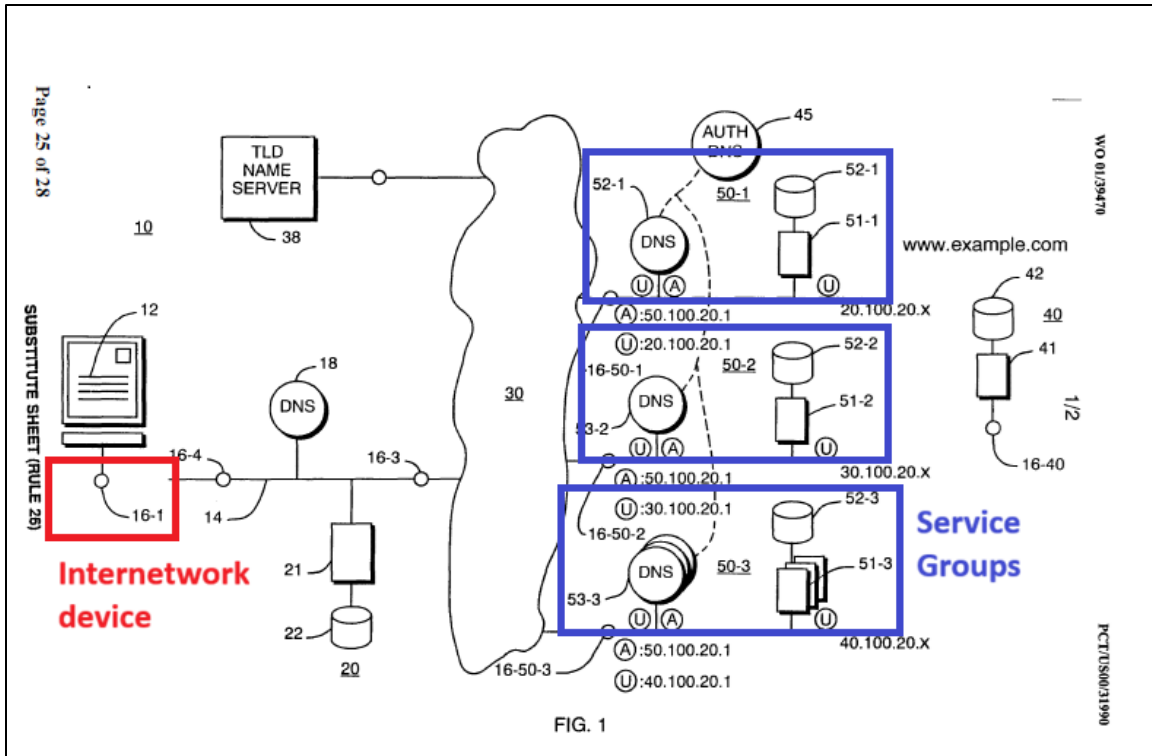
For these reasons, as well as the reasons discussed further in Section V.E, Petitioner does not establish that a POSITA would have combined Glines and

Gupta to yield a system configured to support “*a plurality of content providers*,” as required by claims 13, 18, 22, and 23. *See* Section V.E.

D. The Petition fails to establish that the cited art teaches the “at least one switch” limitations (independent claims 13, 18, 19, 21, and 22, dependent claim 11).

Claims 11, 13, 18, 19, 21, and 22 recite “*at least one switch*” associated with a DNS server or set of content servers. *See* EX1001, claim 13 (element [13e]), claim 18 (element [18f]), claim 19 (element [19f]), claim 21 (element [21e]), claim 22 (element [22g]). The claimed “*at least one switch*” selects a content server from the plurality of content servers—e.g., claim 19 recites, “*by at least one switch, selecting the content server from said respective plurality of content servers associated with said resolving DNS server.*” The Petition fails to meet its burden to establish that Glines, alone or in combination with Gupta, teaches this limitation.

Glines only mentions a “switch” twice. First, Glines notes that “internetwork device 16-1 may be any or any combination of modem, network interface card, router, **switch**, bridge, gateway, or the like.” EX1002, 11:18-20 (emphasis added). This is irrelevant because internetwork device 16-1 just connects the client device to a network segment. EX1002, 11:17-18.



Second, Glines mentions a switch in the context of the service groups, stating only: “However, within the service group, standard load balancing and replication techniques can also apply, such as multiple content servers (returning multiple local IP addresses to name lookup), **layer 4 switches**, etc.” EX1002, 19:13-15 (emphasis added).

Here, Glines generally refers to a Layer 4 switch, but Glines does not teach the Layer 4 switch being used to “*select the content server from said respective plurality of content servers.*” EX1002, 19:13-15; EX2018, ¶¶77-80. Petitioner does not state how or why it would have been obvious to a POSITA to have Glines’s layer 4 switch perform this function. Indeed, Petitioner’s entire analysis consists of

one paragraph, asserting that “Glines describes a Layer 4 switch used for ‘standard load balancing’ among multiple content servers to apply a load balancing policy and select a content server.” Pet., 39 (referring to EX1002, 19:10-16). But this overreads the passage of Glines excerpted above, which does not state the role of the Layer 4 switch in performing the “standard load balancing and replication techniques.” EX1002, 19:13-15; EX2018, ¶¶80-81.

Instead, Glines discloses that “standard load balancing” can be accomplished by “returning multiple local IP addresses to a name lookup” that correspond to “multiple content servers,” rather than the switch selecting the appropriate content server. EX1002, 19:13-16; EX2018, ¶81. In Glines, the DNS server returns the IP addresses for the content servers to the browser, which then requests content from one of the servers. EX1002, 15:26-16:8 (“[T]he name server 53 associated with this closest rate will then respond by reporting the unique IP address of its associated replica content server 51.”). With such a technique in place, Glines has no need to cause the disclosed Layer 4 switch to “*select*” the content server, as the claims require. EX2018, ¶81.

In the Institution Decision, the Board found:

Glines supports Petitioner’s assertion that a service group may contain multiple content servers with a single name server. For example, Glines states that when a DNS host fails, but the content servers in the service group are functioning, clients who have resolved the service name into

a local IP address would continue to get service. Because the service group may contain multiple content servers, Glines's description of standard load balancing techniques applies to the content servers within that service group.

DI, 17 (citing EX1002, 18:12-19, 19:13-15 (internal citations omitted)).

However, the Board's elaboration does not resolve the insufficient teachings of Glines with respect to any function performed by a layer 4 switch. While Glines separately teaches load balancing within a service group and the use of a layer 4 switch, Glines simply does not disclose using a layer 4 switch to "*select the content server from said respective plurality of content servers.*" See EX2018, ¶¶80-82.

The secondary references do not fill the gaps in Glines. First, Petitioner does not rely on Gupta for these limitations. See, e.g., Pet., 38-39 (discussing the "switch" limitation of claim 11), 42, 38, 50, 52, 53 (referring back to claim 11). Second, Petitioner's argument that Colby also allegedly discloses "a content-aware flow switch," Pet., 68-69, 72, ignores that Glines already discloses load balancing techniques that do not require the use of an additional switch, as noted above. As the Federal Circuit has held, "[i]t does not suffice to meet the motivation to combine requirement to recognize that two alternative arrangements . . . were both known in the art." *Virtek Vision Int'l ULC v. Assembly Guidance Sys., Inc.*, 97 F.4th 882, 886 (Fed. Cir. 2024).

Thus, Petitioner fails to demonstrate that independent claims 13, 18, 19, 21, and 22 and dependent claim 11 are obvious over Glines.

E. Petitioner’s hindsight-driven analysis fails to establish that a POSITA would have combined Glines and Gupta to achieve the claimed invention.

Beyond the Petition’s substantive deficiencies regarding the elements of the claims discussed above, the Petition fails to demonstrate that a POSITA would have been motivated to combine Glines and Gupta and would have had a reasonable expectation of success in doing so. *See* EX2018, ¶¶83-91. Neither Petitioner nor its expert explain how the combination would have operated or why the combination would have been successful. *See id.*

Every “B” Ground (Grounds 1B, 2B, 3B, 4B, and 5B) in the Petition relies on the combination of Gupta and Glines. *See* Pet., 1. Although both references discuss DNS resolution, any architectural similarity ends there. EX2018, ¶84. Glines and Gupta employ vastly disparate operational techniques. *Id.*, ¶¶84-90. The mere fact that these architectures separately existed in the prior art is insufficient to establish a motivation to combine. *See Virtek*, 97 F.4th at 887.

As a threshold matter, the Petition does not articulate a single reason **why** a POSITA would have combined Glines and Gupta in the section titled “Motivation to Combine Glines with Gupta.” Pet., 7-8. The sum total of Petitioner’s motivation-to-combine analysis provided in this section consists of comparing

Glines and Gupta, determining that the references include similar elements, and concluding that a POSITA would have been motivated to combine the references based on these similarities. *See* Pet., 7-8. The cited portions of Dr. Mowry’s Declaration offer little further substance. EX1008, ¶¶68-74 (providing similar conclusory analysis). Petitioner contends that “Glines and Gupta share a similar architecture to one another,” and “[g]iven their similarities and shared desire to increase content delivery performance, a [POSITA] would have understood that Glines and Gupta were analogous art.” Pet., 7-8. Petitioner then concludes:

The combination would have involved, for example, applying Gupta’s use of multiple WebCache servers with each name server to Glines to yield a system with multiple content servers for each name server. The combination also would have applied Gupta’s use of an ISP DNS server to Glines to resolve URLs or hostnames for residential Internet users.

Id., 8.

But absent from the section titled “Motivation to Combine Glines with Gupta” is any articulated motivation as to why a POSITA would have plucked the “WebCache servers” and the “ISP DNS Server” from Gupta’s disclosure and modified Glines with these cherry-picked features. *See TriVascular, Inc. v. Samuels*, 812 F.3d 1056, 1066 (Fed. Cir. 2016) (“Although the *KSR* test is flexible, the Board ‘must still be careful not to allow hindsight reconstruction of references . . . without any explanation as to *how* or *why* the references would be combined to

produce the claimed invention.”); *Cheese Sys., Inc. v. Tetra Pak Cheese & Powder Sys., Inc.*, 725 F.3d 1341, 1352 (Fed. Cir. 2013) (“Obviousness cannot be based on the hindsight combination of components selectively culled from the prior art to fit the parameters of the patented invention.” (cleaned up)); *DirectTV, LLC v. Qurio Holdings, Inc.*, IPR2015-02006, Paper 6 at 13-14 (PTAB Apr. 4, 2016) (“Ex post reasoning” and “hindsight” are forbidden in the obviousness analysis); *see also* EX2018, ¶¶74-75 (discussing Gupta’s “WebCache” servers). Indeed, as noted above, Glines already discloses techniques for resolving URLs or hostnames for residential users, as well as a system with multiple file servers for each name server (e.g., file servers 51-3 associated with name server 53-3). EX2018, ¶¶74-75; EX1002, FIG. 1. It is Petitioner’s burden to demonstrate that a POSITA would have been motivated to achieve the combination, and Petitioner did not meet that burden here. *Virtek Vision*, 97 F.4th at 887 (“[T]here must exist a motivation to combine various prior art references in order for a skilled artisan to make the claimed invention.”).

Petitioner’s failure to provide any motivation to combine within the “motivation to combine” section of the Petition is, at best, confusing. However, the Board credited the Petition’s scant discussions of a motivation advanced in the context of specific limitations. *See* DI, 22-24 (citing Pet. 40-41; EX1008, ¶267).

These portions of the Petition briefly touch on two additional feature-specific, purported motivations to combine Glines and Gupta.

First, the Petition asserts that a POSITA “would have benefited from multiple content/WebCache servers at each name server location by enabling load balancing, redundancy, and failure tolerance at these locations.” Pet., 15. Second, the Petition asserts that a POSITA would have been motivated to “make the modification to ensure compatibility with ‘typical’ Internet service architecture and to achieve the speed and efficiency associated with ISP-provided DNS servers.” Pet., 24.

These rationales evince the impermissible hindsight employed by Petitioner in when crafting the combination and would not have motivated a POSITA to combine these very different references. As Dr. Russ explains, a POSITA would have recognized that Glines and Gupta disclose fundamentally different architectures and techniques for delivering content. EX2018, ¶¶85-90. Glines uses anycast addressing to select an appropriate replica DNS server and peered file server based on proximity to the user. EX2018, ¶¶85-86. Gupta offloads the selection of a web server to a network probe server coupled to the DNS server and selects the web server using standard load balancing techniques. EX2018, ¶¶87-89.

In asserting that a POSITA would have combined Gupta with Glines to form a combination that teaches the claimed “*ISP DSN Server*,” Petitioner notes that a

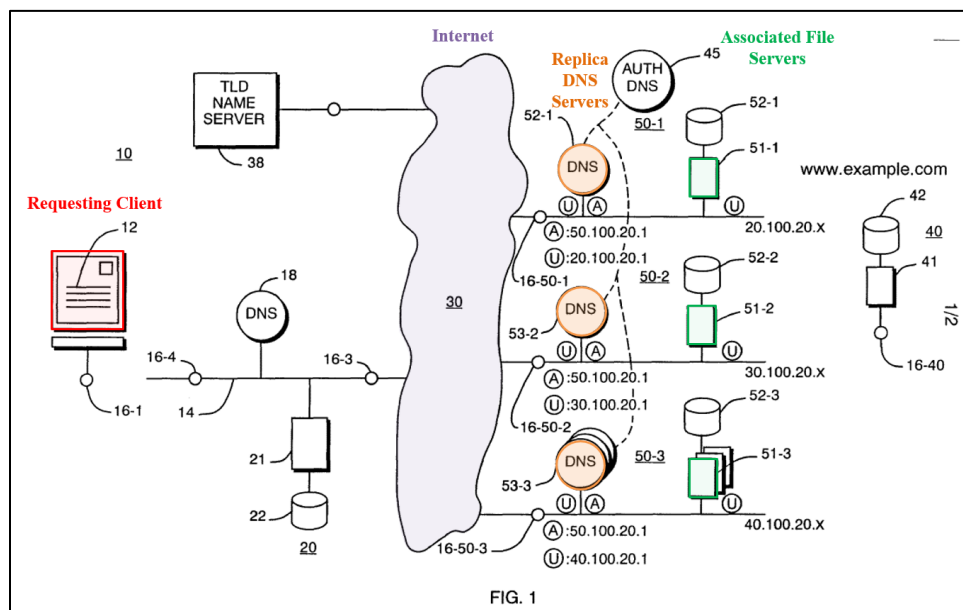
POSITA would have been motivated to “make the modification to ensure compatibility with ‘typical’ Internet service architecture and to achieve the speed and efficiency associated with ISP-provided DNS servers.” Pet., 24. However, this is an aspect of the claimed feature that was distinguished over the prior art during the prosecution of the ’112 patent. For example, the applicant provided the following argument when discussing the amendment that introduced the “*ISP DSN Server*”:

From the onset, Applicant notes that the methods and systems described in the pending claims describe essentially a two-phase DNS process for routing a request to a content server: a) **using an ISP DNS server to resolve the initial request to the anycast address associated with the CDN DNS servers**, and b) using one of the CDN DNS servers (acting in accordance with the anycast scheme) to further resolve the request to at least one content server associated with that CDN DNS server (e.g., see FIG. 5). **The advantage of such a system is that existing ISP DNS servers do not have to be replaced or otherwise reconfigured with anycast addresses (and/or load balancing mechanisms) as is the case with the AP AR routing system described in McCanne.**

EX1007, 330 (emphasis added). The prosecution history of a patent can provide evidence of whether a skilled artisan would have sought to achieve a combination of references. *See Elekta Limited v. ZAP Surgical Systems, Inc.*, 81 F.4th 1368, 1375 (Fed. Cir. 2023). Here, Petitioner’s asserted motivation that a POSITA would have been motivated to “achieve the speed and efficiency associated with ISP-

provided DNS servers” is clear evidence of the hindsight used in reverse engineering the specific claimed feature.

This purported motivation is also entirely decoupled from the actual behavior disclosed in Glines. *See* EX2018, ¶¶85-86. Glines uses anycast addressing to direct requests to one of multiple “alternative or replica name servers 53-1, 53-2, 53-3” that “are peered with content file servers 51-1, 51-2, 51-3 that contain replica copies of files stored at the origin server 40,” as illustrated in Figure 1 below. EX1002, 10:19-25; EX2018, ¶85.



EX1002, FIG. 1 (annotated).

This architecture allows requests to be routed “to the closest available DNS server,” and, in turn, to the file server 51 located near the DNS server. EX1002, 4:30-5:1, 13:3-8 (“Each name server 53 and file server 51 associated with particular content server 50 are considered to be connected in a peering

arrangement.”). In this regard, the name server and file server operate closely together and are “preferably located physically near one another.” *See* EX2018, ¶86.

Gupta’s “ISP 60” (and its included “client DNS server 170”) would not be “an obvious substitute for Glines’s local resolver 18” because Glines relies on a fundamentally different architecture than Gupta. *Pet.*, 24. Glines’s local resolver 18 functions as a cache, rather than DNS server, by receiving a request from a browser and determining “whether or not the requested content file is available locally.” EX1002, 13:24-14:1. Unlike Gupta’s client DNS server 170 “resolve[s] a host name into an IP address,” EX1003, 6:4-9, Glines’s local resolver 18” determines whether requested content is available locally—not to resolve host names, aside from determining the location of the local web server, EX1002, 13:24-14:1. This architecture allows Glines’s “local resolver 18” to function as a cache server, rather than a DNS server, obviating the need to perform any resolution for locally available content. *See* EX2018, ¶58.

In contrast to Glines’s anycast addressing and peering arrangement between DNS servers and file servers, Gupta uses only unicast addressing schemes. EX2018, ¶87. Gupta offloads its content server selection to a separate “network probe server” coupled to the DNS server. *Id.*; EX1003, Abstract. In Gupta, a local DNS server “resolves the IP address of the domain name the user’s computer has

queried for by sending a query to the Authoritative DNS server (ADNS) for that domain name.” EX1003, 2:30-33. The ADNS is “coupled to [a] first network probe server,” which is “configured to determine traffic loads of a plurality of customer web servers” that “stor[e] a web page.” *Id.*, Abstract, 3:26-32; EX2018, ¶89. To select the appropriate web server, the network probe server determines the “customer web server having a traffic load lower than traffic loads of remaining customer web servers from the plurality of customer web servers” and “provide[s] the IP address of the customer Web Server to the user.” EX1003, 3:35-42; *see also id.*, 9:1-5 (“NameServer server 110 typically uses the latency and traffic load information associated with the customer’s web sites that was determined in step 390, to select an appropriate customer web server to return to the user, step 440.”); EX2018, ¶89.

Petitioner’s motivation to combine Glines and Gupta is thus based on a false premise that “Gupta’s ISP 60 [] performs the same functions as Glines’s local DNS resolver 18.” Pet., 24; EX2018, ¶55. In view of these disparate approaches, achieving the combination would have been impractical. *See* EX2018, ¶¶58, 90. Because of this impracticality, the Petition is devoid of any description of how that combination would have been achieved or functioned. The Federal Circuit has consistently held that the existence of similar arrangements in the prior art “does not provide a reason that a skilled artisan would have substituted” one prior art

reference for another. *Virtek Vision*, 97 F.4th at 887 (reversing the Board's findings of obviousness based on an insufficient motivation to combine).

Petitioner's hindsight-driven motivation to combine Glines and Gupta is, therefore, insufficient to render obvious the challenged claims. EX2018, ¶91.

VI. CONCLUSION

For the reasons set forth above, claims 1-23 should be confirmed as patentable over the asserted Grounds upon which this IPR was instituted.

Respectfully submitted,

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