

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GOOGLE LLC,
Petitioner

v.

SANDPIPER CDN, LLC,
Patent Owner

Case IPR2025-00806
U.S. Patent No. 8,645,517

DECLARATION OF DR. PRASHANT SHENOY

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Patent Trial and Appeal Board
U.S. Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

Sandpiper EX2015
Google v. Sandpiper
IPR2025-00806

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I, Prashant Shenoy, Ph.D., do hereby declare as follows:

1. I am over the age of twenty-one and otherwise competent to make this Declaration. This Declaration is based on my personal knowledge as an expert in the relevant field. I could testify competently if asked to do so.

2. I have been retained by Sterne, Kessler, Goldstein & Fox, P.L.L.C. as a technical expert witness on behalf of Sandpiper CDN, LLC to provide this Declaration concerning technical subject matter relevant to the inter partes review of U.S. Patent No. 8,645,517 (“’517 patent”) in IPR2025-00806.

3. I am being compensated for the time spent on this matter at my standard consulting rate of \$650.00/hour. My compensation is not dependent on, and in no way affects, the substance of my statements in this Declaration. My findings are based on my education, experience, and background in the fields discussed below. I reside in Amherst, Massachusetts, USA.

4. In formulating my opinions, I have relied upon my experience in the relevant art, and I have considered each document cited herein, in light of the general knowledge in the art as of September 28, 2001, the effective filing date of the ’517 patent.

5. I will cite to the specification of a U.S. patent using the following format: (Patent, Col: Line Number(s)). For example, the citation to the ’517 patent, 1:1-10 points to the ’517 patent specification at column 1, lines 1-10.

6. I am familiar with the technology at issue and the state of the art at the time the application leading to the '517 patent was filed, including content delivery networks, web protocols, network protocols, and proxy servers.

7. I have been asked to provide my technical review, analysis, insights, and opinions regarding the references. I reserve the right to supplement this Declaration in response to additional evidence that may come to light.

8. I earned a Bachelor of Technology degree from the Department of Computer Science and Engineering at the Indian Institute of Technology in Bombay, India. I later received my Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) degrees in 1994 and 1998, respectively, in Computer Science from the University of Texas of Austin.

9. Over the years, I have led research and industry collaboration projects in areas such as storage and file systems, Web and Internet systems, content distribution, streaming media, database systems, cloud computing, virtualization, RFID and sensor networks, and energy systems. During that time, I have consulted with both large companies and startups in a technical advisory role related to product architecture, IP issues, and applied research.

10. I am a tenured professor in the College of Information and Computer Sciences at the University of Massachusetts Amherst ("UMass"), where I currently hold the position of Distinguished Professor of Computer Science. I am also an

Associate Dean in the College of Information and Computer Sciences. I currently work in both these capacities. I have been a faculty member at UMass since 1998.

11. I received my Bachelor of Technology (B.Tech.) degree in 1993 from the Department of Computer Science and Engineering at The Indian Institute of Technology (“IIT”), Mumbai, India. IIT awarded me the Institute Medal for being the top ranking undergraduate student. In 1994, I received my Master of Science (M.S.) degree in Computer Sciences from The University of Texas at Austin. In 1998, I received my Doctor of Philosophy (Ph.D.) also from the Department of Computer Sciences at The University of Texas at Austin. My dissertation, which was in the area of file systems, was recognized by the department as the Best Doctoral Dissertation of 1998-1999.

12. I have been involved in the research and development of distributed computing systems for more than 30 years. I have been a faculty member at the UMass since 1998 where I perform research and teach in the areas of distributed systems, operating systems, computer networking, data management, and multimedia systems, among others.

13. A major focus of my research has been the design of large-scale distributed computing systems. Over the years, I have led research and industry collaboration projects in areas such as computer networking, distributed systems, storage and file systems, Web and Internet systems, content distribution, streaming

media, database systems, cloud computing, virtualization, RFID and sensor networks, and energy systems. During that time, I have consulted with both large companies and startups in a technical advisory role related to product architecture, IP issues, and applied research.

14. For example, starting in the early 1990s, my research focused on the development of storage and file systems. During that time, I developed multimedia file system and data management technologies that were designed for efficient storage and retrieval of large amounts of video and audio data. I collaborated with AT&T Bell Laboratories to design a new media server for video streaming. These efforts led to resulted in U.S. Patent No. 6,079,028 on fault-tolerant architectures for continuous media servers.

15. In the late 1990s, I led the design of a new operating system called QLinux, that was based on the open-source Linux operating system. As part of this research, I developed resource management and scheduling techniques that provide isolation and service guarantees to applications. This technology provided the underpinnings for fair resource management and isolation techniques used in OS virtualization. It was adopted by a startup company for providing resource isolation in its web hosting products.

16. In the early 2000s, I led several projects on web systems and cloud computing. For example, I led research projects on web technologies such as web

caching and scale web applications. I also led research projects on cloud computing platforms (which were known as web hosting platforms at the time) involving virtualization, dynamic resource management, replication, fault tolerance, and storage. My group at UMass collaborated with technology companies such as IBM, AT&T, Sprint, Intel, and many others as part of this research.

17. My research on virtualization has involved design of technologies for virtual machines and container resource management and their deployment in cloud computing systems and data centers. I am co-inventor on US patent 8,473,557, jointly assigned to AT&T and UMass, on virtual machine migration.

18. Over the years, I have authored or co-authored more than 300 articles in peer-reviewed journals and conference proceedings that have been cited over 27,000 times. Seventeen papers authored by myself and members of my research group on this project won awards for their technical contributions. Two papers have won Test-of-Time awards, an award given to a publication that has had the most impact over a ten year period since its publication.

19. I have served as an Editor for six leading journals and have served as the Technical Program Chair for twenty conferences and workshops in my field. I founded the ACM Special Interest Group on Energy Systems and also served on steering committee of conferences and journals.

20. I am also a Fellow of the ACM, IEEE, AAAS, and AAIA, four professional societies in computing and science.

21. I am a named inventor on three U.S. Patents and one published application (Nos. 2014/0040206, 8,510,596, 8,473,557, and 6,079,028. These documents are generally related to distributed and operating systems, virtualization, and cloud data centers.

22. As a faculty member at UMass, I have also taught undergraduate and graduate courses in operating systems, distributed systems, networking, and related topics for more than twenty years.

23. These courses teach concepts related to operating systems, virtual machines, containers, cloud computing, file systems, and distributed systems. They also involve hands-on course projects on these topics.

24. My Curriculum Vitae is attached as Appendix A, which contains further details on my education, experience, publications, and other qualifications to render an expert opinion.

I. LIST OF DOCUMENTS CONSIDERED

Exhibit No.	Description
1001	U.S. Patent No. 8,645,517 to Stolorz et al. (“’517 Patent”)
1002	Prosecution History of U.S. Application No. 12/978,537
1003	Declaration of Dr. Bill Lin (“Lin”)
1004	Curriculum Vitae of Dr. Bill Lin

Exhibit No.	Description
1005	U.S. Patent Pub. No. 2002/0010798 to Ben-Shaul et al. (“Ben-Shaul”)
1006	U.S. Patent No. 7,082,464 to Hasan et al. (“Hasan”)
1007	U.S. Patent Pub. No. 2002/0169890 to Beaumont et al. (“Beaumont”)
1008	U.S. Patent Pub. No. 2002/0078233 to Biliris et al. (“Biliris”)
1009	Balachander Krishnamurthy et al., On the Use and Performance of Content Distribution Networks, Proceedings of the 1st ACM SIGCOMM Workshop on Internet measurement, November 2001 (“Krishnamurthy”)
1010	Zhuoqing Morley Mao et al., A Precise and Efficient Evaluation of the Proximity between Web Clients and their Local DNS Servers, Proceedings of the 2002 USENIX Annual Technical Conference, June 2002 (“Mao”)
1011	U.S. Provisional Patent App. No. 60/325,177 to Stolorz et al. (“Provisional App.”)
1012	U.S. Patent Pub. No. 2003/0065762 to Stolorz et al. (“2002 Application”)
1013	U.S. Patent Pub. No. 2008/0215718 to Stolorz et al. (“2007 CIP”)
1014	Prosecution History of U.S. Application No. 10/259,497
2001	“Cloud CDN: content delivery network,” <i>Google Cloud</i> , accessed at https://cloud.google.com/cdn (last accessed July 2, 2025)
2002	Prosecution History of U.S. Application No. 10/259,497
2003	Prosecution History of U.S. Application No. 11/932,162

Exhibit No.	Description
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	<i>Intentionally Left Blank</i>
2013	Interim Processes for PTAB Workload Management Memorandum (March 26, 2025)
2014	National Judicial Caseload Profile – United States District Courts (March 2025)
2016	Curriculum Vitae of Dr. Prashant Shenoy

II. OVERVIEW OF STATE OF THE ART

25. Content delivery networks (CDNs) provide critical services that enable content providers to quickly deliver online content to millions of consumers simultaneously over the Internet. In the early 1990s, the World Wide Web saw

increasing adoption, becoming a household staple. This mass adoption led to data congestion issues from the ever-growing number of users seeking to simultaneously access Internet content.

26. A typical computer server in the 1990s could only handle a limited number of simultaneous connections before becoming overloaded. Moreover, signals take time to traverse routers and move through content-congested internet cables. Consumers living far from the physical server(s) hosting content experienced sluggish load times and high latency due to problems such as overloaded servers, congested network segments, and geographic separation.

27. The availability of CDN servers around the world allowed service providers to replicate appropriate content from customers' origin servers to appropriate CDN servers, and transparently rendezvous end-users requesting that content to the "best" CDN server to deliver that content, all while providing their customers with control over their content and user experience. This service and its architecture was quickly adopted by many others in the industry.

28. End-users would connect to an optimal edge server—one that that was closer to them or that had available capacity. Distributing content across a network of servers alleviated data congestion issues, and allowing consumers to connect to edge servers located near them reduced latency. Systems and methods for propagating data from origin servers to edge servers are known as "caching."

29. In the early-to-mid 2000s, demand for CDNs exploded. Content providers like Google and YouTube use CDN technology to meet their enormous data streaming needs, as well as for video search results. EX2001.

III. OVERVIEW OF THE '517 PATENT

30. U.S. Patent Number 8,645,517 (“the ’517 patent”) is entitled “Policy-Based Content Delivery Network Selection.” As the title suggests, a novel feature of the invention includes a particular kind of policy for directing network traffic in an innovative way. The ’517 patent claims benefit via four non-provisional applications in two family chains to U.S. Provisional Application No. 60/325,177 filed September 28, 2001.

31. When using CDN technology, challenges arise related to network traffic associated with requests for content. For example, companies that want to provide their content to end users using a CDN face issues regarding directing network traffic to serve end users’ requests. As one example, issues arise when trying to deliver content from multiple servers at geographically-separated locations with suitable end-user experiences under high traffic loads.

32. The ’517 patent addresses specific needs in the art via specific combinations, which were not conventional at the time of the invention of the ’517 patent, and the ’517 patent describes how specific technical solutions are achieved. For instance, content providers must address how to handle requests from end

users, in some cases in accordance with policy constraints faced by the content providers, even as network conditions affecting the Internet are subject to change.

33. The inventors of the '517 patent developed methods to address these issues, including methods in which a server network implements policy-based traffic direction. For example, embodiments of the invention in the '517 patent provide a specific graphical user interface for obtaining at least one policy for the direction of network traffic, such as using a decision tree with resource and branch nodes. The various criteria that can be used may relate to IP addresses or geographic zones, with answers consisting of IP addresses and CNAMEs, for example.

IV. PROSECUTION HISTORY OF THE '517 PATENT

34. The application that led to the '517 patent was filed on December 24, 2010. During prosecution, it was subject to multiple Office actions, adding to the substantive discussions concerning prior art across the entire family of applications where the '517 patent claims priority to two lines of applications that also received substantive examinations.

35. For example, the application was initially rejected in a Non-Final Office Action dated March 11, 2013. In this Non-Final Office Action, claims 2–5, 10–13, 18 and 19 were rejected as being anticipated by U.S. Patent No. 6,484,261 to Wiegel. Claims 9 and 17 were similarly rejected under as being unpatentable

over Wiegel view of U.S. Patent Application Publication 2002/0145975 to

MeLampy. Claims 6, 7, 14, 15, 20 and 21 were rejected over Wiegel in view of

U.S. Patent No. 6,092,178 to Jindal. Claims 8 and 16 were rejected over Wiegel in view of U.S. Patent No. 6,052,788 to Wesinger. EX1002, 64-72.

36. Patent Owner overcame those rejections by explaining the novel features of the claims that were not present in the primary reference, Wiegel. Specifically, Wiegel did not disclose “having one or more resource nodes specify one or more answers to be provided in response to a Domain Name Service (DNS) request.” EX1002, 55. This unique node structure and function could not be found in the prior art. The Office then allowed the claims. *Id.*, 40.

37. The prosecution history of the ’517 patent further shows that many of the references cited in the Petition were considered and even applied in rejections in predecessor applications. In particular, the Ben-Shaul reference cited in the Petition, *see* Pet., 2, 39–74, was applied in rejections during the prosecution of U.S. Application No. 10/259,497 (“’497 application”) and U.S. Application No. 11/932,162 (“’162 application”) in the priority chain. *See* EX2002; EX2003.

38. Patent Owner overcame the rejection in the ’497 application by including the novel features of the claims indicated as allowable subject matter by the Examiner (“[c]laims 14, 15 . . . are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form

including all of the limitations of the base claim and any intervening claims”) that were not present in the Ben-Shaul reference. *See* EX2002, 239, 290 (“[c]laim 10 has been amended to include the subject matter of objected-to claim 15,” indicated as allowable subject matter by the Examiner, namely “a monitored server, wherein an availability of the monitored server is dynamically monitored” and/or “a managed server, wherein . . . a load share or a shed fraction of the managed server is defined dynamically”). Ben-Shaul’s lack of dynamic monitoring and server management also distinguish it from the policy and policy-based features of the ’517 patent claims.

39. Patent Owner also overcame that rejection in the related ’162 application by explaining that Ben-Shaul did not disclose or suggest “any such dependent relationship between the receipt of a client request for a domain name resolution, on one hand, and the retrieval of policies from a name server’s policy database and the selection of a network based on those retrieved policies, on the other.” *See* EX2003, 1316.

40. The Examiner then allowed the claims based on the amendments of the above features. *See* EX2003, 1331 (“[T]he ’120 reference does not disclose the Applicant’s invention as claimed in detail, such as receipt of a client request to resolve a domain name at a name server, the policy database being on the name server and selecting either the CDN or subscriber server. The ’120 reference

appears to be drawn to formatting content of a web page rather than load sharing/balancing of a network.”). The specific role of the policy and policy-based features in the ’517 claims similarly are not taught in Ben-Shaul.

V. LEGAL STANDARDS

41. In formulating my opinions set forth in this Declaration, I applied the following legal principles.

A. Person of Ordinary Skill in the Art (“POSA”)

42. I understand that patent law analyses are performed from the viewpoint of a POSA. I understand that a POSA is a hypothetical person who is presumed to be aware of all pertinent art, thinks along conventional wisdom in the art, and is a person of ordinary creativity. For purposes of this declaration, I have applied Petitioner’s articulation of a POSA. *See* Pet., 8, EX1003, 50–52 (“A POSITA at the time of the invention would have had at least a bachelor’s degree in computer science, electrical engineering, or a related field, and at least two years of work or research experience in the field of content delivery management or networks. Work experience can substitute for formal education and additional formal education can substitute for work experience”). It is my opinion that the definition of a POSA would not materially affect the limited analysis required for deciding institution and presented in this declaration. If called to give further

opinions in this proceeding, I reserve the right to reconsider the definition of a POSA and arrive at my own conclusion.

B. Claim Construction

43. I understand that in an IPR, patent claim terms are given their ordinary and customary meaning as understood by a POSA at the time of the invention, in view of the patent's specification and its prosecution history—unless the patent explicitly defines the claim term. I also understand that when a patent explicitly defines a claim term in the specification, the patent's definition controls.

44. I understand that a dependent claim contains all limitations of the claim from which it depends.

C. Obviousness

45. I understand that an obviousness analysis involves comparing a claim to the prior art to determine whether the claimed subject matter would have been obvious to a POSA in view of the prior art and general knowledge in the prior art at the time of the patent's priority date (here, June 28, 2005).

46. I understand that obviousness must be assessed from the viewpoint of a POSA at the time of the invention. I further understand that to establish obviousness, a party must perform the following factual inquiries: (a) determining the scope and content of the prior art; (b) ascertaining the differences between the claimed invention and the prior art; and (c) resolving the level of skill in the art. I

understand that, in determining the scope and content of the prior art and ascertaining the differences between the claimed invention, a patent challenger must specify where each element of the claim is found in the prior art.

47. I understand that one way of establishing obviousness is by establishing that a POSA would have had both (i) a reason to modify or combine the teachings of the prior art to achieve the claimed invention and (ii) a reasonable expectation of success in doing so. I understand that the reason to combine prior-art references can come from a variety of sources, not just the prior art itself or the specific problem the patentee was trying to solve. And I understand that the references themselves need not provide a specific hint or suggestion of the alteration needed to arrive at the claimed invention; the analysis may include recourse to logic, judgment, and common sense available to a person of ordinary skill that does not need to be explicit in any reference.

48. I understand that a “reasonable expectation of success” is assessed in view of the prior art and general knowledge in the art from the viewpoint of a POSA at the time of the patent’s priority date, and it does not require an absolute certainty of success. Furthermore, I understand that determining whether the prior art would have suggested to those of ordinary skill in the art to carry out the claimed invention with a reasonable expectation of success must be done after determining that the claimed elements are present in the prior art.

49. I also understand that, before reaching a conclusion that the claimed invention would have been obvious, one must consider any objective evidence of non-obviousness if it is available. The objective evidence of non-obviousness can include evidence of commercial success attributable to the claimed invention, evidence of industry praise for the claimed invention, evidence of a long-felt need that was solved by the claimed subject matter, evidence that others copied the claimed subject matter, or evidence that the claimed subject matter achieved an unexpected, superior result relative to the closest prior art. I understand that such evidence must have a nexus, or causal relationship, to the claimed subject matter beyond what was available in the prior art, and must be commensurate in scope with the patent claim(s) at issue.

D. Written Description

50. I understand that written description of a subject matter is assessed from the viewpoint of a POSA. I understand that to satisfy written description, the disclosures in the application must convey to a POSA that the inventors had “possession” of the claimed subject matter. I understand that the inventor need not physically possess the described subject matter to have “possession” in the context of written description. I understand that possession for written description purposes is determined by the sufficiency of the disclosure in the application taken together, and in the context of, the state of the art at the time of the filing. I understand that

the state of the art at the time of filing is determined by the general knowledge of a POSA, as evidenced by the published literature at the time.

51. I understand that the written description inquiry proceeds the same way whether one is analyzing the patent specification for determining the validity of the claims or analyzing a priority document for determining priority benefit.

VI. THE CLAIMS HAVE WRITTEN DESCRIPTION SUPPORT IN THE PRIORITY APPLICATIONS.

52. I understand that the Petition is first presents a priority-date challenge, and then presents each prior-art reference alternatively under different statutes based on the success of that priority challenge. *See* Pet., 8. I understand that the Board needs to resolve priority challenges as part of the patentability determination.

53. The Petition alleges that no claim of the '517 patent is entitled to a priority date before October 26, 2007 (the 2007 CIP filing date), at least because neither the 2002 Application nor the Provisional Application describes “one or more resource nodes [being] ... mail exchange (MX) records,” as recited in each of the independent claims. *See* Pet., 7. The Petition further alleges that the “mail exchange” and/or “MX” was first introduced in the 2007 CIP. *Id.*

54. I do not agree. An MX record (e.g., Mail Exchanger record) is a type of Domain Name System (DNS) record that specifies which mail server is responsible for accepting email messages on behalf of a domain. Specifically, '517

patent discloses “[r]esources are used to specify the ATC answers to DNS queries” and lists at least five types of resource nodes—IP addresses, CNAME records, MX records, NS records, and Load sharing server sets. *See* [EX1001, ’517 patent], 9:30-42. A POSA would have understood that similar to other types of the resource nodes, the MX record functions as an address for the email domain, telling other servers where to deliver emails addressed to that specific domain. The ’517 patent further presents “[t]hose skilled in the art will understand, upon reading this description, that different and/or other resource nodes may be used”. *See* EX1001, 9:44-46.

55. The Provisional Application has written description of at least IP addresses, CNAME records, and/or NS records. *See* EX1011, U.S. Provisional Application 60/325,177 Provisional, [0067]–[0069]. Specifically, the Provisional Application provides:

A subscriber may activate (turn up) the ATC system (DNS servers) in one of two ways: using a DNS CNAME or using NS delegation. Instead of using ATC to direct traffic for a single DNS hostname, the subscriber may have many different subdomains that it would like to direct to ATC. For example, the subscriber might want all downloads from di.customer.com handled by ATC, together with all of its subdomains, but have all other domains that it controls, such as www.customer.com, resolved by its own name server:

dl.customer.com. => ATC
any.thing.dl.custorner.com. => ATC
www.customer.com. => not ATC
customer.com.=> not ATC

Id. at [0067]. It goes on to provide, “[i]n this case, instead of adding the CNAME record in the subscriber's DNS zone file, it simply delegates the di.customer.com. name to ATC via NS records in its zone file.” *Id.* at [0068]. It further explains:

The delegation (NS-records) method is preferred as it is more flexible and offers all of the reliability, scalability and flexibility of ATC. After the initial contact for delegation, a properly operating resolver making occasional queries will not contact the subscriber's own name server or name servers again. The result is much better name resolution performance since the unnecessary overhead of routing each fresh DNS request through the subscriber's name server is eliminated. The CNAME method keeps the subscriber's own name server in the loop. That is, whenever the CNAME TTL expires, client resolvers will return to the subscriber's name servers to refresh the record.

Id. at [0069].

56. A POSA would have understood, upon reading the Provisional Application, that MX records and/or resource nodes may be used to “activate the ATC system.” *Id.* A POSA would also have understood that the inventors were in possession of a system that uses MX records or resource nodes to activate the ATC system.

57. It is therefore my opinion that there is written description support for the claims in the earliest filed application and in each intervening application, sufficient to demonstrate that the inventors were in possession of all of the claim limitations as of the claimed priority date.

VII. THE ART CITED IN GROUNDS 1 AND 2 DOES NOT TEACH OR SUGGEST THE CLAIMED UNIQUE “POLICY” FEATURES.

58. The Petition relies on prior art that fails to teach or suggest the “policy-based” or “at least one policy” limitations of the claims. The unique policy described and claimed in the ’517 patent directs network traffic in an innovative way not found in the prior art cited for Grounds 1 or 2.

59. Independent claims 1, 9, and 17 (all independent claims) recite various features involving a “policy,” specifically:

A [(1) method/(9)administrative agent/(17)system], operable in a framework in which an adaptive traffic control name server network **implements policy-based traffic direction**, the name server network comprising at least one domain name server comprising hardware in combination with software and constructed and adapted **to provide adaptive policy-based domain name service**, the method comprising:

. . .

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

(C) **providing said at least one policy to the name server network**, wherein the decision tree comprises one or more resource nodes, and one or more branch nodes, wherein the one or more resource nodes specify one or more answers to be provided in response to a Domain Name Service (DNS) request, and wherein . . .

EX1001, 31:24-56. The '517 patent is clear that a “policy” or a “policy-based” feature generally refers to a course, rule, or principle of action. *See* EX1001, 1:43-2:7 (“This invention solves these and other problems by providing a means to distribute network (e.g., Internet) traffic according to a configurable set of rules.”).

60. In the context of these claims, a policy is a course, rule, or principle of action to direct traffic of the underlying servers. *Id.* (“These rules together provide an extremely fine-grained level of network Internet traffic control to providers of Internet content and applications . . .”). The policy or policy-based features make decisions based on the geographical locations and the capacities of the underlying servers in the subscriber’s network to manage and direct traffic. *See* EX1001, 6:33-44 (“For example, the subscriber may set up policies to direct traffic with respect to considerations such as the geographical locations and the capacities of the underlying servers in the subscriber’s network . . .”), 7:13-28 (“Decisions are based on location of the end-user or an approximate thereof, e.g., using the IP address of an end-user’s resolver . . .”) (“The subscriber can explicitly specify the amount of traffic (load share) to be directed to each of their servers within a defined server set in the subscriber server network . . .”).

61. Importantly, the “policy” or “policy-based” features are structurally and functionally different from the “geographical locations and the capacities of the underlying servers,” EX1001, 6:33-36, that the policy features use. In other

words, the policy governs the process, while the geographical locations and the capacities of the underlying servers are the inputs that the policy uses to determine traffic direction. *See* EX1001, 6:33-44, 15:28-35.

62. The '517 patent further illustrates what it means by “policy” and “policy-based” course, rule, or principle of action through several examples. *See* EX1001, 7:13-8:25. One example is a “geographic policy,” in which decisions are based on location of the end-user or an approximate thereof, e.g., using the IP address of an end-user’s resolver. *See* EX1001, 7:13-21. In this example, the policy or policy-based course, rule, or principle of action is interpreted as “if the IP address is within the U.S., the request may be directed to a domestic group of servers in the subscriber server network, otherwise it may be directed to international servers in the network.” *Id.*

63. The cited prior art does not disclose this kind of policy or policy-based feature. In Ground 1, Petitioner relies on Beaumont (EX1007), as disclosing the policy for all of the policy-based limitations of the claims. Pet., 2, 9-34. Petitioner points to a preference table (*see* Beaumont’s Figure 2 below) including locations, capabilities, or statuses of a server for allegedly teaching the recited “policy-based” or “at least one policy” features. Petitioner argues that “Beaumont’s method operates in a ‘data network’ (framework) including a content provider

DNS server that directs requests (traffic) **according to a configurable preference table (policies).**” *See* Pet., 15.

	C1	C2	C3	C4 (optional)	C5 (optional)	C6 (optional)
	Delivery Server Address	Destination Domain	Estimated Distance (milliseconds)	number of times being selected per hour	Health	Time-To-Live (minutes)
R1						
R2	152.192.16.15	182.192	100	100	Working	1
R3	153.192.16.15	182.192	90	90	Down	2
R4	154.192.16.15	182.192	10	10	Working	9
R5	155.192.17.15	155.192	20	20	Working	8
R6	156.192.17.15	156.192			Working	1
R7	157.192.17.15	156.192	50	50	Working	5
R8	158.192.17.15	156.192	70	70	Working	3

EX1007, FIG. 2.

64. A preference table is not a policy. Beaumont’s preference table has none of the structure of the claimed policy, which is characterized by a conditional and a result. *See* EX1001, 8:55-56, 15:28-32, 16:5-7. Nor does the preference table of Beaumont function like the claimed policy.

65. Beaumont’s preference table merely records locations, capabilities, or statuses of a server, such as delivery serve address, destination domain, estimated distance, number of times being selected per hour, health, and time-to-live. *See* EX1007, FIG. 2. It is a listing of information. It does not provide the claimed course, rule, or principle of action. It does not govern any process or direct the traffic of the underlying servers as claimed. Indeed, the information recorded in

Beaumont's preference table could be used to inform a policy—but Beaumont does not teach this nor does Beaumont disclose any kind of policy that could use this information in action.

66. Put another way, what is missing from Beaumont is any disclosure of how the information in the table is used to direct network traffic. At most, Beaumont discloses other information (separate from the preference table) from which a policy might be developed. EX1007, [0031] (suggesting shortest distance and smallest number of lost packets as potential ways to select a content delivery server). A premise on which one might develop a policy is not the disclosure of a policy. Nor is the preference table itself.

67. In the '517 patent claims, information is used to navigate a decision tree by following the policy rules. *See* EX1001, 7:13-21, 9:13-25. The information in Beaumont's preference table could be used by a policy to determine which group of servers to direct the request, but Beaumont's preference table itself does not expressly or inherently disclose any policy. The preference table only discloses the IP address. It does not provide any action or rule of directing such IP address.

68. The other reference cited in Grounds 1 and 2, Hasan, is cited for other limitations of the independent claims. Pet., 2, 9–39. The Petition does not rely on Hasan for any disclosure of policies or policy-based features. Nor does it disclose the claimed policy in any event. Biliris is cited only in Ground 2 and only for

dependent claims. Pet., 2, 35–39. The purported combinations in Grounds 1 and 2 therefore do not disclose this limitation. The absence of at least these claimed “policy” limitations from the prior art defeats any likelihood that Grounds 1 or 2 will prevail.

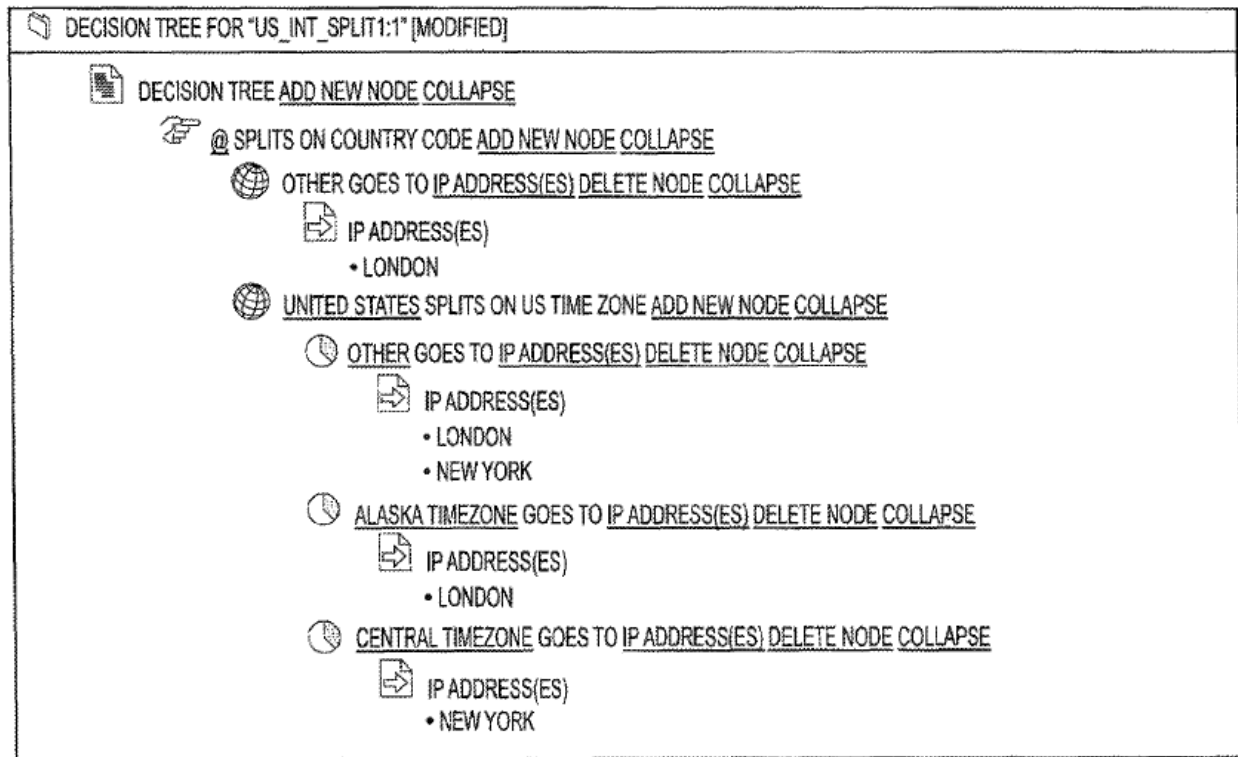
VIII. THE ART CITED IN GROUNDS 1 AND 2 DOES NOT TEACH OR SUGGEST “THE ONE OR MORE BRANCH NODES SPECIFY ONE OR MORE DECISION CRITERIA TO BE APPLIED.”

69. Neither Beaumont nor Hasan discloses the limitation, “the one or more branch nodes specify one or more decision criteria to be applied,” that appears in all independent claims. Petitioner points to a table as satisfying the decision criteria, but the table does not have any criteria. Beaumont never explains how the table directs network traffic (because it does not), and Petitioner’s expert never explains how the table constitutes decision criteria as claimed (it does not).

70. Specifically, independent claims 1, 9, and 17 recite “wherein the one or more branch nodes specify one or more decision criteria to be applied ... (ii) one or more decision criteria for the one or more branch nodes.” *See* EX1001, 31:24–56. This claim limitation basically has two elements: (1) the decision criteria to be applied, and (2) the one or more branch nodes needed to specify the criteria.

71. The ’517 patent makes clear that “decision criteria to be applied” are criteria for selecting or grouping different servers. *See* EX1001, 9:6–8, FIG. 10(a)–(o); *see also* EX1001, 7:37–39 (“It may also alternatively instruct the ATC

framework to direct traffic to servers other than the primary servers.”). For example, in Figure 10(b) of ’517 patent as below, the recited “decision criteria” is interpreted as “SPLITS ON COUNTRY CODE” and/or “SPLITS ON US TIME ZONE.” Also, in this example, these “decision criteria” need to be specified in the branch node of the decision tree in Figure 10(b).



EX1001, FIG. 10(b).

72. Petitioner relies on Beaumont’s content provider DNS server for allegedly teaching sharing the destination domain of the client. *See* Pet., 19. Petitioner then suggests that sharing the destination domain satisfies the “decision criteria” limitation because it provides “answers” in response to a DNS request,

according to the configurable preference table shown above in Beaumont's Figure 2. *Id.*

73. Petitioner further relies on content delivery servers represented in rows R2, R3, and R4 in Beaumont's Figure 2 for allegedly teaching a "decision criterion" to group the content delivery servers—under the same destination domain and the destination domain. *See* Pet., 20. Beaumont's teaching that "content delivery servers identified in column C1 of rows R2, R3, and R4)" can be grouped under the same destination domain, *see* EX1007, ¶28, however, does not disclose a decision criterion as claimed. That is because Beaumont does not teach or suggest the claimed "one or more decision criteria to be applied"—which is interpreted as "content delivery . . . are mapped to the same destination domain," *id.*—needs to be specified by "the one or more branch nodes."

74. Petitioner argues that Beaumont suggests a "decision criterion" in its depiction of rows R2, R3, and R4 in the configurable preference table (Beaumont's Figure 2) because they "are mapped to the same destination [domain], 182.192." Pet., 20. But the elements of rows R2, R3, and R4 of Beaumont's preference table are—at most—listings of the locations, capabilities, or statuses of a server. *See* EX1007, FIG. 2.

75. That one can map them to their destination domains does not indicate why they are mapped and what criteria were used to make that decision.

Accordingly, the preference table listings do not provide the claimed criteria for selecting and grouping different content delivery servers.

76. For the sake of argument, even if Beaumont's selection for rows R2, R3, and R4 was based on grouping different content delivery servers based on the shortest estimated distance to the client, then that selection instruction would need to be explicitly specified in the "one or more branch nodes" associated with the preference table (Beaumont's Figure 2), as claimed in '517 patent. *See* Pet., 20; *compare* EX1007, FIG. 2 *with* EX1001, FIG. 10(b). Clearly, Beaumont's configurable preference table does not have this teaching or suggestion in any way.

77. Hasan does not cure the deficiencies of Beaumont with respect to at least the above recited features. Petitioner relies on Beaumont's content provider DNS server in view of Hasan's GUI that provides "a hierarchical layout" in a "familiar tree structure, with . . . the branches being the facilities, subscribers, devices and log servers" for allegedly teaching the recited "one or more branch nodes" that specify "one or more decision criteria to be applied." *See* Pet., 19–20. In particular, the Petition argues that when incorporated into Beaumont's network, higher-level branches in Hasan's GUI may represent decision criteria and sub-branches in Hasan's GUI may represent individual delivery servers that fulfill the decision criteria and are thus "answers" provided in response to a DNS request. *Id.*

78. However, neither Beaumont nor Hasan (alone or in combination) teaches or suggests that the “one or more decision criteria”—referring to the above-noted grouping instruction—have to be explicitly specified in the “one or more branch nodes” (or in any of the higher-level branches or sub-branches as disclosed by Hasan). In other words, these references are missing the teaching that the “one or more decision criteria” are specified in the structures that Petitioner alleges to be the “one or more branch nodes.” Hasan’s GUI does not have that teaching or suggestion among its branches, as there are no criteria in this GUI at all. This failure is a separate and independent reason why Grounds 1 and 2 cannot succeed on the merits.

IX. THE ART CITED IN GROUNDS 3A AND 3B DOES NOT TEACH OR SUGGEST A POLICY THAT CAN BE IMPLEMENTED FOR “DIRECTION OF NETWORK TRAFFIC.”

79. The prior art of Grounds 3A and 3B does not teach or suggest at least the claimed “policy-based” or “at least one policy” can be implemented for “direction of network traffic.” As discussed above for Grounds 1 and 2, independent claims 1, 9, and 17 recite multiple “policy-based” or “at least one policy” features. These limitations further specify that the system or method “implements policy-based traffic direction . . . using said GUI to obtain at least one policy for direction of network traffic.” EX1001, 31:24-56, 33:9-34:16. As

discussed for Grounds 1 and 2, above, a policy is a course, rule, or principle of action. EX1001, 1:43-2:7.

80. Petitioner relies on Ben-Shaul’s EdgeDNS servers for allegedly teaching the recited “policy-based” or “at least one policy” for “direction of network traffic.” Pet., 45, 47, 48. In particular, Petitioner alleges that each Ben-Shaul’s EdgeDNS server receives DNS requests and “is responsible to return the IP address” of the appropriate content server based on “edge server policy.” *Id.* Petitioner further alleges that Ben-Shaul’s front edge tool GUI is for direction of network traffic and supports the setting of policies using a decision tree representing rules. *Id.*

81. As noted above, the Office already considered this teaching in Ben-Shaul and ultimately allowed the claims of both the ’517 patent’s predecessor patents based on similar distinguishing claimed subject matter found in the ’517 patent claims. *See* EX2002, 784; EX2003, 1331. Accordingly, when the Office considered the claims that issued to become the ’517 patent, it was clearly aware of Ben-Shaul and its relevance to the then pending claims. The argument that Petitioner makes now is very similar to the argument that the Examiner previously made, *see* EX2002, 232–241; EX2003, 1237–1303—and Patent Owner previously overcame, *see* EX2002, 290–291; EX2003, 1315–1319—for two related patents with similar distinguishing claimed subject matter.

82. Specifically, Petitioner argues that Ben-Shaul's EdgeDNS servers "provide ... policy-based domain name service." Each receives DNS requests and "is responsible to return the IP address" of the appropriate content server based on "edge server policy." This service is allegedly "adaptive" in that requests are handled dynamically based on network conditions. *See* Pet., 45–46. Petitioner argues that Ben-Shaul's edge server "leaves" "specify one or more answers to be provided in response to a Domain Name Service (DNS) request" because an IP address for a selected server is provided as an answer to a DNS request. *See id.*, 53. The Petitioner further argues Ben-Shaul discloses a specification of a particular edge server (an answer) for the one or more resource nodes in which the edge server should be returned under particular conditions. *See id.*

83. Likewise, in the prosecution history of '497 application, the Examiner argued that Ben-Shaul discloses "the policies are dynamically adjusted and the policies of the edge servers affect the operation of the domain name servers and thus the resolution of a domain name by the domain name server are influenced by these policies." EX2002, 239–240. The Examiner further argued that Ben-Shaul discloses "EdgeDNS which provides dynamic domain name resolution based on policies." EX2002, 240.

84. Furthermore, in the prosecution history of the '162 application, the Examiner argued that Ben-Shaul discloses "local server/edge server or another

distinct origin site that is selected to provide the resource based on some condition (i.e. policy).” EX2003, 1245. The Examiner further argued that Ben-Shaul discloses “resolving a client request to resolve a domain name, selecting either an edge server or origin server to provide the content provider resources, wherein such selection is based in part on a policy (i.e. preferences, specified policy, policy of load balancing.” EX2003, 1246. The Examiner also contended that Ben-Shaul discloses “content provider can establish ‘policies’ to control which network element distributes the resource.” EX2003, 1247.

85. The argument that Petitioner makes in the Petition here essentially repurposes the argument the Examiner previously made in examining the ’162 application, as both compare Ben-Shaul’s edge server functionality to the claimed policies. That the Office did not apply this same rejection—which Patent Owner twice overcame—to the ’517 patent indicates that the Office did not find it compelling. I do not either.

86. Ben-Shaul does not teach or suggest the recited “policy-based” or “at least one policy” features of the ’517 patent claims, particularly the feature that the claimed policy is implemented for “direction of network traffic.” In Ben-Shaul, the “edge server policy” is an entirely different network functionality than that of the policy recited in the claims. *See* EX1005, ¶¶41, 176–177.

87. Ben-Shaul's edge server policy may control which resources zones are directed to the edge servers, *see* EX1005, ¶41, but it does not produce any decision for direction of network traffic. Ben-Shaul's "edge server policy" that redirects requests to the regional site is only the first step of the request redirection process. *Id.*, ¶181. Ben-Shaul's "first step request direction" is not the recited "direction of network traffic." Ben-Shaul's first step request direction (redirected by the edge server) takes place prior to interactions between origin servers and edge servers, and then merely forwards these requests to certain resource zones. *See id.*, ¶41. Contrastingly, the "network traffic" recited in the '517 patent is "[an] amount of load share," and "[t]he load share for a given server represents the amount of traffic that will be sent to that server within the same tier of the server set." *See* EX1001, 7:22-28, 11:56-58.

88. As described in the '517 patent, "[t]he shed fraction for a given server represents the percentage of traffic that should be redirected away from the server. The redirection may be carried out after load share is made based upon load share policies." EX1001, 22:38-41. The specification thus makes clear that to obtaining the load share "to be directed to each of their server within a defined server set," the direction of network traffic (load share), requires interactions between different servers for making the load share. *See id.*, 7:22-24. Because the "direction of network traffic" with interactions between servers is not the "first step" of Ben-

Shaul's redirection process, Ben-Shaul's "edge server policy" is not a policy or policy-based features as recited in the '517 claims.

89. As another example, "[p]artial failover or tiered failover policies govern the traffic re-direction process when functioning servers in a server group are overloaded or failed." EX1001, 8:52-54. Clearly, the recited "direction of network traffic"—which is carried out after load share is made or when functioning servers in a server group are overloaded or failed—is not the Ben-Shaul's "first step request direction." As such, Ben-Shaul's policies—which have implied the "first step request direction"—do not have the teaching or suggestion of the recited "policy-based" or "at least one policy" that can be implemented for "direction of network traffic" in any way.

90. Hasan does not cure the deficiencies of Ben-Shaul with respect to the above recited features. As discussed above, Hasan discloses a GUI for defining "configuration data and policy information" for servers within a network. EX1006, 7:12-21, 6:59-63. Petitioner relies on Hasan' GUI for "configuring network objects to be a suitable option for the "highly graphical" tools referenced in Ben-Shaul for policy setting, particularly in view of Ben-Shaul's directive to utilize GUIs to ease policy construction." Pet., 43. However, since Ben-Shaul does not disclose the recited "policy-based" or "at least one policy" that can be implemented for

“direction of network traffic” as described above, combining Hasan’s GUI does not cure the deficiencies of Ben-Shaul.

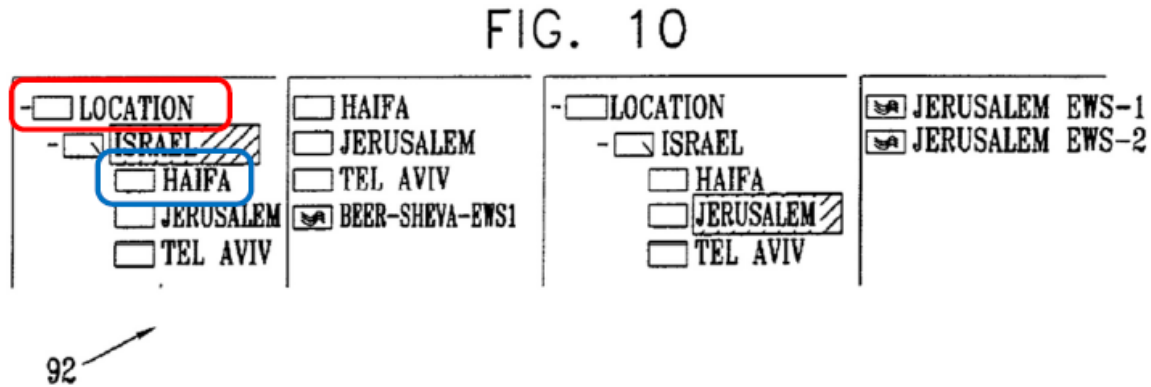
X. THE ART CITED IN GROUNDS 3A AND 3B DOES NOT TEACH OR SUGGEST THAT “THE ONE OR MORE BRANCH NODES SPECIFY ONE OR MORE DECISION CRITERIA TO BE APPLIED.”

91. As discussed above for Grounds 1 and 2, independent claims 1, 9, and 17 recite at least the “one or more branch nodes specify one or more decision criteria to be applied.” This limitation basically has two elements: (1) the decision criteria to be applied, and (2) the one or more branch nodes needed to specify the criteria.

92. The ’517 patent makes clear that “decision criteria to be applied” are criteria for selecting or grouping different servers. *See* EX1001, 7:37-39 (“It may also alternatively instruct the ATC framework to direct traffic to servers other than the primary servers.”); *see* EX1001, 9:6-8, FIGs. 10(a)-(o). For example, if we look at Figure 10(b) of ’517 patent as below, the recited “decision criteria” is interpreted as “SPLITS ON COUNTRY CODE” and/or “SPLITS ON US TIME ZONE.” Also, in this example, these “decision criteria” need to be specified in the branch node of the decision tree in Figure 10(b).

93. In Grounds 3A and 3B, Petitioner relies on Ben-Shaul’s GUI (with decision tree structure having internal nodes) for allegedly teaching the recited “branch nodes” that represent logical aggregations of nodes. *See* Pet., 53. Petitioner

further alleges that the groups defined by the internal nodes “specify one or more decision criteria to be applied,” because they “represent logical aggregations of nodes” based on a particular decision criteria. *Id.*



EX1005, FIG. 10 (annotated).

94. Petitioner misinterprets Ben-Shaul’s GUI “internal nodes” (e.g., “LOCATION” in Figure 10) as the claimed branch nodes. Petitioner argues that Ben-Shaul’s internal nodes “represent[] logical aggregations of nodes” and further alleges that “[a]dministrators may construct a group based, e.g., on region, as shown in Fig. 10 (Ben-Shaul, [0039], [0309]) such that policies are applied to any edge server within the group (Ben-Shaul, [0285], [0289], [0308], [0309]).” Pet., 53. In addition, Petitioner alleges that “[a] DNS request is thus directed to an edge server based on that server’s association with the group (Ben-Shaul, [0044]).” *Id.*

95. Petitioner further interprets that the internal nodes “specify one or more decision criteria to be applied,” because DNS requests may be routed according to group characteristics of edge servers such as “region, language,

interest, organization type, security level, edge server specification and capabilities, communication speeds, subgroups, type of events, etc.” *See* Pet., 55.

96. It is my opinion that the group characteristics of Ben-Shaul’s edge servers (*see, e.g.*, “LOCATIONS” characteristic in Ben-Shaul’s Figure 10) are entirely not the recited “decision criteria” as described in ’517 patent. *See* EX1001, 9:6-8, FIG. 10(a)-(o). As indicated by the ’517 patent, the “decision criteria for selecting or grouping different servers has to be specified in these internal nodes. *Id.* These group characteristics may, at most, be interpreted as server attributes, which are entirely different from the recited “decision criteria.”

97. Even if Ben-Shaul’s group characteristics were considered to be “decision criteria” as claimed in the ’517 patent, Ben-Shaul would require these decision criteria to “construct a group based, e.g., on region.” *See id.*, EX1005, ¶39, ¶309. In other words, to the extent Ben-Shaul teaches decision criteria at all, Ben-Shaul’s group characteristics would need to group the edge servers with a group, i.e. to “construct a group based, e.g., on region.” *See* Pet., 53. They do not. That is because the criteria for selecting the different servers in Ben-Shaul are not specified in Ben-Shaul’s internal nodes.

98. Petitioner alleges that a POSA would have been motivated to combine Hasan’s GUI teachings with Ben-Shaul to provide a GUI for setting policies, and that the combined Ben-Shaul-Hasan GUI includes a decision tree with resource

nodes and branch nodes as claimed. *See* Pet., 54. In particular, Petitioner argues that when combined with Ben-Shaul, higher-level branches in the Hasan's GUI may represent regions or groups, such as Israel, and sub-branches in the Hasan's GUI may represent edge servers. *Id.*

99. It is my opinion that neither Ben-Shaul nor Hasan teaches or suggests that the "one or more decision criteria" (referring to the above-noted selecting or aggregating instruction) are explicitly specified in the "one or more branch nodes" (or in any of the higher-level branches or sub-branches as disclosed by Hasan). Hasan's GUI does not have the teaching or suggestion in any way. The combination of these references therefore does not teach this claim limitation either. Adding Hasan's teachings does nothing to fill the gaps in Ben-Shaul.

XI. CONCLUSION

100. In signing this declaration, I recognize that the declaration will be filed as evidence in an *inter partes* review before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I also recognize that I may be subject to cross-examination in the case and that cross-examination will take place within the United States. If cross-examination is required, I will appear for cross-examination within the United States during the time allotted.

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

Executed on this 13th day of August 2025, in Amherst, MA



/Dr. Prashant Shenoy /