

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CISCO SYSTEMS, INC.,
Petitioner,

v.

ORCKIT CORPORATION,
Patent Owner.

IPR2023-00402
Patent 8,830,821 B2

Before KRISTEN L. DROESCH, NATHAN A. ENGELS, and
BRENT M. DOUGAL, *Administrative Patent Judges*.

DROESCH, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314, 37 C.F.R. § 42.4

I. INTRODUCTION

A. Background

Cisco Systems, Inc. (“Petitioner”) filed a Petition requesting *inter partes* review (“IPR”) of claims 1–20 of U.S. Patent No. 8,830,821 B2 (Ex. 1001, “the ’821 Patent”). Paper 2 (“Pet.”). Petitioner filed a Declaration of Henry Houh, Ph.D., with its Petition. Ex. 1003. Orckit Corporation (“Patent Owner”) timely filed a Preliminary Response. Paper 7 (“Prelim. Resp.”). With our authorization, Petitioner filed a Preliminary Reply (Paper 9, “Prelim. Reply”) and Patent Owner filed a Preliminary Sur-reply (Paper 10, “Prelim. Sur-reply”).

We have authority to determine whether to institute review under 35 U.S.C. § 314 and 37 C.F.R. § 42.4(a). An *inter partes* review may not be instituted unless it is determined that “the information presented in the petition filed under section 311 and any response filed under section 313 shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a).

For the reasons provided below, we determine, based on the record before us, there is a reasonable likelihood Petitioner would prevail in showing at least one of the challenged claims is unpatentable.

B. Related Matter

The parties identify *Orckit Corporation v. Cisco Systems, Inc.*, 2:22-cv-276 (E.D. Tex.) (“parallel district court proceeding”) as currently pending litigation. Pet. 89; Paper 3, 2.

C. The '821 Patent (Ex. 1001)

The '821 Patent “relates to telecommunications and more particularly, is related to high availability of telecommunication entities.” Ex. 1001, 1:16–19. “[W]hen a failure is detected in a network device or connection, network traffic is switched to a standby network device or connection.” *Id.* at 1:27–29. A multiprotocol label switching-transport profile (MPLS-TP) accomplishes a node or span failure recovery by defining a second transport entity by defining a protection entity between the same endpoints as the working transport entity. *See id.* at 1:38–49. “[These] working and protection entities do not share the span or nodes against whose failure protection is required” (*id.* at 1:50–51), but “may not protect against one or several failures affecting both [entities]” (*id.* at 1:64–66). Thus, “there is a need for a protection mechanism to provide . . . recovery in the event of a failure in any of the transport entities.” *Id.* at 2:1–3.

The '821 Patent discloses

“an entity selection method by an MPLS network device . . . [that] provid[es] a plurality of MPLS transport entities between a first endpoint and a second endpoint, determin[es] an overall cost for each pair of entities of the plurality of entities, select[s] a pair of entities from the plurality of transport entities based at least in part upon the entity pair cost, and[,] if an entity pair reselection event occurs, reselect[s] the entity pair.”

Id. at 2:9–18. “The method . . . may further include . . . selecting a working entity from the plurality of transport entities, selecting a protection entity from the plurality of transport entities, and selecting an active entity from the set consisting of the working entity and the protection entity.” *Id.* at 2:22–26.

Figure 1 of the '821 Patent is reproduced below.

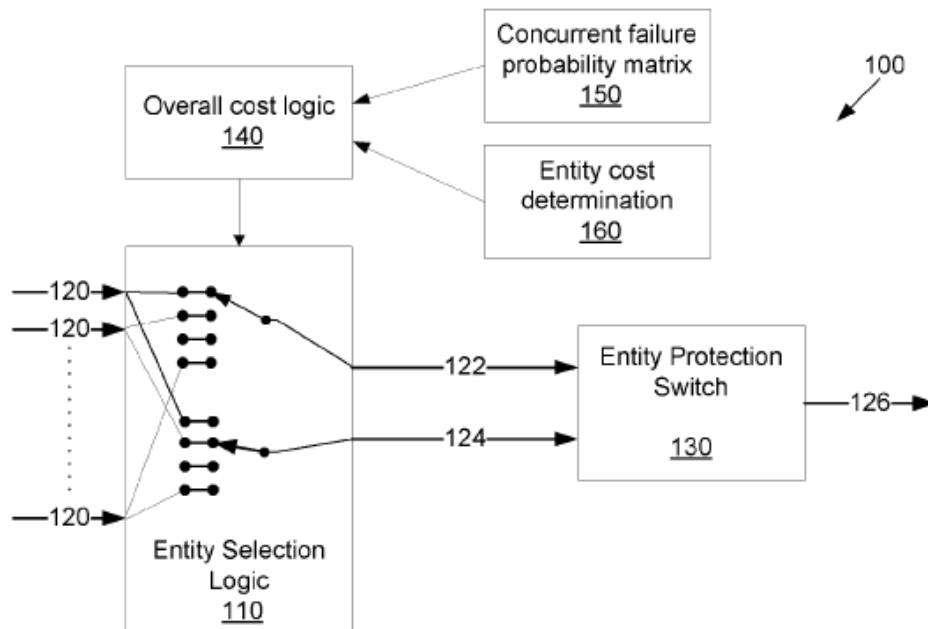


Figure 1 depicts “a block diagram of a first exemplary embodiment of an entity protection system.” Ex. 1001, 2:59–60. “An entity protection switch 130 switches between a working entity 122 and a protection entity 124[, which are] from a set of entities 120 . . . represented within an entity selection logic block 110.” *Id.* at 3:33–36. “Each entity 120 represents a network route between a first endpoint and a second endpoint.” *Id.* at 3:36–37. “An overall cost logic block 140 uses results from a concurrent failure probability matrix 150 and an entity cost determination block 160 to select the working entity 122 and the protection entity 124 from the set of entities 120.” *Id.* at 3:40–44. “[A] pair having multiple spans and/or nodes in common may be more likely to simultaneously fail than a pair having no spans or nodes in common.” *Id.* at 3:47–50.

“Each possible entity pairing is examined for cost.” *Id.* at 4:13. “The overall cost may be determined based on the probability of simultaneous failure of the working and protection entities (SFP), . . . the entity cost, or a

combination of SFP and entity cost.” *Id.* at 4:16–19. “[E]ach entity of the selected entity pair may be selected as a working entity, a protection entity, or an active entity.” *Id.* at 4:30–32. “[E]ntity pair reselection may be triggered when the operational status changes for an entity . . . , when an entity is added . . . , when an entity is removed . . . , or due to combined cost changes in one or more entities.” *Id.* at 4:35–40.

“[An] entity pair may be selected based upon each entity of the pair having the lowest possible probability of individual failure.” Ex. 1001, 5:42–43. “Alternatively, the entity pair may be selected to minimize the probability of a span or node failure simultaneously affecting the working and protection entities, as shown by block 440.” *Id.* at 5:44–46. “An example [approach] would be to minimize SFP . . . by selecting working and protection entity pairs with the lowest SFP, and, if there are multiple pairs with the same SFP within an error margin, . . . choosing the pair that minimizes entity . . . cost [under an interior gateway protocol metric.]” *Id.* at 5:59–66.

D. Illustrative Claim

Claims 1, 14, and 17 are independent, and claims 2–13, 15, 16, and 18–20 depend directly or indirectly therefrom, respectively. *See* Ex. 1001, 7:48–10:20. Claim 1 is reproduced below:

1. An entity selection method performed by a network device, comprising the steps of:
providing a plurality of multi protocol label switching (MPLS) transport entities between a first endpoint and a second endpoint;
determining an overall cost for each entity pair of said plurality of entities;
selecting an entity pair from said plurality of transport entities based at least in part upon said overall cost; and

if an entity pair reselection event occurs, reselecting said entity pair from the group consisting of said entity pair and a replacement entity pair comprising at least one entity distinct from the entities of said entity pair,
wherein said entity pair reselection event is selected from a group consisting of adding an entity to said plurality of transport entities, removing an entity from said plurality of transport entities, an operational status change for one of said plurality of transport entities, and a change in overall cost for one of said plurality of transport entities.

Ex. 1001, 7:48–67.

E. Asserted Patentability Challenges and Asserted Prior Art

Petitioner asserts that claims 1–20 are unpatentable on the following grounds (Pet. 14):

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1–7, 9–11, 13, 17–20	103(a) ¹	Doshi, ² Guichard ³
8, 12	103(a)	Doshi, Guichard, Huang ⁴
14–16	103(a)	Doshi, Guichard, Xu ⁵

II. PATENT OWNER’S ARGUMENTS FOR DISCRETIONARY DENIAL

Patent Owner contends the Board should exercise its discretion to deny institution under 35 U.S.C. § 314, citing the discretionary-denial factors articulated in *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11

¹ The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011), amended 35 U.S.C. § 103 effective March 16, 2013. Because the ’821 Patent claims an effective filing date prior to March 16, 2013, we refer to the pre-AIA version of § 103.

² US 2004/0205239 A1, published Oct. 14, 2004 (Ex. 1005).

³ Guichard et al., *Definitive MPLS Network Designs*, Cisco Press, Indianapolis, IN, 2005 (ISBN: 1-58705-186-9) (Ex. 1006).

⁴ US 2003/0117950 A1, published June 26, 2003 (Ex. 1007).

⁵ US 2011/0141877 A1, published June 16, 2011 (Ex. 1025).

(PTAB Mar. 20, 2020) (precedential) (“*Fintiv*”). *See* Prelim. Resp. 31–45. More specifically, Patent Owner contends that consideration of the *Fintiv* factors weigh in favor of discretionary denial. *See id.* at 34–45; Prelim. Sur-reply 1. Petitioner disagrees. Pet. 85–88; Prelim. Reply 1.

Under § 314(a), the Director has discretion to deny institution of an *inter partes* review, and that discretion has been delegated to the Board. *See* 37 C.F.R. § 42.4(a) (“The Board institutes the trial on behalf of the Director.”); *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2140 (2016) (“[T]he agency’s decision to deny a petition is a matter committed to the Patent Office’s discretion.”); *SAS Inst. v. Iancu*, 138 S. Ct. 1348, 1356 (2018) (“[Section] 314(a) invests the Director with discretion on the question whether to institute review” (emphasis omitted)); *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1367 (Fed. Cir. 2016) (“[T]he PTO is permitted, but never compelled, to institute an IPR proceeding.”).

In *NHK Spring Co. v. Intrix-Plex Technologies, Inc.*, the Board denied institution relying in part on § 314(a) because the parallel district court proceeding was scheduled to finish before the Board reached a final decision. IPR2018-00752, Paper 8 (PTAB Sept. 12, 2018) (precedential). Following *NHK*, the Board articulated the following factors for consideration when determining whether to exercise discretion to deny institution in view of a parallel proceeding:

1. whether the court granted a stay or evidence exists that one may be granted if a proceeding is instituted;
2. proximity of the court’s trial date to the Board’s projected statutory deadline for a final written decision;
3. investment in the parallel proceeding by the court and the parties;

4. overlap between issues raised in the petition and in the parallel proceeding;
5. whether the petitioner and the defendant in the parallel proceeding are the same party; and
6. other circumstances that impact the Board's exercise of discretion, including the merits.

Fintiv at 5–6. “These factors relate to whether efficiency, fairness, and the merits support the exercise of authority to deny institution in view of an earlier trial date in the parallel proceeding.” *Id.* at 6. In evaluating these factors, we take “a holistic view of whether efficiency and integrity of the system are best served by denying or instituting review.” *Id.* (citing Patent Trial and Appeal Board Consolidated Trial Practice Guide November 2019, 58).

Subsequently, the Director issued additional guidance on the application of *Fintiv*. See Katherine K. Vidal, *Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation* (June 21, 2022)⁶ (“*Fintiv* Memo”). The application of this guidance is further guided by the precedential decisions of the Director in *OpenSky Indus., LLC v. VLSI Tech. LLC*, IPR2021-01064, Paper 102, 49–50 (PTAB Oct. 4, 2022) (precedential) and *CommScope Techs. LLC v. Dali Wireless, Inc.*, IPR2022-01242, Paper 23 (Feb. 27, 2023) (precedential) (“*CommScope*”). Accordingly, we are instructed to consider compelling whether the merits determined under the sixth *Fintiv* factor are compelling, but only after a determination that the first five *Fintiv* factors favor discretionary denial. *CommScope*, 4–5. “Compelling, meritorious

⁶ Available at https://www.uspto.gov/sites/default/files/documents/interim_proc_discretionary_denials_aia_parallel_district_court_litigation_memo_20220621_.pdf

challenges are those in which the evidence, if unrebutted in trial, would plainly lead to a conclusion that one or more claims are unpatentable by a preponderance of the evidence.” *Fintiv* Memo 4.

For the reasons that follow, although we find that the considerations of the first five *Fintiv* factors weigh in favor of denying institution in this case, we determine that the Petition presents compelling merits as to the challenged claims, and thus, we decline to exercise our discretion to deny the Petition.

1. Factor 1: Whether the Court Granted a Stay

Patent Owner contends that Petitioner’s motion to stay filed in the parallel district court proceeding was promptly denied, which strongly favors discretionary denial. *See* Prelim. Resp. 34–35 (quoting Ex. 2004, 1; citing Ex. 2005, 2). According to *Fintiv*, the existence of a district court stay pending Board resolution of an *inter partes* review has weighed strongly against discretionary denial, although a denial of such a request sometimes weighs in favor of discretionary denial. *Fintiv* at 6–8. Due to the denial of Petitioner’s motion to stay in the parallel district court proceeding, we determine that the considerations of the first *Fintiv* factor weigh in favor of discretionary denial.

2. Factor 2: Proximity of Trial Date

Patent Owner asserts that the second *Fintiv* factor weighs heavily in favor of discretionary denial because trial in the parallel district court proceeding is scheduled to begin March 4, 2024 and a final written decision is expected no later than September 14, 2024. *See* Prelim. Resp. 35 (citing Ex. 2001, 1; Paper 5, 1). Patent Owner further indicates that the most recent trial court statistics indicate a time-to-trial in the Eastern District of Texas

of 19 months, and using these statistics, the projected trial date would be around February 2024, which is roughly seven months before an expected final written decision. *See id.* at 37.

Petitioner disagrees with Patent Owner’s assertion that the second *Fintiv* factor weighs heavily in favor of discretionary denial. *See* Prelim. Reply 1. According to Petitioner, the second *Fintiv* factor “is [] not generally given heavy weight in the overall *Fintiv* analysis.” *Id.* (quoting *Microsoft Corp. v. WSOU Investments, LLC*, IPR2021-00930, Paper 8 at 6 (PTAB Dec. 2, 2021); citing *PEAG LLC v. Varta Microbattery GmbH*, IPR2020-01214, Paper 8 at 19–20 (PTAB Jan. 6, 2021)).

In response, Patent Owner contends that Petitioner understates the weight given to the second *Fintiv* factor, and asserts that although it is not dispositive alone, it is given substantial weight in the analysis. *See* Prelim. Sur-reply 1 (quoting *Fintiv* Memo 8). Patent Owner further argues that Petitioner’s cited cases are distinguishable because both cases are COVID-era opinions that address trial dates from district court scheduling orders, rather than time-to-trial statistics. *See id.* (quoting *WSOU* at 9, *PEAG* at 19–20).

Due to the projected trial date based on time-to-trial statistics and the actual trial date being more than six months before an expected final written decision, we determine that the considerations of the second *Fintiv* factor weigh in favor of discretionary denial.

3. Factor 3: Investment in the Parallel Proceeding

Petitioner contends that the third *Fintiv* factor favors institution because the parallel district court proceeding is in its very early stages and the investment in it has been minimal. *See* Pet. 86–87. Petitioner also

asserts that it only learned which claims were being asserted on November 3, 2022, and promptly filed its Petition thereafter which weighs against discretionary denial. *See* Pet. 87 (quoting *Fintiv* at 11).

Patent Owner asserts that the third *Fintiv* factor favors denial of institution because significant work in the parallel district court proceeding has already taken place, noting that the parties have produced over 2.4 million pages of discovery, and that infringement and invalidity contentions have been served and supplemented several times. *See* Prelim. Resp. 38–39 (citing Exs. 2002, 2003, 2007, 2012, 2013, 2015–2021). Patent Owner contends that by the time of institution, discovery will be nearly complete, and the Markman hearing is scheduled for September 7, 2023. *See id.* at 39–40 (citing Ex. 2001, 3–4). Patent Owner further contends that Petitioner waited almost six months to file its Petition on January 9, 2023, after the litigation was filed on July 22, 2022. *See id.* at 40. According to Patent Owner, “[t]here was nothing preventing Petitioner from filing a Petition challenging all claims much earlier.” *Id.*

After consideration of the substantial investment in the parallel district court proceeding by the parties and district court and Petitioner’s filing of its Petition on January 9, 2023, five months after the parallel district court case was filed on July 22, 2022, we determine that the considerations of the third *Fintiv* factor weigh in favor of discretionary denial.

*4. Factor 4: Overlap Between the Issues Raised in the Petition
and in the Parallel Proceeding*

Patent Owner contends that the fourth *Fintiv* factor weighs in favor of denying institution because each claim at issue in the parallel district court proceeding is at issue in the Petition, and the Doshi, Guichard, and Huang

references are identified in the Petitioner's invalidity contentions. *See* Pet. 41 (citing Ex. 2015, 9, 20, 25). Petitioner filed the following stipulation:

If the Board institutes trial, Petitioner will cease asserting in the co-pending litigation the combination of references on which trial is instituted for the claims on which trial is instituted, to the extent Petitioner even asserts the same combination in the litigation against it.

Paper 6, 2. Patent Owner contends that this stipulation is a *Sand Revolution* – style stipulation, which the Board has routinely found to weigh only marginally in favor of not exercising discretion to deny institution. *See* Prelim. Resp. 41–42.

Although Petitioner's proposed stipulation mitigates to some degree the concerns of duplicative efforts between the parallel district court proceeding and this proceeding, as well as concerns of potentially conflicting decisions, we find that the proposed stipulation does not fully allay such concerns. In other words, the proposed stipulation alleviates to some degree concerns of duplicative efforts and potentially conflicting decisions, but it does not eliminate them. *See Sand Revolution II LLC v. Continental Intermodal Group–Trucking LLC*, IPR2019-01393, Paper 24 at 12 (PTAB June 16, 2020) (informative)). Accordingly, we determine the considerations of the fourth *Fintiv* factor weigh only marginally against discretionary denial.

5. Factor 5: Whether the Petitioner and Defendant are the Same Party

Patent Owner contends that there is no dispute that Petitioner and defendant in the parallel district court proceeding are the same. *See* Prelim. Resp. 45; *see also* Pet. 88 (acknowledging the same). Patent Owner

contends that this factor weighs in favor of discretionary denial. *See* Prelim. Resp. 45. Given that Petitioner is the defendant in the parallel district court proceeding, we determine the considerations of the fifth *Fintiv* factor weigh in favor of discretionary denial.

6. Factor 6: Other Circumstances, Including the Merits

Petitioner asserts “[t]he merits of Petitioner’s arguments are strong, and this factor weighs against discretionary denial.” Pet. 88 (citing *Fintiv* Memo 4). Patent Owner contends that the sixth *Fintiv* factor weighs in favor of denial of institution because “the merits of Petitioner’s arguments are weak.” Prelim. Resp. 45. “In particular, [Patent Owner argues that] Doshi does not teach or suggest ‘selecting an entity pair from said plurality of transport entities based at least in part upon said overall cost’ as required by independent claims 1 and 17.” *Id.* Patent Owner further contends that “the Petition only provides unsupported attorney argument that ‘the merits of Petitioner’s arguments are strong.’” *Id.* at 46 (quoting Pet. 88). According to Patent Owner, “[t]o the extent this argument could be interpreted as a “compelling merits” argument, it is exactly the sort of argument *CommScope* held was insufficient.” *Id.* (quoting *CommScope* at 5).

We determine that the Petition presents compelling merits at least as to unpatentability of claim 1 over Doshi and Guichard. As part of our analysis below in Section III.D.3, we first discuss the merits of the Petition under the standard required for institution and then discuss our conclusion that the merits are compelling. *See infra* § III.D.3.h.

7. Conclusion

Under the Director’s guidance, we cannot “discretionarily deny institution in view of parallel district court litigation where a petition

presents compelling evidence of unpatentability.” *Fintiv* Memo 2. Because that is the case here, as explained below in Section III.D.3.h., we determine that we should not exercise discretion to deny institution in this proceeding under 35 U.S.C. § 314(a).

III. ANALYSIS

A. Claim Construction

In an *inter partes* review proceeding, the Board applies the same claim construction standard as that applied in federal courts in a civil action under 35 U.S.C. § 282(b), which is generally referred to as the *Phillips* standard. *See* 37 C.F.R. § 42.100(b); *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). Under the *Phillips* standard, “words of a claim ‘are generally given their ordinary and customary meaning.’” *Phillips*, 415 F.3d at 1312.

“Petitioner submits that, for the purposes of this proceeding and the grounds presented herein, no claim term requires express construction.” Pet. 13. Nonetheless, Petitioner asserts that the term “entity” recited in each independent claim includes an MPLS label switch path (LSP) or pseudo wires (PW). *Id.* (citing Ex. 1003 ¶¶ 44–45). “For purposes of this preliminary response, Patent Owner does not propose any terms for express construction” and does not dispute the construction for “entity.” Prelim. Resp. 20.

As demonstrated in the analysis below, at this stage of the proceeding, we need not construe any claim terms and phrases to resolve the controversy before us. *See 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))).

B. Level of Ordinary Skill in the Art

Petitioner asserts that a person of ordinary skill in the art (POSITA) “would have had a working knowledge of network communications and multiprotocol label switching (‘MPLS’) techniques available at the time.” Pet. 12 (citing Ex. 1003 ¶¶ 27–29). Petitioner further asserts that a POSITA “A POSITA would have had a bachelor’s degree in computer science, computer engineering, electrical engineering, or equivalent training, and approximately two years of experience working in the field of network communications and been knowledgeable regarding MPLS techniques.” *Id.*

Patent Owner asserts:

For purposes of this preliminary response, Patent Owner does not dispute Petitioner’s definition of POSITA, except that a POSITA with two years of experience working in the field of network communications would not necessarily have been “knowledgeable regarding MPLS techniques.” MPLS techniques are a specialized area of network communications and many engineers in the field of network communications do not deal with MPLS techniques as part of their day-to-day responsibilities.

Prelim. Resp. 20–21.

For the purpose of determining whether to institute trial, we adopt Petitioner’s definition of a person of ordinary skill in the art because it is consistent with the level of skill reflected by the ’821 Patent Specification and the asserted prior art.

C. Principles of Law

A claim is unpatentable under 35 U.S.C. § 103 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 the subject matter pertains. *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) if in evidence, so-called secondary considerations. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).⁷

D. Patentability Challenge Based on Doshi and Guichard

1. Overview of Doshi (Ex. 1005)

Doshi “relates to network communications and, more specifically, to restoration path sharing.” Ex. 1005 ¶ 4. Doshi discloses “a shared mesh network (SMN) that includes components for [use of] . . . network sharing information . . . and improved service primary and restoration path calculation as a function of the sharing information.” *Id.* ¶ 9. “The SMN includes components that determine primary/restoration path pairs . . . [for] grouping of certain links within the network into shared-risk link groups (SRLGs).” *Id.* ¶ 11. “Links that belong to SRLGs having a primary path link[] are set to a link cost of infinity.” *Id.* “[R]emaining links that do not belong to such SRLGS are evaluated as to their ability to support sharing of restoration bandwidth.” *Id.* “If a link supports sharing, its link cost is reduced by . . . a function of the sharing degree for the link.” *Id.* “Ultimately, the adjusted link costs are used in a minimum-cost primary/restoration path calculation.” *Id.*

⁷ At this stage, the parties do not present evidence or arguments regarding secondary considerations.

The invention also provides a method and network manager “for determining primary and restoration paths for a new service in a mesh network having a plurality of nodes interconnected by a plurality of links.”

Ex. 1005 ¶ 14.

For each of a plurality of candidate path pairs for the new service, each candidate path pair comprising a candidate primary path and a candidate restoration path for the new service, a path cost associated with said each candidate path pair is generated, [and] the path cost for a candidate path pair is a function of shareability of links within the corresponding candidate restoration path.

Id. “The primary and restoration paths for the new service are selected from the plurality of candidate path pairs based on the path cost of each candidate path pair.” *Id.*

Figure 1 is reproduced below and is described as “an exemplary shared mesh data network (SMDN).” *Id.* ¶ 16.

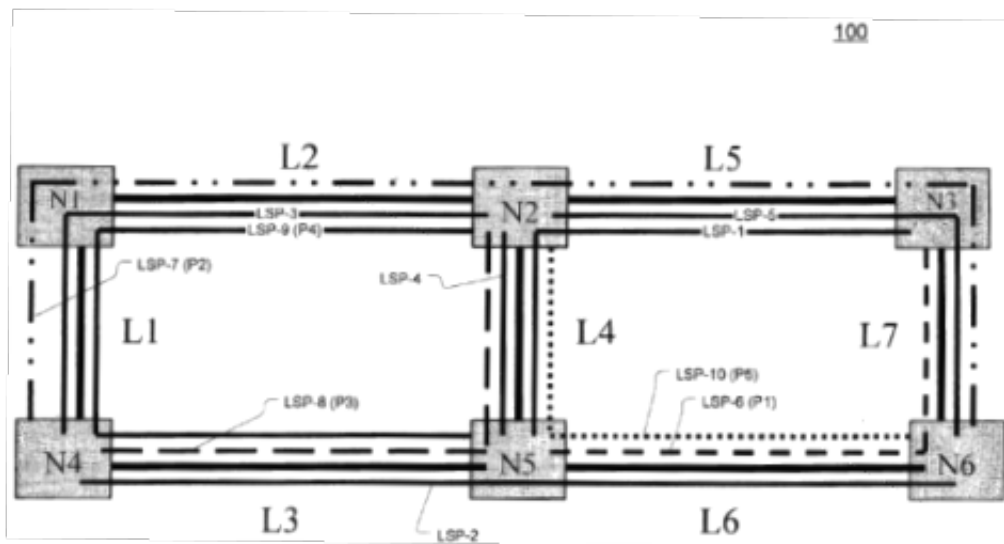


Figure 1 shows that “SMDN 100 includes six ingress/egress nodes N1 to N6 interconnected by seven bidirectional links L1 to L7.” Ex. 1005 ¶ 48.

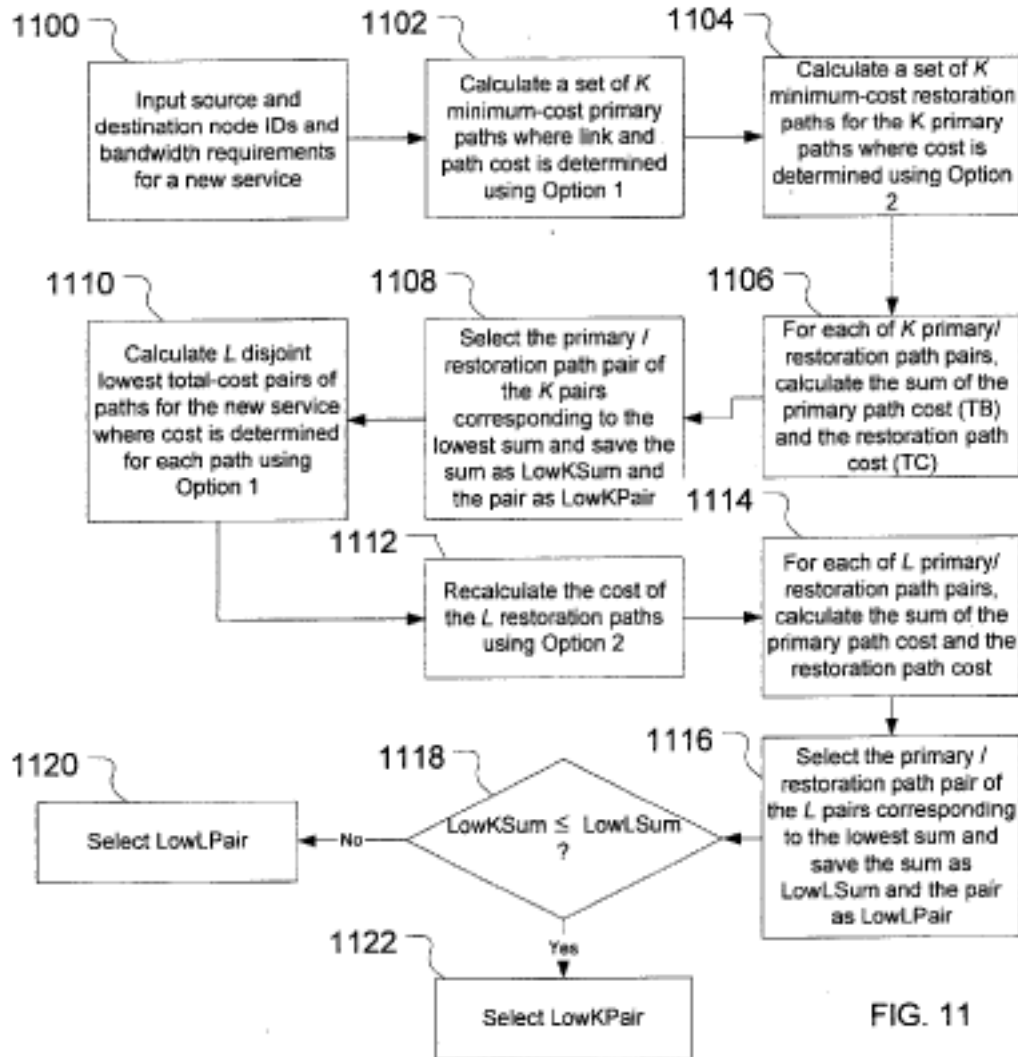
“These nodes and links provide different paths between different pairs of

nodes.” *Id.* “SMDN 100 has been provisioned with five primary label-switched paths (LSPs) LSP-1 to LSP-5.” *Id.* ¶ 50. “A label-switched path is effectively a tunnel between two nodes that carries Service traffic according to a predetermined route[; e.g.,] LSP-1 is a tunnel from node N3 to node N5 that follows the path N3-N2-N5.” *Id.* “There are “five primary LSPs as follows: LSP-1 carries traffic along path N3–N2–N5, LSP-2 carries traffic along path N4–N5–N6, LSP-3 carries traffic along path N2–N1–N4, LSP-4 carries traffic along path N2–N5, and LSP-5 carries traffic along path N2–N3–N6.” *Id.* ¶ 52. “[E]ach LSP may have an associated demand of any reasonable value (e.g., 2Mbps, 10 Mbps, and 100 Mbps).” *Id.* ¶ 51. “[F]or this example, each of the LSPs in FIG. 1 is assumed to be of unit demand.” *Id.*

Figure “1 also illustrates five exemplary protection paths LSP-6 to LSP-10 (also of unit bandwidth in this example) that have been reserved to use for protection of services given a failure of one of the primary paths.” Ex. 1005 ¶ 54. “[T]he tag for each protection LSP carries a parenthetical suffix indicating the primary LSP it protects[; e.g., the figure’s label of] LSP-6 (P1) indicates the protection role that LSP-6 plays for primary LSP-1.” *Id.* In all, the protection paths are: “LSP-6 (along path N3–N6–N5) protects LSP-1, LSP-7 (along path N4–N1–N2–N3–N6) protects LSP-2, LSP-8 (along path N2–N5–N4) protects LSP-3, LSP-9 (along path N2–N1–N4–N5) protects LSP-4, and LSP-10 (along path N2–N5–N6) protects LSP-5.” *Id.*

Figure 11 is reproduced below and “depicts an exemplary method for calculating a minimum-cost primary/restoration path pair for a new service

in consideration of link utilization, utilization threshold, administrative weight, and sharing degree.” Ex. 1005 ¶ 26.



“[I]n step 1100 [of Figure 11], the bandwidth and source and destination IDs for a new service are input.” *Id.* ¶ 142. “[I]n step 1102, the first flow starts with selection of K minimum cost primary paths.” *Id.* ¶ 143. “[I]n step 1104, a set of K minimum-cost restoration paths are calculated and priced.” *Id.* “[I]n step 1106, the Path Costs that were calculated in steps 1102 and step 110[4] are used in the calculation of a sum of the pair

cost for each of the K primary/restoration path pairs.” *Id.* “In step 1108, the minimum sum is saved in the variable LowKSum and the minimum-cost pair is saved in the data structure LowKPair.” *Id.* “In step 1110, the second flow starts with the calculation of L disjoint lowest total-cost pairs of paths for the new Service where cost is determined for each path.” *Id.* ¶ 144. “[I]n step 1114, the sum is calculated of the cost of the primary and the restoration path for each of the L pairs.” *Id.* “[I]n step 1116, the lowest sum is stored in the variable LowLSum and the lowest-cost pair is Stored in the data structure LowLPair.” *Id.* “[I]n the test of step 1118, LowKSum is compared to LowLSum.” *Id.* ¶ 145. “If LowKSum is lower than or equal to LowLSum, then in step 1122, LowKPair is selected as the minimum-cost path pair.” *Id.* “If it is not lower, then in step 1118, LowLPair is selected.” *Id.*

2. Overview of Guichard (Ex. 1006)

Guichard is a textbook directed to “MPLS Network Designs” and includes a section titled “Reoptimizing a Traffic Engineering LSP.” Ex. 1006, 1, 3. Guichard discloses that “[n]etwork state keeps changing.” *Id.* at 3. “Links and nodes fail and recover; new TE LSPs are set up while others may be torn down.” *Id.* at 3. “Consequently, for any TE LSP, a more optimal path may appear in the network.” *Id.* “It is then highly desirable to detect the existence of such a path and reoptimize a TE LSP along a better path when it becomes available.” *Id.*

Guichard further discloses that “[a]n important aspect of any MPLS TE network design relates to the reoptimization triggers.” *Id.* at 5. Examples of “reoptimization triggers” include manual reoptimization, timer-based reoptimization, and event-driven reoptimization. *See id.*

3. Analysis of Claim 1

For the reasons that follow, we are persuaded that Petitioner establishes sufficiently for the purpose of this decision that the subject matter of claim 1 would have been obvious over Doshi and Guichard.

a. Preamble—[1.0] An entity selection method performed by a network device, comprising the steps of:

Petitioner asserts that Doshi teaches the preamble recitation based on Doshi's disclosure of a shared mesh data network (SMDN) that is configured to support RFC 3031 MPLS architecture standard and disclosure of a method implemented by the SMDN manager for selecting primary and restoration paths that correspond to label-switched-paths (LSPs). *See* Pet. 23–25 (reproducing Ex. 1005, Fig. 1 (with Petitioner's added annotations); quoting Ex. 1005 ¶¶ 14, 49, 142; citing Ex. 1003 ¶¶ 67–73; Ex. 1005 ¶¶ 16, 52–54, 82, 141–145, 156, 270–281; code (57), claim 11, Figs. 10, 11, 17, 18). At this stage of the proceeding, we take no position as to whether the preamble is limiting.

Patent Owner does not address or rebut Petitioner's showing for the preamble. *See* Prelim. Resp. 21–31. Nonetheless, the burden remains on Petitioner to demonstrate unpatentability. *See Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015).

Accordingly, for the purpose of institution, Petitioner shows sufficiently that the preamble is satisfied by the teachings of Doshi.

b. [1.1] providing a plurality of multi protocol label switching (MPLS) transport entities between a first endpoint and a second endpoint;

Petitioner asserts that Doshi teaches a plurality of MPLS transport entities between a first endpoint and a second endpoint, based on Doshi's

disclosure of the MPLS network having a plurality of LSPs (e.g., LSP L1 through LSP L10) provisioned between nodes (e.g., N1 through N6). *See* Pet. 25–26 (reproducing Ex. 1005, Fig. 1 (with Petitioner’s added annotations); citing Ex. 1003 ¶¶ 74–78; Ex. 1005 ¶¶ 16, 50–54, 56, 142, 154–156, 188, 190, 192, 195, 267, Figs. 5, 8, 11, 17, 18, 20). According to Petitioner, “[a]ny two (or more) LSPs provided between two end nodes correspond to “*a plurality of multi protocol label switching transport entities.*” Pet. 26 (citing Ex. 1003 ¶¶ 77–78). Referring to Doshi’s Figure 1, Petitioner provides an example of providing LSP-2 as a primary path and LSP-7 as a protection path between end node N4 and end node N6. *See* Pet. 26–27 (reproducing Ex. 1005, Fig. 1 (with Petitioner’s added annotations); citing Ex. 1003 ¶ 79). According to Petitioner, “[a]lthough Figure 1 only illustrates two LSPs between N4 and N6, Doshi makes clear that this figure is merely ‘**exemplary**’ and expressly teaches ‘**two or more paths between**’ the end nodes.” and “also contemplates making ‘[v]arious **modifications**’ to the exemplary embodiments.” Pet. 27 (citing Ex. 1003 ¶ 80; Ex. 1005 ¶¶ 16, 48–55, 300) (alteration in original). Petitioner asserts that a person of ordinary skill in the art “would have found it obvious to provide additional LSPs between two nodes.” *Id.* (citing Ex. 1003 ¶ 81). Petitioner contends that Doshi “contemplates more than two LSPs between two nodes by disclosing ‘two or more paths between’ the end nodes and that there are a ‘plurality of candidate path pairs,’ from which to select for communication.” Pet. 27–28 (citing Ex. 1005, code (57), ¶¶ 14, 48). According to Petitioner, “[t]his would mean that any two nodes would have at least two primary LSPs and two protection LSPs, with different primary

and protection LSP combinations corresponding to candidate pairs.” Pet. 28 (quoting Ex. 1005 ¶ 14; citing Ex. 1003 ¶ 81; Pet. 32–45).

Petitioner provides another example of Doshi providing two primary LSPs and two protection LSPs between nodes N4 and N6. Pet. 28 (reproducing Ex. 1005, Fig. 1 (with Petitioner’s added annotations)). According to Petitioner, a person of ordinary skill in the art “would have recognized that providing more than two LSPs between each node pair (e.g., at least two primary LSPs and two protection LSPs) would be beneficial since doing so facilitates path diversity to reduce the probability of service interruption between the nodes.” Pet. 28–29 (citing Ex. 1003 ¶ 83). Petitioner asserts that “[p]roviding more than two LSPs between two end nodes is desirable because it facilitates reoptimization by providing more potential paths to select from over time.” Pet. 29.

Patent Owner does not address or rebut Petitioner’s showing for this claim limitation. *See* Prelim. Resp. 21–31. Nonetheless, the burden remains on Petitioner to demonstrate unpatentability. *See Dynamic Drinkware*, 800 F.3d at 1378.

Accordingly, for the purpose of institution, Petitioner shows sufficiently that this limitation is satisfied by the teachings of Doshi.

c. [1.2] determining an overall cost for each entity pair of said plurality of entities;

Petitioner contends that Doshi calculates the cost of each primary or protection path as the sum of the link costs, and then the path cost is used to determine the cost of each path pair. *See* Pet. 21 (quoting Ex. 1005 ¶¶ 14, 125; citing Ex. 1003 ¶¶ 90–94; Ex. 1005 ¶¶ 26, 46, 50–54, 76, 82, 130, 142–181, code (57), Figs. 1, 10–13). Petitioner asserts that “Doshi identifies

the path pair with an ‘**overall-minimum cost**,’ and “the cost of each candidate [path] pair is determined by summing a primary path cost and a protection path cost.” *See* Pet. 32–33 (reproducing Ex. 1005, Fig. 11 (with Petitioner’s added annotations); citing Ex. 1003 ¶¶ 95–97; Ex. 1005 ¶ 142). According to Petitioner, a person of ordinary skill in the art “would have understood that Doshi’s cost determination—which considers a myriad of factors such as link utilization, sharing degree, and path disjointedness—represents the “*overall cost*[”] for each candidate path pair.” Pet. 33 (citing Ex. 1003 ¶¶ 96–97). Petitioner further contends that it would have been obvious for the path to be implemented as LSPs because Doshi’s Figure 1 supports MPLS architecture and provides a plurality of LSPs. *See* Pet. 34 (citing Ex. 1003 ¶ 98).

Patent Owner does not address or rebut Petitioner’s showing for this claim limitation. *See* Prelim. Resp. 21–31. Nonetheless, the burden remains on Petitioner to demonstrate unpatentability. *See Dynamic Drinkware*, 800 F.3d at 1378.

Accordingly, for the purpose of institution, Petitioner shows sufficiently that this limitation is satisfied by the teachings of Doshi.

d. [1.3] selecting an entity pair from said plurality of transport entities based at least in part upon said overall cost; and

Petitioner contends that Doshi discloses that primary and protection paths are selected from the plurality of candidate path pairs based on the path cost of each candidate path pair. *See* Pet. 35 (quoting Ex. 1005 ¶ 14; citing Ex. 1005, code (57), ¶¶ 46, 76, 142–145, claims 1, 11). Petitioner asserts that “it would have been obvious for the ‘plurality of candidate path pairs’ (pairs of primary and protection LSPs) to correspond to the provided

plurality of LSPs of the MPLS architecture.” *Id.* (citing Ex. 1003 ¶¶ 102–103; Pet. 25–34). Petitioner asserts that Doshi teaches the selection is based on the overall cost because the lowest cost pair is selected as the overall minimum-cost pair. Pet. 35–36 (reproducing Ex. 1005, Fig. 11 (with Petitioner’s added annotations); quoting Ex. 1005 ¶ 142; citing Ex. 1003 ¶ 104; Ex. 1005 ¶¶ 26, 125–139, 143–145). According to Petitioner, “[t]herefore, Doshi discloses selecting an LSP pair from the plurality of MPLS LSP[s] based on the selected pair having the overall minimum-cost.” Pet. 36 (citing Ex. 1003 ¶¶ 102–105).

Patent Owner contends this limitation of claim 1 “requires an entity pair is selected from a ‘plurality of transport entities.’ That is, two entities are simultaneously selected from a single group of transport entities that are already provided.” Prelim. Resp. 21–22 (reproducing Ex. 1001, Fig. 1 (with Patent Owner’s added annotations); quoting Ex. 1001, 3:33–36, 4:54–59; citing Ex. 1001, Figs. 2–3). According to Patent Owner, Doshi’s Figure 11 and supporting text do not disclose “selecting an entity pair from said plurality of transport entities” as required by the claims because, according to Patent Owner, “[i]nstead, Doshi Fig. 11 first selects a group of K primary paths and subsequently calculates a restoration path for each primary path identified earlier.” *Id.* at 23 (reproducing Ex. 1005, Fig. 11 (with Patent Owner’s added annotations); citing Ex. 1005 ¶ 143); *see also id.* at 24 (similar arguments, citing Ex. 1005 ¶¶ 130–131, 144, 149, Figs. 11, 12).

In other words, Doshi does not simultaneously select a pair of entities from a single group of transport entities that are already provided. Instead, it first creates a group of potential primary paths and then, once those paths are created, for each primary

path, it calculates a restoration path in reference to that particular primary path.

Id.

We do not agree with Patent Owner's arguments because they are not commensurate in scope with the claim limitation. Claim 1 does not recite or require that the primary path and restoration path be simultaneously selected from a single group of paths, as argued by Patent Owner.

Patent Owner further argues that Doshi's primary/restoration path pair is not selected from a plurality of transport entities as required by claim 1 because the primary/restoration path pair is selected from a plurality or primary/restoration path pairs. *See* Prelim. Resp. 24–25 (reproducing Ex. 1005, Fig. 11 (with Patent Owner's added annotations)). According to Patent Owner, Doshi's disclosure of Figure 11 is different from claim 1 which requires "selecting one ('an') entity pair from a plurality of entities, not selecting an entity pair from a plurality of entity **pairs**." *Id.* at 25. Stated another way, Patent Owner asserts that claim 1 requires "selecting two entities out of a group of transport entities, not selecting two entities out of a group of transport entity pairs as taught by Doshi Fig. 11 step 1116." *Id.*

We do not agree with Patent Owner's arguments. As an initial matter, claim 1 is not limited to selecting just one entity pair, as argued by Patent Owner. Second, based on Patent Owner's arguments, we are unable to appreciate a difference or distinction between selecting a pair of entities from the claimed "plurality of transport entities" and Patent Owner's contention that Doshi only teaches selecting a pair of entities from "a plurality of [transport] entity pairs." This is because "a plurality of entity pairs" (i.e., at least two transport entity pairs) necessarily includes a

“plurality of transport entities” (i.e., at least three entities). *See also* Pet. 42 (“Doshi’s plurality of candidate path pairs include a plurality of LSPs (e.g., at least two primary and at least two protection LSPs) between a pair of end nodes.”)

Accordingly, for the purpose of institution, Petitioner shows sufficiently that Doshi teaches or suggests this limitation.

e. [1.4] if an entity pair reselection event occurs, reselecting said entity pair from the group consisting of said entity pair and a replacement entity pair comprising at least one entity distinct from the entities of said entity pair,

Petitioner contends that the combination of Doshi and Guichard teaches this limitation. *See* Pet. 40–45. Petitioner asserts that Guichard teaches event driven reoptimization where it may be desirable to trigger a reoptimization upon the occurrence of a particular event, such as the restoration of a link in the network. *See* Pet. 40 (quoting Ex. 1006, 5; citing Ex. 1003 ¶¶ 115–116; Ex. 1006, 3–4). According to Petitioner, a person of ordinary skill in the art “would have understood that Guichard generally teaches that the current LSP path selection should be evaluated following a trigger event (e.g., LSP set up, LSP torn down, restoration of a link, or new link) to determine whether a more optimal LSP path is available,” and also “would have recognized that this evaluation may or may not result in a reoptimization.” Pet. 40 (quoting Ex. 1006, 5; citing Ex. 1003 ¶ 117).

For the purpose of this decision, and based on Petitioner’s citations to Doshi, Guichard, and Dr. Houh’s testimony (Ex. 1003), we are persuaded Petitioner sets forth sufficient articulated reasoning with rational underpinning to support the conclusion that it would have been obvious to one of ordinary skill in the art to combine the teachings of Doshi with Guichard’s teachings of reoptimization triggered by an event. *See*

Pet. 20–22, 40–45; *KSR*, 550 U.S. at 418. Petitioner asserts that “[i]t would have been obvious to a [person of ordinary skill in the art], in view of Guichard, to perform event-driven reoptimization, when implementing Doshi’s MPLS architecture, to determine if there are better LSP paths available or if the currently selected LSP pair represents the overall minimal cost.” Pet. 41 (citing Ex. 1003 ¶ 118; Pet. 20–23); *see also* Pet. 21–22 (“to evaluate the potential for reoptimization to determine whether the selected LSP pair remains the overall minimum-cost pair or whether there as a better pair available for reoptimization.”).

Petitioner further explains “[i]n implementing the combination with Doshi, a [person of ordinary skill in the art] would have evaluated any restored and new LSPs along with all existing LSPs (including the currently utilized LSP pair) by repeating Doshi’s candidate pair cost determination and selection techniques . . . in response to a trigger event to potentially reoptimize the selection.” Pet. 41 (citing Ex. 1003 ¶ 119; Pet. 32–40). Petitioner further asserts that “[i]t would have been obvious to a [person of ordinary skill in the art] that repeating Doshi’s candidate path pair cost determination and selection would—in certain instances—result in the reselection of the currently utilized LSP pair.” *Id.* (citing Ex. 1003 ¶ 120; Pet. 32–34). Petitioner further explains, “[i]n the combination, Doshi’s currently utilized LSP pair would be repeatedly evaluated and reselected, per Guichard’s event-driven reoptimization technique, if it continues to have the overall-minimum cost per Doshi’s cost determination.” Pet. 41–42 (citing Ex. 1003 ¶ 120; Pet. 32–34). Petitioner further explains that, in the proposed combination, “[t]he currently used primary and protection LSP pair would be initially selected based on the overall minimum cost and the remaining

LSPs would be available (with any restored or new LSPs in the network that generate the trigger event, per Guichard) as potential replacements during reoptimization.” Pet. 42 (citing Ex. 1003 ¶ 122; Pet. 32–34); *see* Pet. 43–44 (reproducing Ex. 1005, Fig. 1 (with Petitioner’s modifications and added annotations); quoting Ex. 1005 ¶¶ 14, 142; citing Ex. 1003 ¶¶ 123–125).

Patent Owner does not address or rebut Petitioner’s showing for this claim limitation. *See* Prelim. Resp. 21–31. Nonetheless, the burden remains on Petitioner to demonstrate unpatentability. *See Dynamic Drinkware*, 800 F.3d at 1378.

Accordingly, for the purpose of institution, Petitioner shows sufficiently that this limitation is satisfied by the combined teachings of Doshi and Guichard.

f. [1.5] wherein said entity pair reselection event is selected from a group consisting of adding an entity to said plurality of transport entities, removing an entity from said plurality of transport entities, an operational status change for one of said plurality of transport entities, and a change in overall cost for one of said plurality of transport entities.

Petitioner contends Guichard teaches this limitation based on Guichard’s disclosure that the reoptimization evaluation is triggered if a link is restored in the network, each time a new link is advertised as newly operational, when new LSPs are set up, and when other LSPs are torn down. *See* Pet. 45–46 (quoting Ex. 1006, 3, 5; citing Ex. 1003 ¶¶ 128–133; Pet. 23–45).

Patent Owner does not address or rebut Petitioner’s showing for this claim limitation. *See* Prelim. Resp. 21–31. Nonetheless, the burden remains on Petitioner to demonstrate unpatentability. *See Dynamic Drinkware*, 800 F.3d at 1378.

Accordingly, for the purpose of institution, Petitioner shows sufficiently that this limitation is satisfied by the combined teachings of Doshi and Guichard.

g. Summary

Accordingly, for the purpose of institution and based on the record before us, Petitioner shows sufficiently that the limitations of claim 1 are taught or suggested by the combination of Doshi and Guichard. In light of the foregoing, we are persuaded that Petitioner has demonstrated a reasonable likelihood of prevailing in showing that claim 1 is unpatentable over Doshi and Guichard.

h. Compelling Merits

“Compelling, meritorious challenges are those in which the evidence, if unrebutted in trial, would plainly lead to a conclusion that one or more claims are unpatentable by a preponderance of the evidence.” *Fintiv* Memo 4. We determine that Petitioner’s challenge as to claim 1 based on Doshi and Guichard meets this standard. As set forth in the previous sections, Petitioner demonstrates that at this stage all elements of claim 1 are disclosed, taught, or suggested by Doshi and Guichard. If unrebutted at trial, we would conclude by a preponderance of the evidence that at least claim 1 is unpatentable over Doshi and Guichard.

Petitioner relies on various disclosures of Doshi and Guichard for disclosing, teaching, or suggesting the limitations of claim 1. *See* Pet. 20–46; *see also infra* § III.D.3 (detailing Petitioner’s arguments). At this stage of the proceeding, Patent Owner has not produced persuasive rebuttal argument or evidence that would lead us to any conclusion other than that Petitioner has shown by a preponderance of evidence that claim 1

is unpatentable. For all but claim limitation [1.3], Patent Owner provides no rebuttal to Petitioner’s analysis. Patent Owner’s arguments directed to claim element [1.3] summarized in Section III.D.3.d., are not commensurate in scope with that limitation, and do not provide sufficient explanation regarding any meaningful distinction between selecting an entity pair from “a plurality of transport entities” and selecting an entity pair from a plurality of transport entity pairs. In short, we determine that, on this preliminary record, Petitioner’s challenge to claim 1 meets the “compelling merits” standard as set forth in the Director’s *Fintiv* Memo.

4. Analysis of Independent Claim 17

Independent claim 17 recites limitations similar to the limitations recited in claim 1, except that claim 17 is directed to a non-transitory computer readable media configured to perform a method. *Compare* Ex. 1001, 7:48–67 *with, id.* at 9:1–19. Petitioner’s analysis addressing the limitations of claim 17 is substantially the same as, and relies upon, Petitioner’s analysis addressing claim 1. *Compare* Pet. 63–65 *with, Pet.* 30–46. Patent Owner’s arguments address claims 1–7, 9–11, 13, and 17–20 together as a group, and do not specifically address the limitations of claim 17 apart from the disputed limitation that is common to claims 1 and 17. *See* Prelim. Resp. 21–26.

For the same reasons as those explained above addressing independent claim 1, for the purpose of institution and based on the record before us, Petitioner shows sufficiently that the limitations of claim 17 are disclosed, taught, or suggested by Doshi and Guichard. Accordingly, we are persuaded that Petitioner has demonstrated a reasonable likelihood of

prevailing in showing that claim 17 is unpatentable over Doshi and Guichard.

5. Analysis of Dependent Claims 2–7, 9–11, 13, and 18–20

Claims 2–7, 9–11, and 13 depend directly or indirectly from claim 1, and claims 18–20 depend directly or indirectly from independent claim 17. *See* Ex. 1001, 7:48–8:41, 9:1–10:18. We have reviewed Petitioner’s contentions and cited supporting evidence addressing how the combined teachings of Doshi and Guichard discloses, teaches, or suggests each of the limitations recited in dependent claims 2–7, 9–11, 13, and 18–20. *See* Pet. 46–66 (citations omitted). Patent Owner’s arguments address claims 1–7, 9–11, 13, and 17–20 together as a group, and do not specifically address the limitations of dependent claims 2–7, 9–11, 13, and 18–20 apart from the disputed limitations of independent claims 1 and 17. *See* Prelim. Resp. 21–26.

For the purpose of institution and based on the record before us, including the reasons explained above addressing independent claims 1 and 17, Petitioner shows sufficiently that the limitations of claims 2–7, 9–11, 13, and 18–20 are disclosed, taught, or suggested by Doshi and Guichard. Therefore, we are persuaded that Petitioner has demonstrated a reasonable likelihood of prevailing in showing that claims 2–7, 9–11, 13, and 18–20 are unpatentable over Doshi and Guichard.

E. Patentability Challenge Based on Doshi, Guichard, and Huang

1. Overview of Huang (Ex. 1007)

Huang “relates to protection of connections formed through a mesh-type communication network and, in particular, relates to a link redial protection scheme for such network.” Ex. 1007 ¶ 1. Huang discloses

“Multi-Protocol Label Switching (MPLS) . . . for managing network traffic flow.” *Id.* ¶ 4. “A path between a given source node and a destination node may be predetermined at the source node.” *Id.* “The nodes along the predetermined path are then informed of the next node in the path by way of a message sent by the source node to each node in the predetermined path.” *Id.* “Each node in the path associates a label [in the received packet, included at the source node,] with a mapping of output to the next node in the path.” *Id.* “The path arranged in this way is called a Label Switched Path (LSP).” *Id.*

“Rather than redial each path affected by a fault on a single fiber used by those paths, the connections using the faulty fiber may be routed through one or more backup bundles[] where bandwidth has been reserved expressly for that purpose.” *Id.* ¶ 15

[The] link-redial service . . . [thus] includes[:] receiving a request to set up a [LSP] segment [(]over a direct connection between a head end node and a tail end node[]) and] specifying a required protection bandwidth for the [LSP] segment[:] and determining a backup route to the tail end node, responsive to the receiving, where the backup route avoids use of the direct connection.

Id. ¶ 16.

“To create a [LSP], a source node determines a route for the LSP and sends a Connection Request message to each node along the determined route[: the message] . . . indicat[ing] the determined route and allow[ing] a node along that route to . . . forward the . . . message to the next node.”

Ex. 1007 ¶ 30. “Once traffic is flowing over the LSP, the established link can be called a working link.” *Id.* “For a given direct connection between a head end node and a tail end node, there may be multiple working links[]

each associated with a different LSP” (*id.* ¶ 31), that “employ a given fiber between a head end node . . . and a tail end node . . . [, and] may be logically considered a ‘working bundle’.” *Id.* ¶ 32. “A backup LSP may be set up between the head end node . . . and the tail end node . . . to protect each of the working links in the working bundle.” *Id.* “[I]n the event of a failure in the fiber, each of the working links in the working bundle may be switched to corresponding individual backup LSPs, i.e., a backup bundle.” *Id.*

“[B]ackup bandwidth on the path segments of backup LSPs is reserved, but may be shared among other backup bundles.” *Id.* ¶ 53. “[T]o reserve link redial protection bandwidth . . . , the head end node . . . selects a backup route . . . from a table of routes that have been pre-computed to connect the head end node . . . to the tail end node.” *Id.* ¶ 40. “[The] table of routes may be organized by a metric called ‘cost’, in which case the table may be called a Minimum Cost Route (MCR) table.” *Id.*

2. Analysis of Dependent Claims 8 and 12

Dependent claims 8 and 12, ultimately dependent from claim 1 via different intermediary claims, recite “the step of configuring said working entity as revertive.” Ex. 1001, 8:20–21, 8:36–37. Petitioner asserts that Doshi incorporates by reference in its entirety RFC 3209, which describes returning to an original path when the failed resource becomes re-activated. *See* Pet. 70 (citing Ex. 1005 ¶ 56; Ex. 1011, 12). According to Petitioner,

[s]ince Doshi describes switching from a working LSP to a protection LSP after a failure, and since Doshi incorporates RFC 3209’s disclosure of returning to an original path that is re-activated after a failure, it would have been obvious to a [person of ordinary skill in the art] to configure the working LSPs as revertive.

Id. (citing Ex. 1003 ¶¶ 214–215) (emphasis omitted).

In a second position, Petitioner relies on Huang for teaching that in the event of a failure of a working link, traffic may be switched to a corresponding individual backup LSP, and also discloses revertive switching where the connection will be switched from the backup LSP to the working link once the working link has cleared the failure that caused the switchover. *See* Pet. 70 (citing Ex. 1003 ¶¶ 216–218; Ex. 1007 ¶¶ 30–31, 53). For the purpose of this decision, and based on Petitioner’s citations to Doshi, Huang, and Dr. Houh’s testimony (Ex. 1003), we are persuaded Petitioner sets forth sufficient articulated reasoning with rational underpinning to support the conclusion that it would have been obvious to one of ordinary skill in the art to combine the teachings of Doshi with Huang’s teachings of revertive switching.” *See* Pet. 69–71; *KSR*, 550 U.S. at 418. Petitioner asserts that that a person of ordinary skill in the art “would have found it obvious to utilize revertive switching in Doshi, as taught by Huang, such that the switch configures the working LSP to be used again once the fault is cleared,” as a person of ordinary skill in the art “would have recognized that in some instances, e.g., in the case of a quickly resolved mistaken failure diagnosis, it would be simpler to revert back to the working LSP instead of calculating the costs for all LSPs only to again select the working LSP.” Pet. 70–71 (citing Ex. 1003 ¶¶ 214–220; Pet. 67–69); *see* Pet. 68 (similar argument, citing Ex. 1003 ¶¶ 207–208).

Patent Owner’s arguments do not address the limitations of claims 8 and 12 apart from the disputed limitations of independent claims 1 and 17. *See* Prelim. Resp. 21–26.

For the purpose of institution and based on the record before us, including the reasons explained above addressing independent claims 1

and 17, Petitioner shows sufficiently that the limitations of claims 8 and 12 are disclosed, taught, or suggested by the combined teachings of Doshi and Guichard, and by the combined teachings of Doshi, Guichard, and Huang. Therefore, we are persuaded that Petitioner has demonstrated a reasonable likelihood of prevailing in showing that claims 8 and 12 are unpatentable over Doshi, Guichard, and Huang.

F. Patentability Challenge Based on Doshi, Guichard, and Xu

1. Overview of Xu (Ex. 1025)

Xu “relates generally to networking and networking architecture, and more particularly, to combining path protection and traffic engineering for providing fast recovery time when network failures are detected.”

Ex. 1025 ¶ 1. Xu discloses “balancing load in a network after failure of a link.” *Id.* ¶ 5. “A path between a given source node and a destination node may be predetermined at the source node.” *Id.* “At an ingress router, traffic is routed by automatically balancing traffic load over a predefined set of paths from the ingress router to [an] egress router according to . . . splitting ratios.” *Id.* ¶ 6 (omitting variable identifiers/labels). “Each splitting ratio defines a fraction of the demands to be transmitted over a path of the set of paths [during] a detectable failure state . . . [of a] set of modeled failure states.” *Id.* “[Each] modeled state[] . . . cause[s] at least one path of the predefined set of paths to fail . . . [and] has at least a predetermined probability of occurrence.” *Id.* “[The] goal is to compute paths and splitting ratios that minimize congestion over the range of possible failure states.” *Id.* ¶ 53.

“[T]he ingress router has a simple static configuration that determines the traffic-splitting ratios among the available paths, while intermediate

routers merely forward packets over preestablished paths.” *Id.* ¶ 35. “Using pre-established end-to-end paths allows fast failure recovery as the ingress router can shift the load away from the failed paths.” *Id.*

2. Analysis of Independent Claim 14 and Dependent Claims 15 and 16

Independent claim 14 recites “logic configured to determine a probability of concurrent failure of said working entity and said protection entity.” Ex. 1001, 8:50–52. To address this limitation of claim 14, Petitioner asserts that “Doshi recognizes that when two paths are disjoint, e.g., by being node- and link-disjoint, ‘then a failure affecting one of them will not affect the other.’” Pet. 80 (quoting Ex. 1005 ¶ 40; citing Ex. 1003 ¶¶ 250–251). According to Petitioner, a person of ordinary skill in the art “would have understood that probability of concurrent failure is inversely related to disjointedness—as paths become more disjoint, the likelihood they will fail concurrently goes down.” *Id.* Petitioner further asserts that it would take two distinct failures (one affecting each path) for both paths to fail concurrently. Pet. 81 (citing Ex. 1003 ¶¶ 250–251). According to Petitioner, “[s]ince Doshi explains that the “probability of occurrence” of two such failures is “**very insignificant**,” a POSITA would have understood that determining that two paths are disjoint with no nodes or links in common is also a determination that the paths have a “very insignificant” probability of failing concurrently. *Id.* (citing Ex. 1003 ¶¶ 250–251; Ex. 1005 ¶ 40). Petitioner asserts that “knowledge of, e.g., strict disjointedness represents a determination that there is a “very insignificant” probability that the paths will fail at the same time.” *Id.* (citing Ex. 1003 ¶¶ 250–251).

Petitioner also asserts that Xu discloses a network architecture that uses multiple paths between each ingress-egress router pair and provides techniques for selecting the end-to-end paths between the pair, which is informed by models of failure states that would cause at least one path to fail. *See* Pet. 81 (citing Ex. 1025 ¶¶ 6, 30–38, 49, 80, claims 1, 11). Petitioner contends that Xu explains that each failure state has a predetermined probability of occurrence. *See* Pet. 82 (citing Ex. 1025 ¶ 6). According to Petitioner, a person of ordinary skill in the art “would have understood that at least some of the modeled failure states would be states in which the failure affects two paths simultaneously—corresponding to a state of concurrent failure.” Pet. 81 (citing Ex. 1003 ¶¶ 252–253); *see* Pet. 82 (asserting a predetermined probability has been determined).

Patent Owner argues that although Doshi discloses that it is assumed the probability of concurrent failure is insignificant, Doshi does not disclose any logic (e.g., circuitry or software) that determines (e.g., calculates) the probability of concurrent failure. *See* Prelim. Resp. 28–29. Patent Owner also contends that Xu does not disclose determining a probability of concurrent failure of the working entity and the protection entity because, among several reasons, there is nothing in the Petition that indicates Xu’s failure states relate to a working entity and a protection entity, and only relates to a predetermined threshold probability of each failure state. *See id.* at 29–31.

Patent Owner’s arguments addressing the teachings of Doshi and Xu raise questions as to the sufficiency of Petitioner’s showing for this limitation of claim 14. Thus, for the purpose of institution, we are not persuaded that Petitioner has demonstrated a reasonable likelihood of

prevailing in showing that claim 14, and claims 15 and 16 dependent therefrom, are unpatentable over Doshi, Guichard, and Xu. In any event, we institute an *inter partes* review of all of the challenged claims on all of the grounds articulated in the Petition, including the patentability challenge to claims 14–16 based on Doshi, Guichard, and Xu. *See SAS*, 138 S. Ct. 1348.

IV. CONCLUSION

For the foregoing reasons, we determine there is a reasonable likelihood that Petitioner would prevail in showing at least one of the challenged claims of the '821 Patent is unpatentable.

V. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, pursuant to 35 U.S.C. § 314(a), an *inter partes* review of claims 1–20 of the '821 Patent is instituted with respect to all grounds set forth in the Petition; and

FURTHER ORDERED that pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4(b), *inter partes* review of the '821 Patent shall commence on the entry date of this Order, and notice is hereby given of the institution of a trial.

IPR2023-00402
Patent 8,830,821 B2

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