

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

JUNIPER NETWORKS, INC.,
Petitioner,

v.

WSOU INVESTMENTS, LLC
d/b/a BRAZOS LICENSING AND DEVELOPMENT,
Patent Owner.

IPR2021-00959
Patent 7,382,781 B1

Before BRIAN J. McNAMARA, ROBERT J. WEINSCHENK, and
JOHN A. HUDALLA, *Administrative Patent Judges*.

HUDALLA, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
35 U.S.C. § 318(a)

Juniper Networks, Inc. (“Petitioner”) filed a Petition (Paper 2, “Pet.”) requesting an *inter partes* review of claims 1–3, 6, 7, 9, and 18 (“the challenged claims”) of U.S. Patent No. 7,382,781 B1 (Ex. 1001, “the ’781 patent”). Petitioner filed a Declaration of Kevin Jeffay, Ph.D. (Ex. 1003) with its Petition. Patent Owner, WSOU Investments, LLC d/b/a

Brazos Licensing and Development (“Patent Owner”), did not file a preliminary response. We determined that the information presented in the Petition established that there was a reasonable likelihood that Petitioner would prevail with respect to its unpatentability challenges. Pursuant to 35 U.S.C. § 314, we instituted this proceeding on November 30, 2021, as to all challenged claims and all grounds of unpatentability. Paper 6 (“Dec. on Inst.”).

During the course of trial, Patent Owner filed a Patent Owner Response (Paper 9, “PO Resp.”), and Petitioner filed a Reply to the Patent Owner Response (Paper 11, “Pet. Reply”). Patent Owner also filed a Sur-reply. Paper 12 (“PO Sur-reply”).

An oral hearing was held on August 30, 2022, and a transcript of the hearing is included in the record. Paper 20 (“Tr.”).

We have jurisdiction under 35 U.S.C. § 6. This decision is a Final Written Decision under 35 U.S.C. § 318(a) as to the patentability of claims 1–3, 6, 7, 9, and 18 of the ’781 patent. For the reasons discussed below, Petitioner has demonstrated by a preponderance of the evidence that claims 1–3, 6, 7, 9, and 18 of the ’781 patent are unpatentable.

I. BACKGROUND

A. *Real Parties-in-Interest*

Petitioner identifies Juniper Networks, Inc. as the real party-in-interest. Pet. 1. Patent Owner identifies WSOU Investments, LLC d/b/a Brazos Licensing and Development as the real party-in-interest. Paper 3, 1.

B. Related Proceedings

The parties identify the following proceedings related to the '781 patent (Pet. 1–3; Paper 3, 2):

WSOU Invs., LLC v. Juniper Networks, Inc., No. 6-20-cv-00812
(W.D. Tex. filed Sept. 4, 2020);

WSOU Invs., LLC v. Juniper Networks, Inc., No. 6-20-cv-00813
(W.D. Tex. filed Sept. 4, 2020);

WSOU Invs., LLC v. Juniper Networks, Inc., No. 6-20-cv-00814
(W.D. Tex. filed Sept. 4, 2020);

WSOU Invs., LLC v. Juniper Networks, Inc., No. 6-20-cv-00815
(W.D. Tex. filed Sept. 4, 2020);

WSOU Invs., LLC v. Juniper Networks, Inc., No. 6-20-cv-00816
(W.D. Tex. filed Sept. 4, 2020);

WSOU Invs., LLC v. Juniper Networks, Inc., No. 6-20-cv-00902
(W.D. Tex. filed Sept. 30, 2020);

WSOU Invs., LLC v. Juniper Networks, Inc., No. 6-20-cv-00903
(W.D. Tex. filed Sept. 30, 2020);

IPR2021-00538;

IPR2021-00768; and

IPR2021-00769.

C. The '781 patent

The '781 patent is directed to “a multicast architecture for a virtual private local area network service in a metro Ethernet network.” Ex. 1001, 1:19–21. The '781 patent describes a conventional fully-meshed virtual private local area network service (VPLS) metro Ethernet network (MEN)

where each Provider Edge (PE) node is bi-directionally connected to every other PE node via a Label Switched Path (LSP). *Id.* at 1:40–45, 2:6–8.

Conventional multicasting in a VPLS MEN is “achieved by sending packet traffic on multiple point-to-point interfaces between PE [Provider Edge] nodes that are already communicating unicast packet traffic.” *Id.* at 2:19–22. The ’781 patent describes a problem with conventional multicasting where a particular LSP that is already burdened by existing unicast traffic is further burdened by multicast traffic. *Id.* at 2:22–26. In this situation, LSPs carrying delay-sensitive unicast traffic may be disturbed by the addition of the multicast traffic, and certain regions of the MEN may be congested while others are not. *Id.* at 2:26–30. The invention described in the ’781 patent seeks to provide “an improved MEN VPLS that more efficiently accommodates both unicast and multicast traffic.” *Id.* at 2:31–34.

Figure 1a of the ’781 patent is reproduced below.

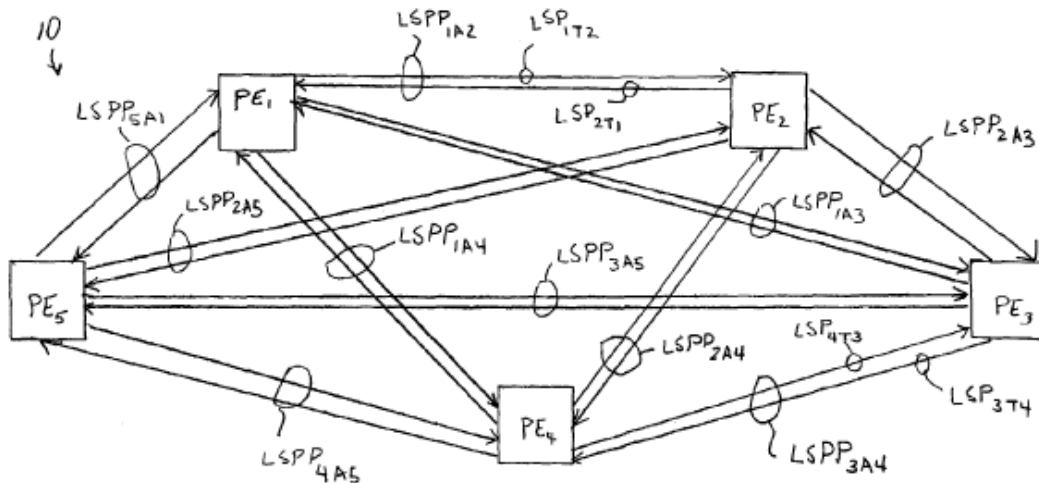


Figure 1a depicts a first overall routing configuration for unicast communications in network system 10, which is a MEN that provides a VPLS. *Id.* at 2:55–57, 2:66–3:4, 4:14–17, 4:43–45. Network system 10 includes five PE nodes PE₁, PE₂, PE₃, PE₄, and PE₅. *Id.* at 3:9–13. Network

system 10 is fully meshed, meaning that each PE node is connected to every other PE node in the system via a respective LSP (illustrated with an arrow). *Id.* at 3:42–45. In Figure 1a, each bi-directional connection between two nodes is depicted as an LSP pair (LSPP) that includes one LSP for communications in one direction and another LSP for communications in the opposite direction. *Id.* at 3:45–51. In the example of Figure 1a, LSPP_{1A2} and LSPP_{1A3} are heavily loaded with unicast traffic.¹ *Id.* at 4:57–62.

Figure 1b of the '781 patent is reproduced below.

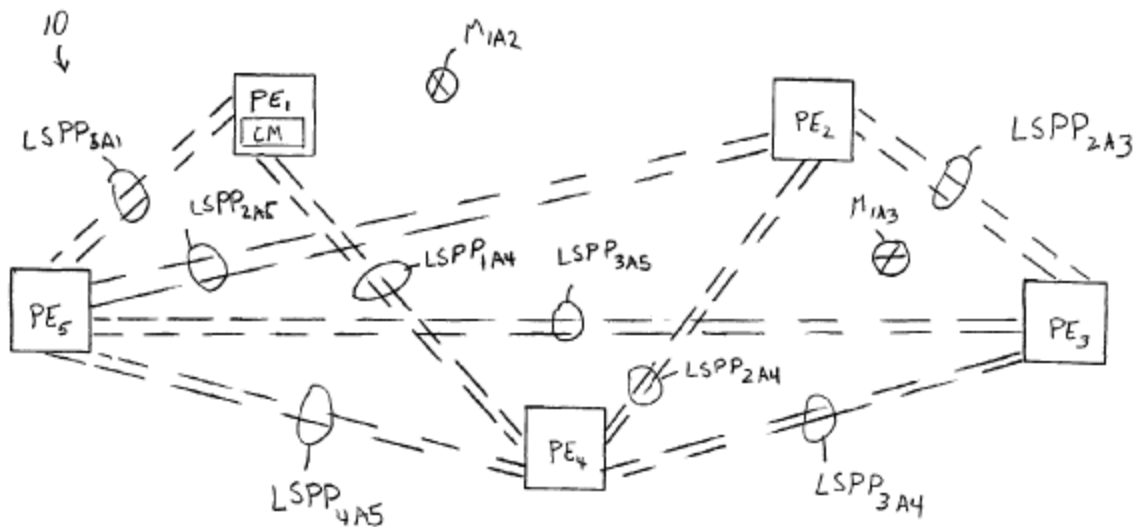


Figure 1b depicts a second overall routing configuration for multicast communications in network system 10. *Id.* at 2:58–60, 4:17–21, 4:40–45. Central manager CM develops the second overall routing configuration based on the multicast traffic requirements of each PE node as well as existing unicast traffic requirements. *Id.* at 4:24–29, 5:14–17. In particular, CM may develop the second overall routing configuration by constructing a

¹ The Specification of the '781 patent sometimes mistakenly refers to LSPPs as LSPs, but the numbering convention makes clear what reference was intended. We have corrected these references for clarity.

single Steiner tree (as is known in the art)² and then making exceptions to the Steiner tree construction based on various constraints. *Id.* at 5:5–14. For example, based on heavy unicast traffic, LSPP_{1A2} and LSPP_{1A3} are missing in Figure 1b and have been replaced with circled X's M_{1A2} and M_{1A3} to indicate that the affected PE nodes are prohibited from communicating multicast packets directly with one another, though multicast packets may be re-routed along any of the other LSPs. *Id.* at 4:57–5:4.

The '781 patent issued from an application filed on November 21, 2003. Ex. 1001, code (22). As discussed below, Petitioner applies the November 21, 2003, filing date of the application (i.e., the earliest effective filing date of the challenged claims) for qualifying the asserted reference as prior art. *See* Pet. 9.

D. Illustrative Claim

Of the challenged claims of the '781 patent, claims 1 and 18 are independent. Claims 2, 3, 6, 7, and 9 depend from claim 1. Claim 1 is illustrative of the challenged claims and recites:

1. A centralized node for coupling into a computer network along which network traffic flows between a plurality of nodes in a form of packets, programmed to perform the steps of:
 - identifying requirements of unicast packet traffic along the network, wherein the unicast packet traffic identifies a first traffic configuration along the network; and
 - constructing a second traffic configuration along the network, differing from the first traffic configuration, wherein

² The '781 patent also states that it was known in the art to minimize a certain cost function (e.g., the number of hops) with respect to the nodes of a Steiner tree. Ex. 1001, 5:38–49.

the second traffic configuration is for routing multicast packet traffic along the network; and

communicating routing information representing at least a portion of the second traffic configuration to each node in the plurality of nodes, wherein each node in the plurality of nodes routes multicast packet traffic in response to the at least a portion of the second traffic configuration.

Ex. 1001, 10:5–21.

E. Prior Art

Petitioner relies on the following prior art:

U.S. Patent No. 6,778,531 B1, filed Sept. 29, 2000, issued Aug. 17, 2004 (Ex. 1004, “Kodialam”);³ and

Applicants’ Admitted Prior Art (Ex. 1001, 1:22–2:34, “AAPA”).

F. The Instituted Grounds

We instituted *inter partes* review of claims 1–3, 6, 7, 9, and 18 of the ’781 patent on the following grounds (Dec. on Inst. 19), which are all the grounds presented in the Petition (Pet. 7–8):

³ Petitioner also relies on U.S. Patent No. 6,584,071 B1 (Ex. 1012, “Kodialam071”). Although Kodialam071 is not asserted expressly in the enumerated grounds of unpatentability below, Petitioner contends Kodialam071 is incorporated by reference in Kodialam. *See* Pet. 18 (citing Ex. 1004, 12:29–38); Pet. Reply 12–14. Patent Owner disputes the extent to which Kodialam071 is incorporated by reference. PO Resp. 21–26; PO Sur-reply 18–20. Petitioner only cites Kodialam071 with respect to the obviousness ground based on Kodialam and AAPA. *See* Pet. 38–39. Given that we do not reach the Kodialam–AAPA obviousness ground (*see infra* § II.E), we need not resolve this issue.

Claims Challenged	35 U.S.C. §	References
1–3, 6, 7, 9, 18	102(e) ⁴	Kodialam
1–3, 6, 7, 9, 18	103(a)	Kodialam, AAPA

II. ANALYSIS

A. Legal Standards

A claim is anticipated if a single prior art reference either expressly or inherently discloses every limitation of the claim. *Orion IP, LLC v. Hyundai Motor Am.*, 605 F.3d 967, 975 (Fed. Cir. 2010). Although the elements must be arranged or combined in the same way as in the claim, “the reference need not satisfy an *ipsissimis verbis* test,” i.e., identity of terminology is not required. *In re Gleave*, 560 F.3d 1331, 1334 (Fed. Cir. 2009) (citing *In re Bond*, 910 F.2d 831, 832–33 (Fed. Cir. 1990)).

A claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *See KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007).

The question of obviousness is resolved on the basis of underlying factual determinations, including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) where in evidence, so-called secondary

⁴ The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284, 287–88 (2011), amended 35 U.S.C. §§ 102 and 103. Because the ’781 patent was filed before March 16, 2013 (the effective date of the relevant amendments), the pre-AIA versions of §§ 102 and 103 apply.

considerations.⁵ *See Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). We also recognize that prior art references must be “considered together with the knowledge of one of ordinary skill in the pertinent art.” *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994) (citing *In re Samour*, 571 F.2d 559, 562 (CCPA 1978)).

B. Level of Ordinary Skill in the Art

Citing testimony from Dr. Jeffay, Petitioner contends a person of ordinary skill in the art (or “POSITA”) would have possessed “a bachelor’s degree in computer engineering, computer science, or a related field (or its equivalent), plus at least two years of experience managing and configuring computer networks, including experience with networking protocols and network routing.” Pet. 15 (citing Ex. 1003 ¶ 54). Patent Owner does not propose an alternative definition. *See* PO Resp. 4.

We adopt Petitioner’s definition of the level of ordinary skill in the art without the qualifier “at least,” which introduces ambiguity. We are satisfied that this definition comports with the level of skill necessary to understand and implement the teachings of the ’781 patent and the asserted prior art.

C. Claim Interpretation

In an *inter partes* review, we construe each claim using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. [§] 282(b), including construing the claim in accordance with

⁵ The trial record does not include any evidence of secondary considerations of nonobviousness.

the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.

37 C.F.R. § 42.100(b) (2020). Accordingly, our claim construction standard is the same as that of a district court. *See id.* Under the standard applied by district courts, claim terms are generally given their plain and ordinary meaning as would have been understood by a person of ordinary skill in the art at the time of the invention and in the context of the entire patent disclosure. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) (en banc). “There are only two exceptions to this general rule: 1) when a patentee sets out a definition and acts as his own lexicographer, or 2) when the patentee disavows the full scope of a claim term either in the specification or during prosecution.” *Thorner v. Sony Comput. Entm’t Am. LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012).

Petitioner notes that the parties have put forth certain terms for construction in the underlying litigation, but Petitioner contends that no terms require construction in this case. Pet. 15–16. Patent Owner also does not put forth any terms for construction. PO Resp. 5–6. We determine that no terms require explicit construction. *See, e.g., Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019) (“The Board is required to construe ‘only those terms . . . that are in controversy, and only to the extent necessary to resolve the controversy.’” (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

D. Anticipation Ground Based on Kodialam

Petitioner contends claims 1–3, 6, 7, 9, and 18 are anticipated by Kodialam. Pet. 21–37; Pet. Reply 2–10. Patent Owner disputes Petitioner’s contentions. PO Resp. 6–17; PO Sur-reply 1–16.

1. Kodialam

Kodialam is a U.S. patent directed to determining paths through nodes of a telecommunications network for multicast routing of packets having guaranteed service levels. Ex. 1004, 1:14–17. Figure 3 of Kodialam is reproduced below.

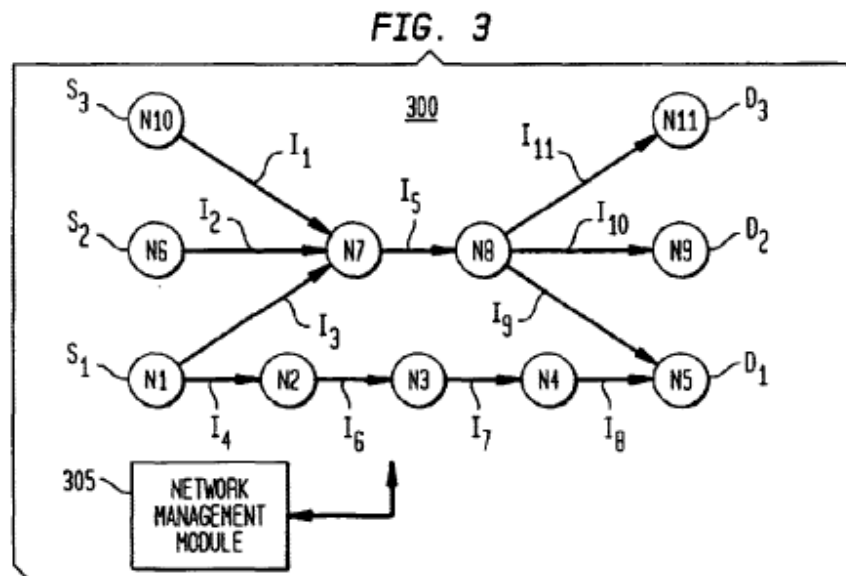


Figure 3 depicts network 300 of nodes N1–N11 that are interconnected via links I1–I11. *Id.* at 4:52–56. Network management module 305 may “generate provisioning, multicast routing trees, forwarding tables, and other connection set-up information that may be downloaded into corresponding routers of nodes N1–N11.” *Id.* at 5:8–12. Network 300 may employ the Multi-Protocol Label Switched (MPLS) standard for multicast packet routing applications using label switched paths (LSPs) with provisioned

service levels (also known as guaranteed quality-of-service (QoS)). *Id.* at 2:10–15, 4:58–67, 5:62–65.

Kodialam describes solving a maximum unicast flow problem by computing a directed tree (path) for which routing of the corresponding flows affects critical links as little as possible. *Id.* at 11:9–12. Kodialam further describes solving a Steiner tree/maximum multicast flow problem by iteratively computing critical links and determining the resulting tree for the iteration. *Id.* at 7:52–55, 10:49–52. In this case, the method “selects the multicast routing tree that provides the ‘maximum’ flow while taking into account these critical links.” *Id.* at 10:52–55.

Petitioner contends Kodialam qualifies as prior art under 35 U.S.C. § 102(e) based on its filing date. Pet. 16–17. Patent Owner does not dispute the prior art status of Kodialam. We have no evidence of an invention date other than the earliest possible effective filing date of the challenged claims. We determine that Kodialam qualifies as prior art under 35 U.S.C. § 102(e) because Kodialam’s filing date of September 29, 2000, is before the earliest effective filing date of the challenged claims, which is November 21, 2003. Ex. 1001, code (22); Ex. 1004, code (22).

2. *Claim 1*

The preamble of claim 1 recites “[a] centralized node for coupling into a computer network along which network traffic flows between a plurality of nodes in a form of packets.” Ex. 1001, 10:5–7. Petitioner cites Kodialam’s network management module 305 in network 300 as disclosing the centralized node in a computer network. Pet. 21–22 (citing Ex. 1004, 5:5–12, Fig. 3). Petitioner contends that Kodialam’s network management

module 305 “constructs multicast routing trees that are distributed to each node N1-N11” in network 300 to allow for the flow of packets between nodes N1–N11. *Id.*

Neither party addresses whether the preamble is limiting. Because Petitioner has shown that Kodialam discloses the preamble (*see, e.g.*, Ex. 1004, 5:5–12, 10:5–7, Fig. 3), we need not determine whether the preamble is limiting. *See Realtime Data*, 912 F.3d at 1375.

Claim 1 recites that the centralized node is programmed to perform various steps. Ex. 1001, 10:5–8. The first of those steps is “identifying requirements of unicast packet traffic along the network, wherein the unicast packet traffic identifies a first traffic configuration along the network.” *Id.* at 10:9–11. For the “first traffic configuration,” Petitioner cites various disclosures in Kodialam related to routing unicast packets. Pet. 23–25. In particular, Petitioner notes Kodialam’s disclosure of taking into account “critical links for unicast flows” as part of generating a multicast routing tree. *Id.* at 23–24 (quoting Ex. 1003 ¶¶ 67–68; Ex. 1004, 10:49–62, claim 7). Petitioner contends the critical unicast links are the recited “requirements” that are identified in this step. *Id.* Petitioner also cites Kodialam’s disclosures on how to route unicast traffic by computing a directed tree path for which routing of the corresponding flows affects critical links as little as possible. *Id.* at 24–25 (citing Ex. 1004, 11:9–26).

Patent Owner contends that Petitioner fails to cite any express teaching of the “identifying” step in Kodialam, and, instead, “the Petition relies solely on Dr. Jeffay’s testimony in an attempt to fill the evidentiary gap.” PO Resp. 14–15 (citing Pet. 23–24; Ex. 1003 ¶ 67); PO Sur-reply 13. Patent Owner further contends that Dr. Jeffay’s supporting testimony “is

untethered to any supporting evidence.” PO Resp. 15; *see also* PO Sur-reply 14–16 (similar arguments). Patent Owner further disputes Petitioner’s analysis to the extent that Dr. Jeffay references critical links that are used for the generation of a multicast routing tree, not a unicast transmission. PO Resp. 16–17 (citing Ex. 1004, Abstr.).

Contrary to Patent Owner’s arguments, however, Petitioner cites directly to Kodialam in conjunction with Dr. Jeffay’s testimony. In particular, Petitioner cites Kodialam’s disclosure of solving “the maximum multicast flow problem” by first computing “critical links.” Pet. 23–24 (quoting Ex. 1004, 10:49–57). Petitioner also cites Kodialam’s claim 7 (*id.* at 24), which discloses “generat[ing] the set of critical links for sets of unicast pairs, each unicast pair defined between the source and one of the plurality of receivers.” Ex. 1004, 16:62–65. These disclosures both support Dr. Jeffay’s testimony and independently establish that Kodialam describes identifying unicast traffic requirements, because Kodialam’s system identifies and prioritizes critical unicast links. *See* Ex. 1004, 10:49–57, 11:9–26, 16:62–65. For similar reasons, these disclosures also describe the identification of the “first traffic configuration” of unicast packet traffic. *See id.* Thus, we are persuaded that Kodialam discloses the “identifying” step of claim 1.

Claim 1 further recites the step of “constructing a second traffic configuration along the network, differing from the first traffic configuration, wherein the second traffic configuration is for routing multicast packet traffic along the network.” Ex. 1001, 10:12–15. Petitioner maps the recited “second traffic configuration” to Kodialam’s disclosure of generating a multicast routing tree. Pet. 25 (citing Ex. 1004, 5:5–12).

Petitioner notes that Kodialam provides several detailed examples of how the network management module constructs multicast routing trees that differ from unicast routing trees (with their critical links). *Id.* at 25–26 (citing Ex. 1004, 8:57–63, 10:49–55, claim 6).

Patent Owner does not dispute Petitioner’s analysis of the “constructing” step. We are persuaded that Kodialam discloses generating a multicast routing tree (i.e., the “second unicast traffic configuration”) that takes into account and is different from the prioritized unicast traffic configuration. *See, e.g.*, Ex. 1004, 5:5–12, 8:57–63, 10:49–55.

Claim 1 further recites the step of “communicating routing information representing at least a portion of the second traffic configuration to each node in the plurality of nodes.” Ex. 1001, 10:16–18. According to Petitioner, “Kodialam describes that forwarding tables of a multicast routing tree (*i.e.*, a portion of the second traffic configuration) are used by each node’s router to forward packets and that the nodes download that information from the network management module.” Pet. 27 (citing Ex. 1004, 1:42–52, 5:1–4). In particular, Petitioner cites Kodialam’s disclosure of the network management module generating “multicast routing trees, forwarding tables, and other connection set-up information” for downloading by the nodes in the network. *Id.* at 27–28 (quoting Ex. 1004, 5:8–12) (emphasis omitted) (citing *id.* at 14:46–52).

Patent Owner disputes Petitioner’s analysis for the “communicating” step insofar as it relies in part on information that appears in the “Description of Related Art” section of Kodialam, which Patent Owner calls the “Kodialam Related Art.” PO Resp. 7–8 (citing Ex. 1004, 1:19–3:48). In particular, Patent Owner notes Petitioner’s reliance on Kodialam’s

description of centralized network management system 105, which “coordinate[s] calculation and installation of provisioned paths as router forwarding tables” that “are used by each node’s router to forward each received packet to the next node in the path and toward its destination,” among other things. *Id.* at 11 (quoting Ex. 1004, 1:42–52; Pet. 27). Patent Owner purports to distinguish this Kodialam Related Art from Petitioner’s other citations in Kodialam’s “Summary of Invention” and “Detailed Description” sections, which Patent Owner calls the “Kodialam Embodiments.” *See id.* at 8–9. Patent Owner argues that Petitioner’s anticipation analysis is deficient because it relies on “multiple, distinct portions of the Kodialam Prior Art *and* the Kodialam Embodiments.” *Id.* at 10–11; *see also* PO Sur-reply 1–3 (similar argument). Patent Owner cites *Microsoft Corp. v. Biscotti, Inc.*, 878 F.3d 1052, 1069 (Fed. Cir. 2017), for the proposition that “anticipation is not proven by multiple, distinct teachings that the artisan might somehow combine to achieve the claimed invention.” PO Resp. 12–13. Patent Owner further argues that Kodialam does not state that the Kodialam Related Art may be combined with the Kodialam Embodiments. PO Resp. 9; PO Sur-reply 1.

We do not agree with Patent Owner’s arguments because we need not even consider Petitioner’s citation to the Kodialam Related Art in order to reach a conclusion on anticipation. Petitioner correctly notes that its analysis for the “communicating” step also “cites Kodialam at 5:1-4, 5:8-12, and 14:46-52 – which are indisputably in the ‘Kodialam Embodiments’ portion” of Kodialam. Pet. Reply 2–4. We find that Petitioner’s citations to the Kodialam Embodiments persuasively show that Kodialam describes the “communicating” step—even if we were to ignore Petitioner’s cited

disclosures in the Kodialam Related Art. In particular, Petitioner quotes Kodialam's disclosure that network management module 305 "may be employed to generate provisioning, ***multicast routing trees, forwarding tables, and other connection set-up information that may be downloaded into corresponding routers of nodes N1-N11.***" Pet. 27–28 (quoting Ex. 1004, 5:8–12) (emphasis by Petitioner). Petitioner further quotes Kodialam's disclosure that "[e]ach of the nodes N1-N11 includes one or more corresponding routers that forward packets based on a forwarding table of a multicast routing tree." *Id.* at 27 (quoting Ex. 1004, 5:1–4). Based on these disclosures, we are persuaded that Kodialam's forwarding tables of a multicast routing tree represent "a portion of the second traffic configuration," and the forwarding tables are generated and downloaded (i.e., communicated) to each of a plurality of nodes. We additionally note that, despite having been given an opportunity at oral argument to state how these cited disclosures from the Kodialam Embodiments might be deficient, Patent Owner did not note any deficiencies. *See* Tr. 20:21–22:21. Nor does Patent Owner argue in its papers that Petitioner's cited disclosures from the Kodialam Embodiments are deficient. Thus, based on Petitioner's citations to the Kodialam Embodiments alone, we are persuaded that Kodialam discloses the "communicating" step. As such, Patent Owner's arguments based on the holding of *Biscotti* are inapposite.⁶

Claim 1 further recites that "each node in the plurality of nodes routes multicast packet traffic in response to the at least a portion of the second

⁶ For similar reasons, we need not consider Petitioner's arguments related to *Biscotti* that a person of ordinary skill in the art "would at once envisage" the claimed invention. *See* Pet. Reply 5–6.

traffic configuration.” Ex. 1001, 10:18–21. Petitioner cites Kodialam’s disclosure of routers in the nodes “forward[ing] packets based on a forwarding table of a multicast routing tree constructed in accordance with the multicast routing method.” Pet. 28 (quoting Ex. 1004, 5:1–4) (citing *id.* at 14:46–50). Patent Owner does not dispute Petitioner’s analysis for this limitation. We are persuaded that Kodialam discloses nodes that route multicast packet traffic in accordance with multicast routing tree information. *See, e.g.*, Ex. 1004, 5:1–4, 14:46–50.

For these reasons, we are persuaded that Kodialam describes each limitation of claim 1, combined in the same way as in claim 1. On the entire trial record, we determine that Petitioner has shown, by a preponderance of the evidence, that claim 1 is anticipated by Kodialam.

3. *Claim 2*

Claim 2 depends from claim 1 and further recites that “each node in the plurality of nodes comprises a Provider Edge node.” Ex. 1001, 10, 23–45. Petitioner cites, *inter alia*, Kodialam’s illustration in Figure 3 of Provider Edge Nodes N1, N6, and N10 and N5, N9, and N11. Pet. 30–31 (citing Ex. 1004, 5:45–51, Fig. 3); *see also id.* at 29 (citing Ex. 1003 ¶ 76) (contending that “a ‘Provider Edge node’ is a router at the boundary between two networks in an MPLS network”). Patent Owner does not contest Petitioner’s analysis of this limitation. We are persuaded that nodes N1, N6, and N10 and N5, N9, and N11 in Kodialam’s Figure 3 are Provider Edge Nodes. *See, e.g.*, Ex. 1003 ¶¶ 60–62, 76; Ex. 1004, 5:45–51, Fig. 3.

Claim 2 further recites that “for unicast communications each Provider Edge node in the plurality of nodes is coupled to communicate

directly with each other Provider Edge node in the plurality of nodes.”
Ex. 1001, 10:25–28. Petitioner cites Kodialam’s teaching that “[a] unicast LSP may be established between any one of the ingress PE nodes and any one of the egress PE nodes to allow for direct communication between those nodes.” Pet. 31 (citing Ex. 1003 ¶ 78; Ex. 1004, 10:58–62). Petitioner provides an example keyed to Kodialam’s Figure 3 in which an LSP is established between ingress node N10 and egress node N11. *Id.* Patent Owner does not contest Petitioner’s analysis of this limitation. We are persuaded that Kodialam discloses direct unicast communication via an LSP between ingress node N10 and egress node N11. *See, e.g.*, Ex. 1003 ¶ 78; Ex. 1004, 10:58–62.

Otherwise, Patent Owner relies on the same arguments discussed above with respect to claim 1. PO Resp. 26. We do not agree with Patent Owner’s arguments for the same reasons mentioned above. *See supra* § II.D.2.

Petitioner has persuasively shown that Kodialam discloses the additional limitations of claim 2. On the entire trial record, we determine that Petitioner has shown, by a preponderance of the evidence, that claim 2 is anticipated by Kodialam.

4. *Claim 3*

Claim 3 depends from claim 1 and further recites that “the step of constructing a second traffic configuration comprises constructing a Steiner tree along the network.” Ex. 1001, 10:29–32. According to Petitioner, “Kodialam discloses that a ‘Steiner tree’ is used to generate a ‘multicast routing tree that defines the paths for routing flows of the M-LSP request,’

i.e., the second traffic configuration.” Pet. 32 (quoting Ex. 1004, 7:57–59) (citing Ex. 1004, 7:52–8:32, 13:5–8). Patent Owner does not contest Petitioner’s analysis of this limitation. We are persuaded that Kodialam discloses the use of a Steiner tree to construct the recited “second traffic configuration.” *See, e.g.*, Ex. 1004, 7:52–8:32, 13:5–8.

Claim 3 further recites that “the at least a portion of the second traffic configuration communicated to each node corresponds to the connectivity of the respective node along the Steiner tree.” Ex. 1001, 10:33–36. Petitioner cites Kodialam’s disclosure that, “[u]sing weights for each link generated with either of the two methods, a weighted, directed multicast (Steiner) tree is computed for the network based on the routing of the M-LSP demand from the source s to all the receivers in R_s .” Pet. 32 (quoting Ex. 1004, 13:5–8). According to Petitioner, the multicast Steiner tree corresponds to the connectivity of nodes along the Steiner tree. *Id.* Patent Owner does not contest Petitioner’s analysis of this limitation. We are persuaded that Kodialam’s weights for each link in the disclosed multicast Steiner tree correspond to the connectivity of each respective node. *See, e.g.*, Ex. 1004, 13:5–8.

Otherwise, Patent Owner relies on the same arguments discussed above with respect to claim 1. PO Resp. 26. We do not agree with Patent Owner’s arguments for the same reasons mentioned above. *See supra* § II.D.2.

Petitioner has persuasively shown that Kodialam discloses the additional limitations of claim 3. On the entire trial record, we determine that Petitioner has shown, by a preponderance of the evidence, that claim 3 is anticipated by Kodialam.

5. *Claim 6*

Claim 6 depends from claim 1 and further recites that “the step of constructing a second traffic configuration comprises constructing a Steiner tree along the network.” Ex. 1001, 10:48–50. Petitioner cites the same disclosures from its analysis of claim 3 regarding Kodialam’s use of multicast Steiner trees with weights for each link in the network. Pet. 33 (citing Ex. 1004, 7:52–8:32, 13:5–8). Patent Owner does not dispute Petitioner’s analysis for this claim, and Patent Owner relies on the same arguments discussed above with respect to claim 1. PO Resp. 26. We do not agree with Patent Owner’s arguments for the same reasons mentioned above. *See supra* § II.D.2.

For similar reasons to those discussed above for claim 3, we are persuaded that Kodialam discloses using a Steiner tree to construct a second traffic configuration along the network. *See, e.g.*, Ex. 1004, 7:52–8:32, 13:5–8. On the entire trial record, we determine that Petitioner has shown, by a preponderance of the evidence, that claim 6 is anticipated by Kodialam.

6. *Claim 7*

Claim 7 depends from claim 1 and further recites that “the centralized node is one node in the plurality of nodes.” Ex. 1001, 10:51–52. Petitioner contends that “the functions of [Kodialam’s] ‘network management module’ or centralized node ‘may be implemented by various processors distributed throughout the network, *either in the nodes*, in separate processing entities, or both.’” Pet. 33 (quoting Ex. 1004, 5:11–44) (emphasis by Petitioner). Patent Owner does not dispute Petitioner’s analysis for this claim, and Patent Owner relies on the same arguments discussed above with respect to

claim 1. PO Resp. 26. We do not agree with Patent Owner's arguments for the same reasons mentioned above. *See supra* § II.D.2.

We are persuaded that Kodialam discloses the functions of network management monitor 305 can be implemented in a node. *See, e.g.*, Ex. 1004, 5:11–44. On the entire trial record, we determine that Petitioner has shown, by a preponderance of the evidence, that claim 7 is anticipated by Kodialam.

7. *Claim 9*

Claim 9 depends from claim 1 and further recites that “the plurality of nodes comprises more than one group of nodes.” Ex. 1001, 10:57–59. Petitioner contends that, in Kodialam's system, “multiple M-LSP routing requests may be received” with different sources and recipients, and “Kodialam describes that an M-LSP request determines what subset of routers in the network are used for that particular request.” Pet. 34 (citing Ex. 1004, 6:14–26, 6:40–45). Patent Owner does not contest Petitioner's analysis of this limitation. We are persuaded that Kodialam discloses using different subsets of routers (i.e., the recited “group of nodes”) based on a particular request. *See, e.g.*, Ex. 1004, 6:14–26, 6:40–45.

Claim 9 further recites that “the step of constructing a second traffic configuration along the network comprises constructing the second traffic configuration for a first group of nodes in the more than one group of nodes.” Ex. 1001, 10:60–63. Petitioner cites the same analysis discussed above for “the step of constructing a second traffic configuration” in claim 1. Pet. 35. Patent Owner does not contest Petitioner's analysis of this limitation. For the same reasons discussed above with respect to claim 1, we

are persuaded that Kodialam discloses constructing the second traffic configuration for a group of nodes. *See, e.g.*, Ex. 1004, 5:5–12, 8:57–63, 10:49–55.

Claim 9 further recites that “the centralized node is further programmed to perform a step of constructing a different respective second traffic configuration along the network for each group in the more than one group of nodes.” Ex. 1001, 10:64–67. Petitioner again cites Kodialam’s disclosure of receiving multiple M-LSP routing requests with different sources and recipients. Pet. 35 (citing Ex. 1004, 6:14–26). Petitioner contends that “Kodialam describes how a multicast tree (i.e., ‘second traffic configuration’) is constructed for the group of nodes associated with the source/recipients identified in the request.” *Id.* (citing Ex. 1004, 8:57–63, 10:49–55). Petitioner further cites Kodialam’s disclosure of a centralized node, network management system 620, constructing multicast routing trees that are used in a multicast routing method. *Id.* at 35–36 (citing Ex. 1004, 5:1–4, 15:1–4). Patent Owner does not contest Petitioner’s analysis of this limitation. We are persuaded that Kodialam’s network management system 620 constructs multicast trees for different groups of nodes associated with the sources and recipients identified in M-LSP routing requests. *See, e.g.*, Ex. 1004, 5:1–4, 6:14–26, 8:57–63, 10:49–55, 15:1–4.

Otherwise, Patent Owner relies on the same arguments discussed above with respect to claim 1. PO Resp. 26. We do not agree with Patent Owner’s arguments for the same reasons mentioned above. *See supra* § II.D.2.

Petitioner has persuasively shown that Kodialam discloses the additional limitations of claim 9. On the entire trial record, we determine

that Petitioner has shown, by a preponderance of the evidence, that claim 9 is anticipated by Kodialam.

8. *Claim 18*

Independent claim 18 is a method claim that is similar in scope to claim 1. Ex. 1001, 12:14–29. Petitioner relies on the same analysis from claim 1. Pet. 36–37. Patent Owner relies on the same arguments discussed above with respect to claim 1. PO Resp. 26. We do not agree with Patent Owner’s arguments for the same reasons mentioned above. *See supra* § II.D.2.

For the same reasons discussed above with respect to claim 1, we determine that Petitioner has shown, by a preponderance of the evidence, that claim 18 is anticipated by Kodialam.

E. *Obviousness Ground Based on Kodialam and AAPA*

Petitioner contends the subject matter of claims 1–3, 6, 7, 9, and 18 would have been obvious over the combination of Kodialam and AAPA. Pet. 37–46. Because the Kodialam anticipation ground is dispositive as to all challenged claims, we do not reach Petitioner’s obviousness ground based on Kodialam and AAPA. *See SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348, 1359 (2018) (holding a petitioner “is entitled to a final written decision addressing all of the claims it has challenged”).

III. CONCLUSION⁷

Petitioner has shown, by a preponderance of the evidence, that claims 1–3, 6, 7, 9, and 18 of the '781 patent are anticipated by Kodialam.

IV. ORDER

Accordingly, it is

ORDERED that claims 1–3, 6, 7, 9, and 18 of the '781 patent are unpatentable; and

FURTHER ORDERED that, because this is a Final Written Decision, parties to this proceeding seeking judicial review of our decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

⁷ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. See 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. See 37 C.F.R. § 42.8(a)(3), (b)(2).

In summary:

Claims	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatentable	Claims Not shown Unpatentable
1–3, 6, 7, 9, 18	102(e)	Kodialam	1–3, 6, 7, 9, 18	
1–3, 6, 7, 9, 18	103(a)	Kodialam, AAPA ⁸		
Overall Outcome			1–3, 6, 7, 9, 18	

⁸ We do not reach this ground. *See supra* § II.E.

IPR2021-00959
Patent 7,382,781 B1

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