

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CISCO SYSTEMS, INC.,
Petitioner,

v.

PORTSMOUTH NETWORK CORP.,
Patent Owner.

IPR2024-00506
Patent 8,014,394 B2

Before JUSTIN T. ARBES, CHARLES J. BOUDREAU, and
PETER D. SHAPIRO, *Administrative Patent Judges*.

SHAPIRO, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

A. *Background and Summary*

Petitioner Cisco Systems, Inc. filed a Petition (Paper 2, “Pet.”) requesting *inter partes* review of claims 1, 2, 4–12, and 14–18 of U.S. Patent No. 8,014,394 B2 (Ex. 1001, “the ’394 patent”) pursuant to 35 U.S.C. § 311(a). Patent Owner Portsmouth Network Corp. filed a Preliminary Response (Paper 7, “Prelim. Resp.”) pursuant to 35 U.S.C. § 313.

Pursuant to 35 U.S.C. § 314(a), the Director may not authorize an *inter partes* review unless the information in the petition and any preliminary response “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.” See 37 C.F.R. § 42.4(a) (2024) (“The Board institutes the trial on behalf of the Director.”). For the reasons that follow, we institute an *inter partes* review as to claims 1, 2, 4–12, and 14–18 of the ’394 patent on all grounds of unpatentability asserted in the Petition.

B. *Related Matters*

The parties indicate that the ’394 patent is the subject of parallel proceedings, *Portsmouth Network Corp. v. Cisco Systems, Inc.*, 2:23-cv-00441 (E.D. Tex.) (“the Cisco case”) and *Portsmouth Network Corp. v. Juniper Networks, Inc.*, 23-cv-12201-PGL (D. Mass). See Pet. 2; Paper 4, 2 (Patent Owner’s Mandatory Notices). Petitioner filed petitions challenging certain unrelated patents asserted in the Cisco case. IPR2024-00503, Paper 2; IPR2024-00505, Paper 2; IPR2024-00954, Paper 2. In addition, Juniper Networks, Inc. filed two petitions challenging claims of the ’394 patent. IPR2024-00913, Paper 2; IPR2024-00989, Paper 2.

C. *The '394 Patent*

The '394 patent, titled “High-Speed Processing of Multicast Content Requests,” issued Sep. 6, 2011, from U.S. Application No. 12/369,011, filed on Feb. 11, 2009. Ex. 1001, codes (21), (22), (45), (54). The '394 patent relates to delivery of multicast traffic streams over a communication network through a “network element.” *Id.* at code (57). The goal of the '394 patent is to enable the fast delivery of multicast content with minimal latency for processing events associated with changing the multicast forwarding configuration. *Id.* at 4:58–62.

More specifically, the background section of the '394 patent describes:

Some multicast content applications are highly sensitive to the response time to change in the forwarding configuration. For example, in an Internet Protocol Television (IPTV) application, when a user switches (“zaps”) from one television channel to another, the user’s set-top box initiates a process of stopping to receive one multicast packet stream and starting to receive another multicast stream. The zapping time, i.e., the time from the moment the user switches the channel in his or her set-top box until the new channel is displayed, is determined by the time needed by the network to apply this forwarding change. Fast zapping time is particularly difficult to achieve when the rate of change requests is high, such as during a commercial break in which a large number of users switch channels almost simultaneously.

Embodiments of the present invention provide improved methods and systems for performing selective multicast forwarding in packet networks. The disclosed methods and systems are particularly effective in adapting rapidly to requests to change the multicast forwarding configuration.

Ex. 1001, 4:44–62.

The network element described in the '394 patent to accomplish this is illustrated in Figure 1 which is reproduced below.

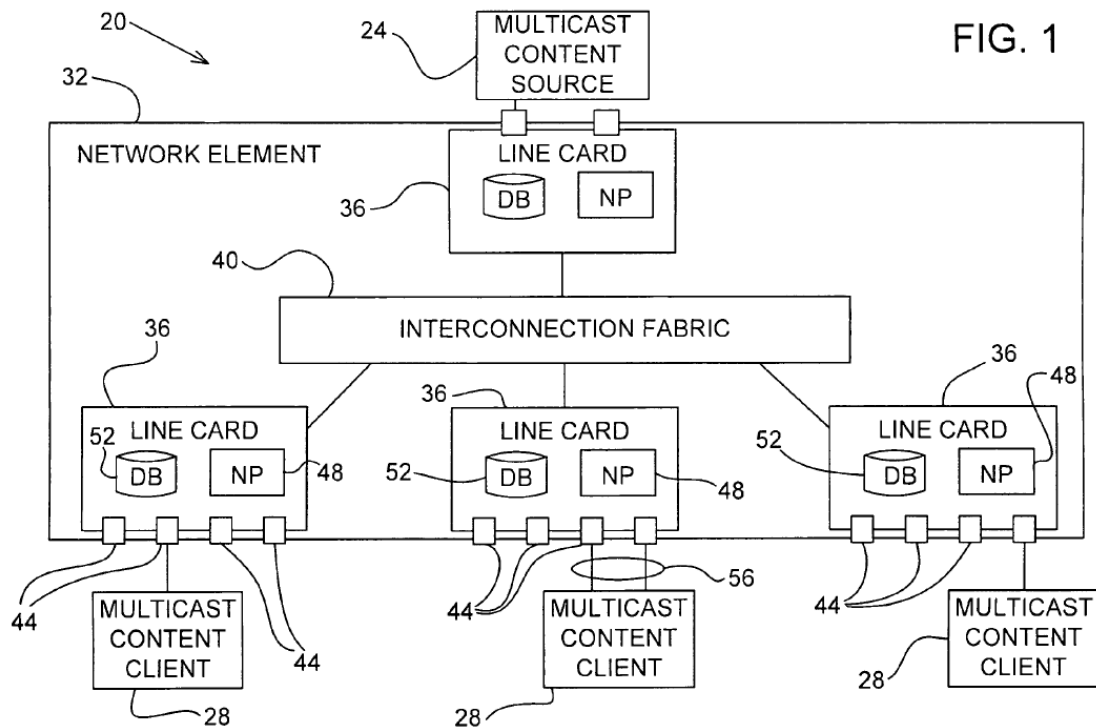


Figure 1 shows a network element 32, which processes communication packets received on its ports 44 from a packet network 20. Ex. 1001, 1:53–56, 5:57–64. The network element has line cards 36, each of which has an NP (network processor) 48, a database 52, and ports 44. *Id.* at 6:23–46. “The line cards are interconnected by an interconnection switch fabric 40.” *Id.* at 6:24–25. Once packets are received on a port in a line card, the corresponding network processor 48 responsible for that port processes them. *Id.* at 6:32–35. “Each line card 36 further comprises a filtering database 52, which holds a list of multicast streams that are permitted for forwarding by the network element . . .” *Id.* at 6:35–38.

Figure 1 also shows a multicast content source 24, such as live IP Television (IPTV), connected to the top line card through its left port. Ex. 1001, 5:64–6:3. Three multicast content clients 28 are shown on the bottom of Figure 1, one connected to each of the bottom three line cards.

Id. at 6:4–6. “In an IPTV application, the multicast clients may comprise set-top boxes.” *Id.* at 6:15–17. For some multicast streams, “two or more ports 44 are aggregated to form a high-capacity port 56, in order to provide high traffic capacity and redundancy to a certain content client or content source.” *Id.* at 6:61–64. A common communication protocol used to broadcast and receive multicast streams is Internet Group Management Protocol (IGMP). *Id.* at 1:21–23.

“In order to avoid unnecessary congestion and processing load, network element 32 forwards multicast streams from source 24 to clients 28 selectively, rather than flooding . . . all ports.” Ex. 1001, 7:10–13. “For this purpose, filtering database 52 in each line card 36 holds a list of multicast streams, which are permitted for forwarding by the network element.” *Id.* at 7:13–16. “[T]he filtering databases also indicate the specific port or ports to which each permitted multicast stream is to be forwarded.” *Id.* at 7:16–18. “When the network element receives a given multicast stream from source 24, NP 48 in a given line card 36 forwards this stream to the designated ports only if the stream appears in its filtering database.” *Id.* at 7:18–21.

“The filtering database[s] in the different line cards are updated by monitoring request messages, which are sent by the multicast clients in order to start or stop receiving certain multicast content.” Ex. 1001, 7:23–26. Figure 2, which shows how the databases are updated when a request for new multicast content is received, is reproduced below.

FIG. 2

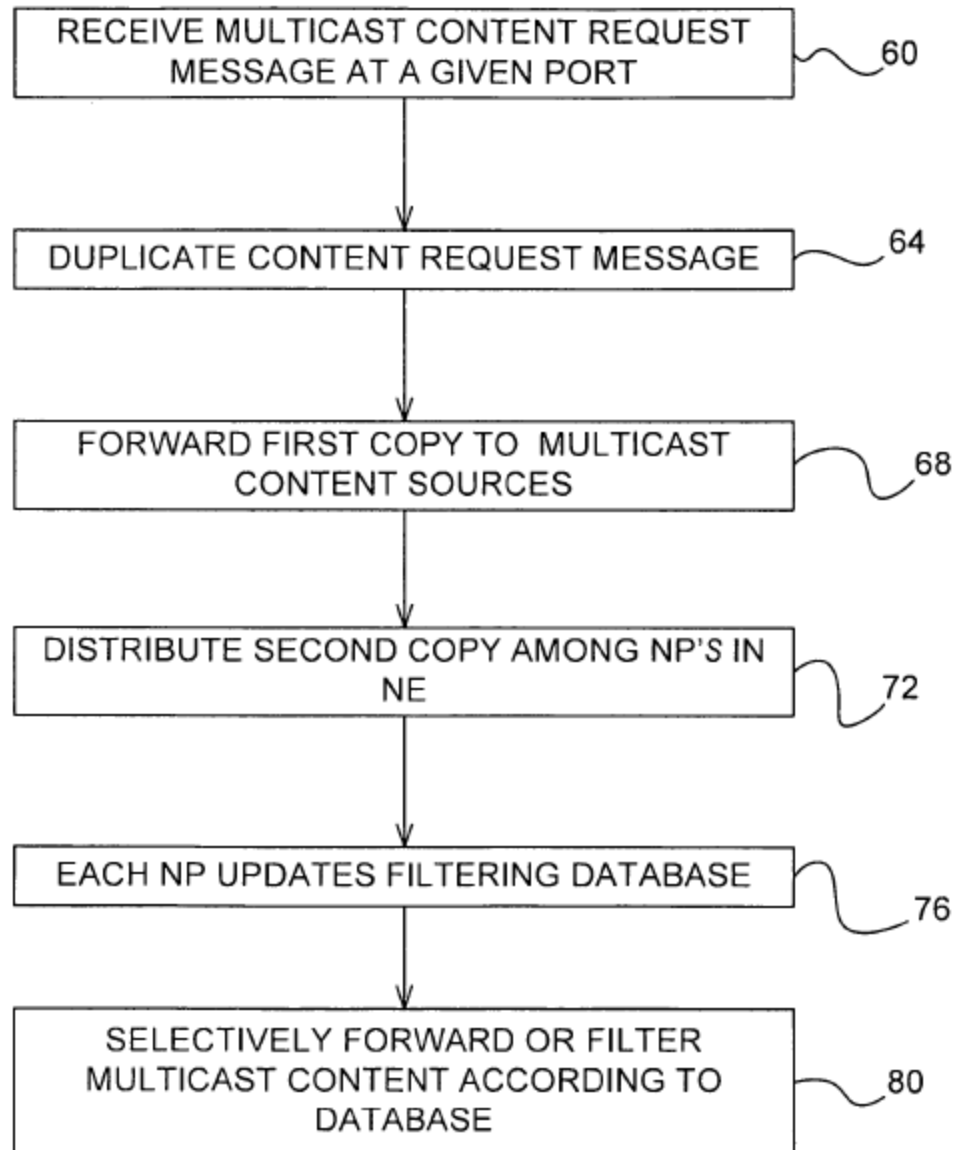


Figure 2 “is a flow chart that schematically illustrates a method for updating database 52 based on multicast content requests.” Ex. 1001, 7:27–29. As shown on the top of the flowchart, “network element 32 receive[s] a multicast content request message, at a request reception step 60.” *Id.* at 7:30–32. “The request is sent from a given multicast client 28, is addressed

to a certain multicast source and arrives at one or [more] ports 44 of the network element.” *Id.* at 7:34–36. “The multicast content request may comprise, for example, a request to join a certain multicast service (i.e., to start receiving certain multicast content) or to leave a certain multicast service (i.e., to stop receiving certain multicast content).” *Id.* at 7:40–43. “For example, in an IPTV application, when a multicast client 28 (e.g., a set-top box) switches (‘zaps’) from one television channel to another, the client sends a request to stop receiving the content of the previous channel and to start receiving the content of the new channel.” *Id.* at 7:46–50.

Next, step 64 in the flowchart shows that the “line card duplicates the request.” Ex. 1001, 7:53. In step 68, “the first copy of the request is forwarded to the appropriate multicast sources.” *Id.* at 7:54–55. At step 72, a “second copy of the request is forwarded to all the NPs in the network element.” *Id.* at 7:56–57. At step 76, “[e]ach NP receiving the distributed copy updates its respective database 52.” *Id.* at 7:63–64. “[T]he distributed copy comprises an indication of the ingress port, i.e., the port via which the request arrived at the network element.” *Id.* at 8:3–5. “If the request comprises a request to receive a certain multicast stream, the NPs update their filtering databases to permit forwarding of the request multicast stream. . . . to [the ingress] port [of the request].” *Id.* at 8:9–18. “If the request comprises a request to stop receiving a certain multicast stream, the NPs remove the corresponding entry from their filtering databases.” *Id.* at 8:22–24. Finally, at step 80, “[t]he network element selectively forwards the incoming multicast streams in accordance with the updated filtering databases,” i.e., by sending them out of the ingress port where the request came from which is now stored in the filtering databases. *Id.* at 8:25–27.

The '394 Patent also describes how limits can be placed on the number of streams allowed on a given port. Ex. 1001, 8:36–59. “In some embodiments, the network element allows only a limited number of multicast streams to be forwarded over any given port, so as not to exceed the maximum bandwidths of the ports. For example, a maximum allowed number of multicast streams may be set to each port.” *Id.* at 8:36–40. “In these embodiments, filtering databases 52 hold port counters, which are indicative of the number of multicast streams that are permitted for forwarding over each port” *Id.* at 8:41–45.

Typically, the port counter of a given port is initialized to the maximum allowed number of [multicast streams]. The counter is decremented when a new multicast stream is permitted for forwarding to the port, and is incremented when an existing multicast stream is removed from the port. Thus, a port counter that is equal to zero indicates that the maximum allowed number of streams have already been permitted for this port.

Id. at 8:51–58.

D. Illustrative Claim

Challenged claims 1, 8, 11, and 18 of the '394 patent are independent. Dependent claims 2 and 4–7 depend from claim 1. Dependent claims 9–10 depend from claim 8. Dependent claims 12 and 14–17 depend from claim 11. Claim 1 recites (with letter designations used in the Petition to refer to the various limitations):

1. [p] A method for communication, comprising:
 - [a] operating a network element,
 - [b] wherein the network element further comprises multiple interconnected processing units and multiple ports,
 - [c] wherein each processing unit is assigned to a different subset of the multiple ports of the network element, and

[d] wherein each processing unit contains a processor for processing packets communicated over the different subset of the multiple ports to which the processing unit is assigned;

[e] storing in each processing unit a respective list, each list indicating all of one or more multicast packet streams that are permitted for forwarding by the network element, and further indicating which of the one or more ports each multicast packet stream is permitted to be forwarded to;

[f] receiving from a client a request relating to reception of a given multicast packet stream;

[g] distributing the request among the multiple processing units within the network element, and

[h] updating the respect list in each processing unit responsively to the request, and

[i] selectively forwarding multicast packets associated with the given multicast packet stream by the processing units in accordance with the respective updated lists,

[j] wherein operating the network element comprises aggregating two or more of the ports to form a high-capacity port, and

[k] wherein aggregating the ports comprises setting an upper limit on a number of the multicast packet streams that are permitted for forwarding over the high-capacity port,

[l] wherein the request indicates that the given multicast packet stream is to be forwarded over the high-capacity port, and

[m] wherein updating the list comprises modifying the list to indicate that the given multicast packet stream is permitted for forwarding over the high-capacity port only when the number of the multicast packet streams that are permitted for forwarding over the high-capacity port, including the given multicast packet stream, does not exceed the upper limit.

E. Evidence

Petitioner relies on the following prior art:

U.S. Patent No. 5,999,530 (Ex. 1011, “LeMaire”);

U.S. Patent No. 6,370,142 B1 (Ex. 1009, “Pitcher”);

U.S. Patent Application Publication No. 2005/0041665 A1 (Ex. 1005, “Weyman”);

U.S. Patent Application Publication No. 2006/0146823 A1 (Ex. 1012, “Ding”);

U.S. Patent Application Publication No. 2006/0224877 A1 (Ex. 1010, “Jain”);

U.S. Patent Application Publication No. 2007/0297406 A1 (Ex. 1008, “Rooholamini”); and

WO Patent Application Publication No. 2007/140702 A1 (Exs. 1006, 1007 (certified translation), “Li”).

F. Prior Art and Asserted Grounds

Petitioner asserts that claims 1, 2, 4–12, and 14–18 would have been unpatentable on the following grounds:

Claim(s) Challenged	35 U.S.C. §	References/Basis
1, 4, 6, 7, 11, 14, 16, 17	103(a) ¹	Weyman, Li
5, 15	103(a)	Weyman, Li Rooholamini
16	103(a)	Weyman, Li, Pitcher
8, 18	103(a)	Weyman, Jain, LeMaire
9	103(a)	Weyman, Jain, LeMaire, Li
10	103(a)	Weyman, Jain, LeMaire, Pitcher
2, 12	103(a)	Weyman, Li, Ding

¹ The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284 (2011), amended 35 U.S.C. § 103, effective March 16, 2013. Because the application from which the ’394 patent issued was filed before this date, the pre-AIA version of § 103 applies.

II. ANALYSIS

A. *Legal Standards*

A claim is unpatentable for obviousness if, to one of ordinary skill in the pertinent art, “the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007) (quoting 35 U.S.C. § 103(a) (2006)). The question of obviousness is resolved on the basis of underlying factual determinations, including “the scope and content of the prior art”; “differences between the prior art and the claims at issue”; and “the level of ordinary skill in the pertinent art.” *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).²

A patent claim “is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art.” *KSR*, 550 U.S. at 418. An obviousness determination requires finding “both ‘that a skilled artisan would have been motivated to combine the teachings of the prior art references to achieve the claimed invention, and that the skilled artisan would have had a reasonable expectation of success in doing so.’” *Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1367–68 (Fed. Cir. 2016).

² Additionally, “secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented. As indicia of obviousness or non-obviousness, these inquiries may have relevancy.” *Graham*, 383 U.S. at 17–18. Here, however, Patent Owner has not asserted in its Preliminary Response that any such considerations are relevant, and we have no other evidence of such indicia currently before us.

“Although the *KSR* test is flexible, the Board ‘must still be careful not to allow hindsight reconstruction of references . . . without any explanation as to *how* or *why* the references would be combined to produce the claimed invention.’” *TriVascular, Inc. v. Samuels*, 812 F.3d 1056, 1066 (Fed. Cir. 2016). Further, an assertion of obviousness “cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *KSR*, 550 U.S. at 418 (quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)); accord *In re NuVasive, Inc.*, 842 F.3d 1376, 1383 (Fed. Cir. 2016) (stating that “conclusory statements” amount to an “insufficient articulation[] of motivation to combine”; “instead, the finding must be supported by a ‘reasoned explanation’”); *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016) (“To satisfy its burden of proving obviousness, a petitioner cannot employ mere conclusory statements. The petitioner must instead articulate specific reasoning, based on evidence of record, to support the legal conclusion of obviousness.”).

B. Level of Ordinary Skill in the Art

Petitioner argues that at the time of the filing date of the ’394 patent (February 11, 2009), a person of ordinary skill in the art (POSITA) would have had

a bachelor’s degree in computer science, computer engineering, electrical engineering, or in an equivalent field, or approximately two years of experience working in the field of information technology and networking Lack of professional experience can be substituted by additional education, and vice versa.

Pet. 12 (citing Ex. 1002 ¶¶ 62–63). Patent Owner does not dispute this assertion or present its own contention regarding the level of ordinary skill

in the art. Based on the record presented, including our review of the '394 patent and the types of problems and solutions described in the '394 patent and cited prior art, we agree with Petitioner's proposed definition of the level of ordinary skill for purposes of this Decision.

C. Claim Construction

We interpret each challenged 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 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). Petitioner asserts that no claim requires express construction for the grounds presented in the Petition. Pet. 12. Patent Owner states that it applies the ordinary and customary meaning to the '394 patent's claim terms but does not propose any express interpretations. Prelim. Resp. 4. In view of these positions, we find that no express interpretation of any claim term is necessary to determine whether to institute an *inter partes* review in this proceeding. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) ("Because we need only construe terms 'that are in controversy, and *only to the extent necessary* to resolve the controversy,' we need not construe [a particular claim limitation] where the construction is not 'material to the . . . dispute.'" (citation omitted and emphasis added)).

D. Ground 1

Petitioner contends that claims 1, 4, 6, 7, 11, 14, 16, and 17 are unpatentable as obvious over Weyman in view of Li, citing the testimony of

Henry H. Houh, Ph.D., as support. Pet. 17–56; Ex. 1002. Patent Owner filed a Preliminary Response opposing institution. Prelim. Resp. 10–12. We are persuaded that Petitioner has established a reasonable likelihood of prevailing on its asserted ground based on Weyman in view of Li as to independent claims 1 and 11.

1. *Weyman*

Weyman is a U.S. patent titled “System and Method for Distributed Multicast Routing.” Ex. 1005, code (54). Similar to the ’394 patent, Weyman describes a “distributed router composed of individual units” which “appears to be a single network entity” for communicating multicast packets. *Id.* at code (57).

Figure 5 in Weyman illustrates a distributed router with multiple units and is reproduced below.

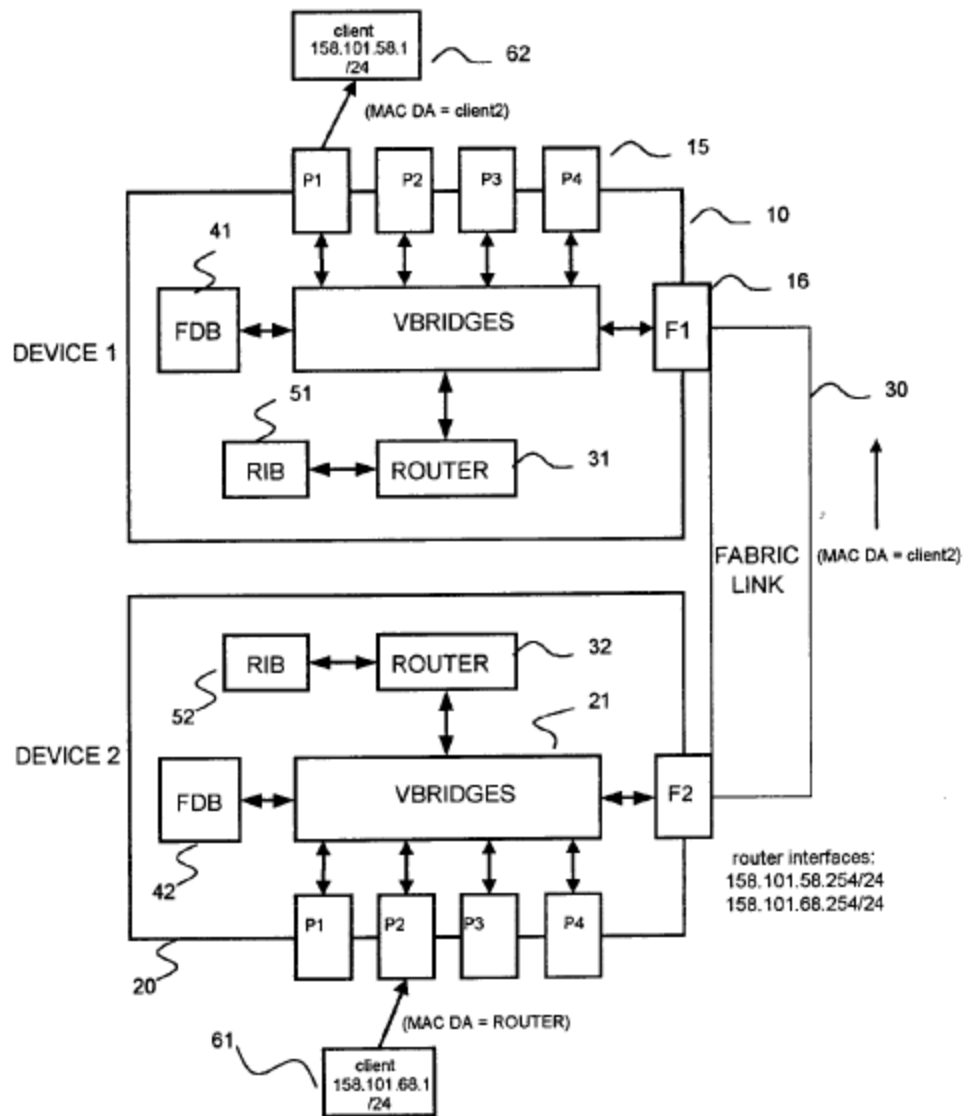


FIG.5

Figure 5 shows how two units, Device 1 (labeled 10) and Device 2 (labeled 20), are connected to each other by a Fabric Link 30 via ports F1 and F2 to form one distributed router. Ex. 1005 ¶ 64. Each unit (device) has four user ports P1–P4 (collectively labelled 15) that can connect to other devices in the network such as routers and clients. *Id.* Each unit also has a bridge labelled Vbridge 21 and a forwarding database used by the bridge

called a FDB, labelled 41 and 42 on devices 1 and 2, respectively. *Id.* Each bridge also has a router, labelled 31 and 32, and a router forwarding database called a RIB (router information base) labelled 51 and 52. *Id.* All of the individual routers in a distributed router have the same RIB that causes them to collectively operate as one distributed router. *Id.* ¶¶ 65–71; Ex. 1002 ¶¶ 65–67.

The distributed router can handle multicast streams. Ex. 1005 ¶¶ 65–71; Ex. 1002 ¶¶ 65–67. Figure 11 helps illustrate how this works and is reproduced below.

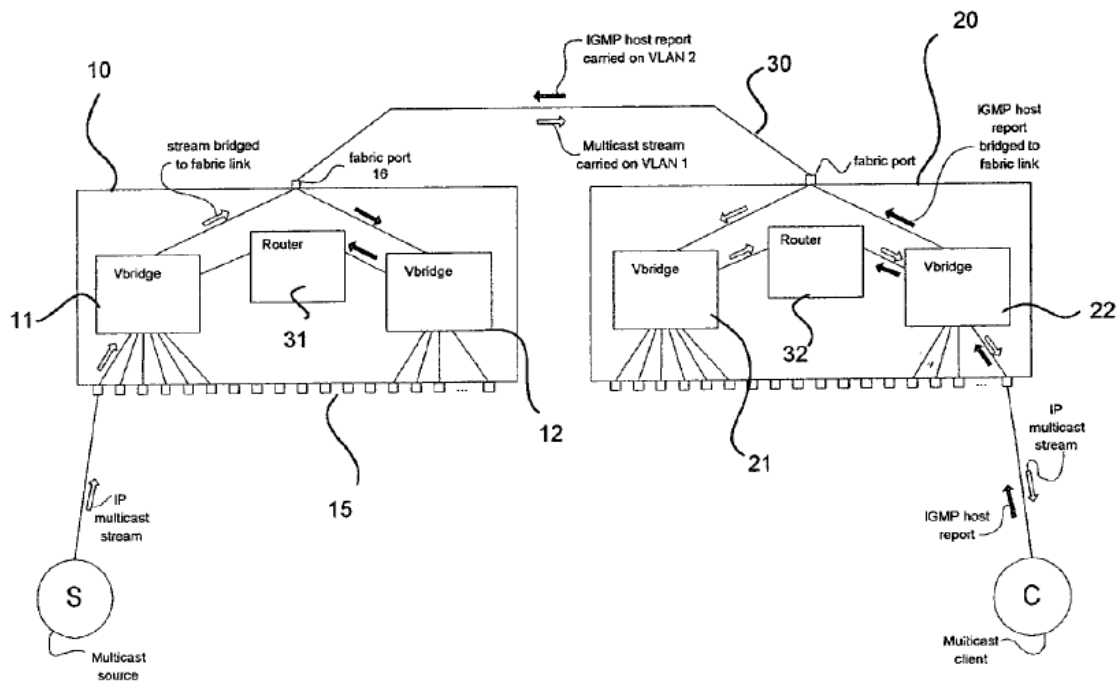


FIG.11

Figure 11 helps show how a multicast client, shown connected to the rightmost user port of unit 20, can request a multicast stream from the source connected to the leftmost port in unit 10. Ex. 1005 ¶ 136. When client C wants to join the multicast stream, it sends a request, an IGMP report, to unit

20. *Id.* ¶¶ 137, 162. Unit 20 sends the request to its internal router 32 and also to the fabric port for forwarding to router 31 in unit 10. *Id.* Then “the router[s] in both units would snoop the IGMP report and would use the report in the construction of the multicast forwarding tables.” *Id.* ¶ 139. In this way, all router forwarding tables, RIBs, have the same entries. *Id.* ¶¶ 65, 162. The Vbridge forwarding databases, FDBs, are populated in a similar way from the addresses of the packets involved in the IGMP report request message. *Id.* ¶¶ 45–46. Once the forwarding information has been created, the Vbridges and routers will coordinate to deliver the multicast stream from the source to the client. *Id.* ¶¶ 103, 127; Ex. 1002 ¶¶ 70–72.

Weyman also teaches that a unit’s ports can be combined to form an “aggregated link” in order to provide “resilience in a distributed router.” Ex. 1005 ¶¶ 50, 86. An aggregated link “comprises a multiplicity of physical connections [i.e., ports] constituting a single logical connection.” *Id.* ¶¶ 50, 88–89; Ex. 1002 ¶¶ 78–82.

2. *Li*

Li is an international patent application titled “Multicast Service Processing Method, System, and Access Device.” Ex. 1007, codes (12), (54). Similar to Weyman, *Li* discloses using communication devices to deliver multicast content from a source to a client. Ex. 1007, 1:20–2:11. In *Li*, the client uses an “access device” to request access to multicast streams. *Id.* The access device functions as a multicast router. Ex. 1007, 26:13–15; Ex. 1002 ¶ 87. Figure 9 illustrates how this setup works and is reproduced below.

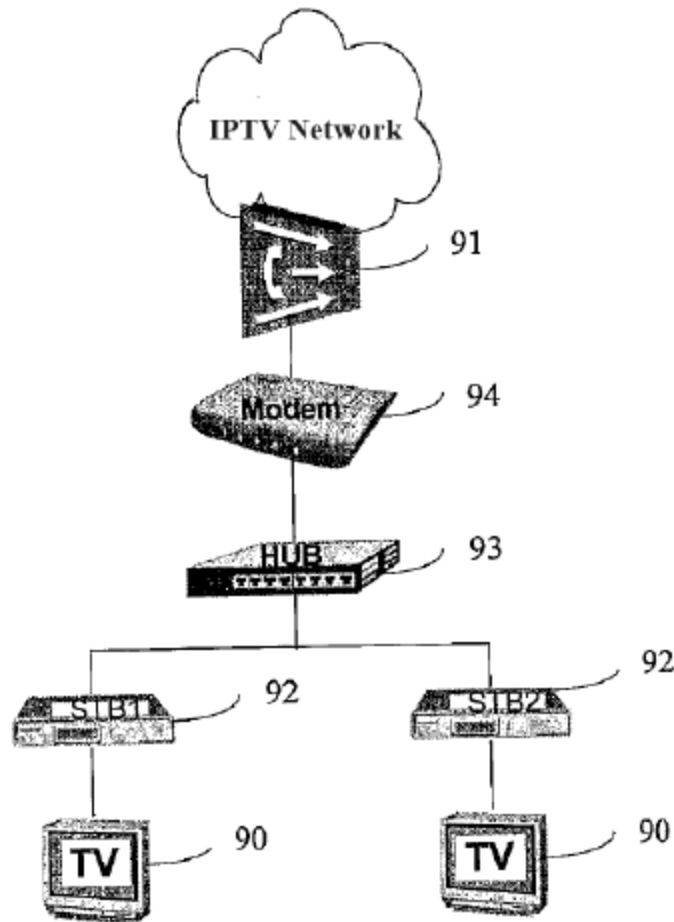


FIG. 9

Figure 9 shows multicast clients, set top boxes (STB) 1 and 2, labeled 92, connected to a router 91 (the access device), which, in turn is connected to an IPTV network. Ex. 1007, 26:13–17; Ex. 1002 ¶ 87. When the STB sends a multicast join request to router 91, the router determines “whether a multicast channel request[] to join is permitted to join” the port. Ex. 1007, 27:10–13; Ex. 1002 ¶ 88. In doing so, the router checks the maximum number of multicast channels allowable on its service ports:

[E]ach . . . service port is configured with the maximum number of accessed multicast channels allowable, which can be set dependent [on the] bandwidth of the . . . port or as required for management. . . . [If] the number of channels being

forwarded over the port is below the maximum number of accessed channels allowable, which is set for the port . . . the port allows an access to the new channel for joining; otherwise, the new channel cannot be added.

Ex. 1007, 28:23–29:1. If allowed, the router “start[s] forwarding data of the new channel; otherwise, it is preliminarily determined that the channel is rejected.” Ex. 1007, 31:4–12. If there is a preliminary rejection, then the router checks to see if any of the port’s existing multicast streams are being terminated (and therefore opening a space for the new request), and, if not, the router finally rejects the join request. Ex. 1007, 31:13–19; Ex. 1002 ¶¶ 90–92.

3. *Analysis of Claim 1*

Petitioner asserts that Weyman in view of Li teaches or suggests all of the limitations of claim 1. Pet. 25–86.

Petitioner asserts Weyman teaches the preamble, “[a] method for communication comprising,” by disclosing how a distributed router provides a multicast stream to a user port, which is a method for communication. Pet. 25. Patent Owner does not dispute that Weyman teaches this element. Prelim. Resp. 6–21. We agree that, based on the current record, Weyman teaches the preamble, regardless of whether it is limiting. *See* Ex. 1005, code (57), ¶¶ 136–138; Ex. 1002 ¶¶ 104–105.

a) *Limitation 1a – operating a network element;*

Based on the current record, we are persuaded that Petitioner has shown sufficiently that Weyman teaches this limitation. *See, e.g.*, Pet. 26–27; Ex. 1005 ¶¶ 6, 93, 107, 136–137, 148, 151–153; Ex. 1002 ¶¶ 106–107. Petitioner contends that Weyman teaches operating a distributed router,

which is a network element. *See* Pet. 26–27. Patent Owner does not dispute Weyman teaches this limitation.

b) Limitation 1b – wherein the network element further comprises multiple interconnected processing units and multiple ports,

Based on the current record, we are persuaded that Petitioner has shown sufficiently that Weyman teaches this limitation. *See, e.g.*, Pet. 27–29; Ex. 1005 ¶¶ 24–25, 29, 60, 62, 64, 122–125, 140, 151, 158, 162; Ex. 1002 ¶¶ 108–112. Petitioner contends that Weyman discloses that the distributed router has multiple units, each of which processes IGMP messages and multicast streams. *See* Pet. 27–28. The units are interconnected by a fabric link. *Id.* at 28 (citing Ex. 1005 ¶¶ 24–25). The distributed router also has multiple ports, i.e., the user ports and the fabric ports. *Id.* at 29 (citing Ex. 1005 ¶¶ 29, 60, 62, 64, 122–125). Patent Owner does not dispute that Weyman teaches this limitation.

c) Limitation 1c – wherein each processing unit is assigned to a different subset of the multiple ports of the network element, and

Based on the current record, we are persuaded that Petitioner has shown sufficiently that Weyman teaches this limitation by describing that in the distributed router shown in Figure 1, unit 10 has a first set of user ports, and unit 20 has a second set of user ports. *See* Pet. 29–30; Ex. 1005, Fig. 5, ¶ 64; Ex. 1002 ¶¶ 113–114. Patent Owner does not dispute that Weyman teaches this limitation.

d) Limitation 1d – wherein each processing unit contains a processor for processing packets communicated over the different subset of the multiple ports to which the processing unit is assigned;

Based on the current record, we are persuaded that Petitioner has shown sufficiently that Weyman teaches this limitation. *See, e.g.*, Pet. 30–33; Ex. 1005 ¶¶ 25, 93, 97–98, 104, 116–117, 122–125, 127; Ex. 1002 ¶¶ 115–117. Petitioner contends Weyman teaches that each unit has a Vbridge and a router that processes incoming packets, including those carrying the multicast streams, and forwards them to the appropriate egress port, and therefore this teaches, or at least renders obvious to a POSITA, that each unit has a processor. Pet. 30–31. Based on the current record, we agree. Patent Owner does not dispute that Weyman teaches this limitation.

e) Limitation 1e – storing in each processing unit a respective list, each list indicating all of one or more multicast packet streams that are permitted for forwarding by the network element, and further indicating which of the one or more ports each multicast packet stream is permitted to be forwarded to;

Based on the current record, we are persuaded that Petitioner has shown sufficiently that Weyman teaches this limitation. *See* Pet. 33–39; Ex. 1005 ¶¶ 31, 46, 69–70; Ex. 1002 ¶ 123. Petitioner contends Weyman teaches that each unit in the distributed router includes multicast forwarding tables for the Vbridge and Router. Pet. 34 (citing Ex. 1005 ¶ 128 (“[T]he bridge multicast forwarding tables and the router multicast forwarding tables should be used to control the forwarding of the multicast traffic to both user ports and fabric”) (emphasis omitted)). Petitioner also contends that Weyman teaches that the forwarding tables “will provide, for each multicast source and destination group pair, the rule by which the router’s data plane

must forward or filter the stream.” Pet. 36 (quoting Ex. 1005 ¶ 111). Patent Owner does not dispute that Weyman teaches this limitation.

f) Limitation 1f – receiving from a client a request relating to reception of a given multicast packet stream;

Based on the current record, we are persuaded that Petitioner has shown sufficiently that Weyman teaches this limitation. See Pet. 39–40; Ex. 1005, Fig. 11, ¶ 160; Ex. 1002 ¶¶ 136–137. Petitioner contends Weyman teaches that “[i]n order to join the destination group for the [multicast] stream, the client would need to send an IGMP host report.” Pet. 39 (quoting Ex. 1005 ¶ 137). Sending such an IGMP request “enables multicast clients on a sub-network to register with their local routers in order to receive IP multicast streams.” Pet. 39 (quoting Ex. 1005 ¶ 160). Patent Owner does not dispute that Weyman teaches this limitation.

g) Limitation 1g – distributing the request among the multiple processing units within the network element, and

Based on the current record, we are persuaded that Petitioner has shown sufficiently that Weyman teaches this limitation. See Pet. 40–41; Ex. 1005, Fig. 11, ¶¶ 137, 162; Ex. 1002 ¶¶ 138–140. Petitioner contends Weyman teaches that “Vbridge 22 in device 20 would forward [the request] to the unit’s multicast router and also the fabric port. Vbridge 12 in unit 10 would then receive the [request] and forward it to the router 31.” Pet. 40–41 (quoting Ex. 1005 ¶ 137). Patent Owner does not dispute that Weyman teaches this limitation.

h) Limitation 1h – updating the respective list in each processing unit responsively to the request; and

Based on the current record, we are persuaded that Petitioner has shown sufficiently that Weyman teaches this limitation. See Pet. 42; Ex. 1005 ¶ 138; Ex. 1002 ¶¶ 141–143. Petitioner contends Weyman teaches

that once the request for a multicast stream, in the form of the IGMP host report, is distributed to each unit, the units “would use the report in the construction of the respective forwarding table in the router.” Pet. 42 (quoting Ex. 1005 ¶ 138). Patent Owner does not dispute that Weyman teaches this limitation.

i) *Limitation 1i – selectively forwarding multicast packets associated with the given multicast packet stream by the processing units in accordance with the respective updated lists,*

Based on the current record, we are persuaded that Petitioner has shown sufficiently that Weyman teaches this limitation. See Pet. 42–43; Ex. 1005 ¶ 127; Ex. 1002 ¶¶ 144–147. Petitioner contends Weyman teaches that once the forwarding tables are updated, the multicast streams will only be forwarded to the ports that had been indicated by the tables as receiving the streams. Pet. 42–43 (citing Ex. 1005 ¶ 127). Patent Owner does not dispute that Weyman teaches this limitation.

j) *Limitation 1j – wherein operating the network element comprises aggregating two or more of the ports to form a high-capacity port, and*

Based on the current record, we are persuaded that Petitioner has shown sufficiently that Weyman teaches this limitation. See Pet. 43–45; Ex. 1005, Fig. 6, ¶¶ 13, 50, 88; Ex. 1002 ¶¶ 148–152. Petitioner contends Weyman teaches “aggregating two or more of the [physical connections] to form [an aggregated link]” on the distributed router and points to Figure 6, which illustrates such an aggregation and shows it forms a high-capacity port. Pet. 43–44 (quoting Ex. 1005 ¶ 50). Patent Owner does not dispute that Weyman teaches this limitation.

k) Limitation 1k – wherein aggregating the ports comprises setting an upper limit on a number of the multicast packet streams that are permitted for forwarding over the high-capacity port,

Based on the current record, we are persuaded that Petitioner has shown sufficiently that Weyman in view of Li teaches this limitation. See Pet. 45–46; Ex. 1007, 28:23–29:1, 31:4–19; Ex. 1002 ¶¶ 153–155. Petitioner points to Li’s teaching that during the processing of a join request to a multicast channel, a counter can be used to limit the maximum number of multicast streams that can be assigned to a port. Pet. 45 (“[E]ach . . . port is configured with the maximum number of accessed multicast channels allowable.”) (quoting Ex. 1007, 28:23–29:1).

Motivation to Combine Weyman and Li

Petitioner contends a POSITA would be motivated to “incorporate Li’s channel joining processing unit into Weyman’s distributed router so that Weyman’s distributed router does not overload a particular port and degrade the router’s reliability.” Pet. 22; Ex. 1002 ¶¶ 93–94. According to Petitioner, “Li expressly teaches that ‘the maximum number of channels that can be selected of a service port needs to be controlled.’” Pet. 22 (quoting Ex. 1007, 5:5–23). Petitioner also contends that Weyman teaches processing multicast join requests locally at the unit, “so a POSITA would have been motivated to control the assignment of multicast streams to ports locally at the unit as well.” Pet. 23–24. Also, “local control of [a] port’s workload is desirable” because it would minimize the use of the fabric link, which is desirable according to Weyman. Pet. 23 (citing Ex. 1005 ¶ 119).

Further, Petitioner contends that a POSITA would have been motivated to apply Li’s teachings to the Weyman’s aggregated high-capacity

ports as well, “in order not to overload the ports/aggregated link.” Pet. 21 (citing Ex. 1002 ¶¶ 93–94).

Finally, Petitioner contends that a POSITA would have had a reasonable expectation of success in “incorporating Li’s channel joining processing unit into Weyman’s unit.” Pet. 23.

Both Weyman and Li are directed to an IGMP based multicast router, and the ports (and any aggregated link) in Weyman and the service port in Li are both carrying multicast streams. . . . Furthermore, Li’s channel joining process unit is configured to control the number of multicast streams on a particular port based on a straightforward determination

Pet. 23–24.

Based on the current record, we are persuaded that a POSITA would have been motivated to combine Weyman and Li as proposed by Petitioner. Pet. 21–25; Ex. 1002 ¶¶ 84–103; Ex. 1005 ¶¶ 4–5, 76, 98, 104–105, 119, 137–139, 162; Ex. 1007, 5:5–23, 1:17–19, 33:16–35:23. Patent Owner does not dispute that a POSITA would have been motivated to combine Weyman with Li’s channel joining processing unit. Furthermore, both references relate to similar subject matter, processing multicast stream requests, and Li’s channel joining processing unit addresses the problem of potentially overloading a port when doing so. *See, e.g.*, Ex. 1005 ¶¶ 4–5 (“[A] primary object of the present invention is to provide a switching fabric, and units . . . [to] provide distributed multicast routing [and] to minimi[z]e the usage of bandwidth on links between the units of such a fabric.”); Ex. 1007, 1:17–19 (“The present invention relates to the field of data communication, and, in particular, to a method, system, and access device for processing multicast service.”), 5:5–23 (“the maximum number of multicast channels that can be selected of a service port needs to be controlled”); *see Intel Corp. v. PACT*

XPP Schweiz AG, 61 F.4th 1373, 1380–81 (Fed. Cir. 2023) (“That [two prior art references] address the same problem and that [one of the references] was a known way to address that problem is precisely the reason that there’s a motivation to combine under *KSR* and our precedent.”).

As pointed out by Petitioner, there is no apparent reason why these two concepts could not be combined together in a straightforward manner at the port level, so a POSITA would have had a reasonable expectation of success in doing so. Pet. 21; Ex. 1002 ¶¶ 93–94; see *Elektro Ltd. v. Zap Surgical Sys., Inc.*, 81 F.4th 1368, 1377 (Fed. Cir. 2023) (“Evidence of reasonable expectation of success, just like evidence of a motivation to combine, ‘may flow from the prior art references themselves, the knowledge of one of ordinary skill in the art, or in some cases, from the nature of the problem to be solved.’”) (quoting *Brown & Williamson Tobacco Corp. v. Philip Morris Inc.*, 229 F.3d 1120, 1125 (Fed. Cir. 2000)).

Furthermore, we are also persuaded on this record that the same benefits would have existed and motivated a POSITA to combine Li’s channel joining processing unit with Weyman’s aggregated high-capacity ports. See Pet. 21; Ex. 1002 ¶¶ 93–94.

Patent Owner’s Argument

Patent Owner contends that Weyman and Li fail to teach limitation 1k because the multicast “channels” described in Li are not the same as the claimed “multicast packet stream.” Prelim. Resp. 10–12. According to Patent Owner, multicast “stream” in the ’394 patent “refers to the actual content coming from a multicast source, such as a TV channel or movie.” *Id.* at 11. “In contrast, *Li* clearly defines ‘channel’ as a multicast group.” *Id.* (citing Ex. 1007, 2:14–17 (“While joining a multicast group, which is often

referred to as a channel, the terminal device 21 sends an IGMP report message to the access device 22 via modem 20.”)).

Patent Owner further contends:

As *Li* repeatedly explains, the actual flow or stream of content is different than the channel itself, further highlighting that *Li*’s channel is not equivalent to the ’394 patent’s multicast streams. EX1007 (“For example, if a user fast scans multiple channels 1 to 10 sequentially, **video flows of those ten channels** are sent concurrently to a multicast server port of the multicast access device for a period of time.”) (emphasis added); *id.* at [4:22–26] (“If no joining message of the channel sent from another multicast user is received in a defined fast quitting response time, it is considered that no other user is watching the channel and **multicast flow of the channel** is cut immediately. If a joining message of the channel sent from another multicast user is received in the defined fast quitting response time, the **multicast flow of the channel** continues to be forwarded instead of being cut.”) (emphasis added).

Prelim. Resp. 12.

We are persuaded, based on the current record, that the multicast “channel” in *Li* teaches the “multicast packet stream” recited in claim 1 of the ’394 patent. The word “channel” is described throughout *Li* as the flow of data (communication packets) that carry the multicast content, such as a TV channel. *See, e.g.*, Ex. 1007, 3:9–22 (referring to a channel as an IPTV channel that has video flow); 3:23–4:15 (describing multicast channels as IPTV channels); 4:18–27 (describing that when a quit request is processed, a message is sent to check if any other users are “watching the channel” and, if not, “multicast flow of the channel is cut immediately”). For example, *Li* discusses that

in order to provide all users with an [IPTV] experience similar to traditional CATV (Cabled TV), a channel switching request of a single user has to be processed within 1 second In

order to solve the delay problem in multicast processing, there is a solution in which all multicast programs are pushed to the access device. However, this solution may lead to a significant increase of fixed bandwidth occupied by multicast when there is a large number of *multicast channels*. For example in the case of 1000 *multicast channels*, each of which occupies a bandwidth of 5M on average, a fixed bandwidth of 20G is needed from an edge device to an access device in order to push multicast traffic.

Ex. 1007, 3:24–4:8 (emphasis added). In that discussion, Li is referring to a “multicast channel” as the data carrying an IPTV channel, which has a 5M average bandwidth. *Id.*

Moreover, at this stage, when Li is viewed as a whole, we do not find “channel” in Li is defined as a “multicast group,” as Patent Owner seems to contend. *See* Prelim. Resp. 11. Rather, as used in Li, a “multicast group” is a group of multicast channels, which, for example, might have a common trait, such as being channels that are frequently selected. *See, e.g.,* Ex 1007, 10:2–3 (reciting “creating a multicast group of user frequently selected multicast channels in a multicast forwarding table of a main control board of the access device”), 55:27–56:1 (reciting “creating a multicast group of frequently selected multicast channels in a multicast forwarding table of a main control board of the access device”). The sentence in Li cited by Patent Owner says the multicast group is “often” referred to as a channel, not the other way around, so it would seem to indicate an informal shorthand, i.e., a group of multicast channels may “often” be referred to as a “channel.” Ex. 1007, 2:14–17. That does not indicate the reverse, that a multicast channel must always be a group, and such an interpretation is contradicted by the numerous references in Li that describe a multicast

channel as being a single channel, such as an IPTV channel, as discussed above.

Furthermore, we do not find that either of the other passages in Li cited by Patent Owner (set forth above) shows that there is a difference between “channel” as used in Li and “stream” as used in the ’394 patent. The citation to Li by Patent Owner to multiple channels being sent concurrently over the port is describing a problem that existed prior to the invention in Li, namely that when a person “fast scans multiple channels 1 to 10 sequentially,” this leads to “concurrent transmission of old and new video flows and wastes a lot of bandwidth.” Ex. 1007, 3:17–19. The reason for this is because it takes time to quit a channel, so fast scans (changing the channel quickly (“channel surfing”), which involves quitting the old channel and adding the new one) result in adding channels “for a period of time” before the quit process finishes. Ex. 1007, 3:12–22. Therefore, channel surfing could degrade performance. *Id.* at 4:11–13. So this citation does not show that Li’s multicast channel is different than claim 1’s “multicast packet stream,” but is instead framing one of the problems that Li is meant to address.

Patent Owner’s second citation to Li is describing the process that occurs when a client quits subscribing to a multicast channel in the prior art and does not relate to what constitutes the multicast channel in Li. Ex. 1007, 4:16–27. There may be multiple clients subscribing to the same channel, sometimes on the same port, so when one client quits the channel, the multicast content continues to be processed, or, alternatively, if another client subscribes within a “defined fast quitting response time,” then the flow of multicast content will also continue uninterrupted. *Id.*

Accordingly, Petitioner has made a sufficient showing, based on the record before us, that Weyman in view of Li teaches this limitation.³

l) Limitation 1l – wherein the request indicates that the given multicast packet stream is to be forwarded over the high-capacity port, and

Based on the current record, we are persuaded that Petitioner has shown sufficiently that Weyman teaches this limitation. See Pet. 46–47; Ex. 1005 ¶¶ 41–43, 137, 162; Ex. 1002 ¶¶ 156–162. Petitioner contends Weyman teaches that once the request (IGMP report) is duplicated and distributed in Weyman, information is extracted from it, including the ingress port, to update the database entries. Pet. 46–47. That process can also be applied to the aggregated link. Pet. 47. Patent Owner does not dispute that Weyman teaches this limitation.

m) Limitation 1m – wherein updating the list comprises modifying the list to indicate that the given multicast packet stream is permitted for forwarding over the high-capacity port only when the number of multicast packet streams that are permitted for forwarding over the high-capacity port, including the given multicast packet stream, does not exceed the upper limit.

Based on the current record, we are persuaded that Petitioner has shown sufficiently that the combination of Weyman and Li teaches this limitation, for similar reasons to those discussed above with respect to limitation 1k, i.e., that a POSITA would have been motivated to combine Li’s port control with Weyman’s distributed router to implement an upper limit on the number of multicast streams permitted on a port. See also Pet.

³ The parties are encouraged to address the interpretation of “multicast packet stream” in the challenged claims during trial.

47–49. Patent Owner does not dispute that Weyman and Li teach this limitation.

n) Conclusion

Based on the current record, we find that Petitioner has demonstrated a reasonable likelihood of prevailing for claim 1. Petitioner’s Ground 1 also contends that claim 11, which is an apparatus claim for a network element that otherwise has essentially the same limitations as claim 1, is rendered obvious for the same reasons discussed above for claim 1. Pet. 51–56. Patent Owner opposes Petitioner’s arguments for claim 11 for the same reasons as discussed above for claim 1. Prelim. Resp. 10–12. Therefore, based on the current record, we also find Petitioner has demonstrated a reasonable likelihood of prevailing for claim 11.

E. Ground 4

Petitioner contends that claims 8 and 18 are unpatentable as obvious over Weyman in view of Jain and LeMaire, citing the testimony of Dr. Houh as support. Pet. 68–83; Ex. 1002 ¶¶ 221–281. Patent Owner opposes institution, specifically focusing on limitation 8k (which is also recited in limitation 18j). Prelim. Resp. 13–16. We are persuaded that Petitioner has established a reasonable likelihood of prevailing on its asserted ground based on Weyman in view of Jain and LeMaire as to claims 8 and 18 for the reasons discussed below.

1. Jain

Jain is a patent application titled “System and Method for Controlling Boot-Up Process in a Communications Network Switch.” Ex. 1010, codes (12), (54). Jain discloses controlling the boot-up process in a communication device (referred to as a network node) by effecting a link down, i.e., deactivating the ports on the device, to allow initialization and

configuration of the device’s software to occur before reactivating the ports for communication. Ex. 1010, code (57), ¶¶ 19–21. Controlling the boot-up process in this way avoids deleterious effects to the integrity of the traffic received on the ports. *Id.* ¶ 20.

2. Analysis of Claim 8

For the preamble to claim 8 and claim elements designated as 8a–8i in the Petition, Petitioner refers back to similar elements to claim 1 for why Weyman teaches the limitations. Pet. 75–77. Patent Owner does not dispute that Weyman teaches these limitations. Based on the current record, and for the reasons discussed above with respect to the corresponding limitations for claim 1, Petitioner has shown sufficiently that Weyman teaches these limitations.

For limitation 8j, “wherein operating the network element comprises initializing a new processing unit added to the network element by,” Petitioner contends that “Weyman discloses that the distributed router ‘can accommodate the **addition** or removal of unit’ . . . and ‘[i]f a unit with a default configuration joins the fabric[,] it needs to **update its configuration** to that of the distributed multicast router.’” Pet. 77 (quoting Ex. 1005 ¶¶ 69, 156). Patent Owner does not dispute that Weyman teaches limitation 8j. Based on the current record, Petitioner has shown sufficiently that Weyman teaches limitation 8j.

For limitation 8k, “deactivating the ports to which the new processing unit is assigned,” Petitioner contends that Jain teaches this limitation. Pet. 78. Specifically, according to Petitioner, Jain teaches that “when a new unit is added to the distributed router, the distributed router can disable or discontinue (‘deactivat[e]’) the user ports of the new unit.” *Id.* (citing Ex. 1010 ¶ 20). Petitioner cites the following passage in Jain for this: “a

‘Link Down’ condition is effectuated on at least a portion of the link ports in the network node. . . . When the Link Down condition is sensed by the entities (i.e., devices and nodes) connected to the network node via respective links, network traffic on the links is discontinued (block 206).” Ex. 1010 ¶ 20; *see* Pet. 78.

Patent Owner disputes that Jain discloses limitation 8k because “Jain discloses a controlled boot-up process that issues a ‘Link Down’ command to disable ports on a newly-added node in a network. . . . But that is not what the claims require. . . . [T]he claims require ‘deactivating the ports to which the new processing unit is assigned.’” Prelim. Resp. 13 (citations omitted). Patent Owner continues “Jain is clear that the controlled boot-up process is in response to a reset condition due to a catastrophic failure or similar reason.” *Id.* (citing Ex. 1010 ¶¶ 19, 20). Therefore, according to Patent Owner, “Jain does not issue a Link Down command when a new processing unit is added to a network. Rather, Jain’s boot-up process focuses on a node that already exists and is active in the network but was reset or powered down.” *Id.* at 14 (citing Ex. 1010 ¶¶ 17, 19).

Based on the current record, we find that Petitioner has made a sufficient showing that Jain teaches limitation 8k, and we are unpersuaded by Patent Owner’s argument. Contrary to Patent Owner’s contention, Jain does not limit a Link Down command to a “catastrophic failure or similar reason.” Prelim. Resp. 13; Ex. 1010 ¶ 19. Rather, Jain says that the “Link Down” condition “deactivate[s] or de-energize[s]” its “link port interfaces” and can be effectuated “for some reason,” including, for example, “a catastrophic switch software and/or hardware failure, reset, power down, rebooting, etc.” Ex. 1010 ¶ 19. Patent Owner acknowledges that the Link Down condition deactivates the ports on a processing unit, but disputes that

it would be triggered when a new processing unit is assigned. Prelim. Resp. 13. Based on the current record, we disagree. Jain describes that the Link Down can be triggered, for example, when the “power” is turned off or “reboot[ed].” Ex. 1010 ¶ 19. Therefore, when a new card is added to a router and the power is turned on, a Link Down condition could be in effect, in which case the ports would be deactivated. *Id.*

Patent Owner also disputes Petitioner’s contention that a POSITA would have been motivated to combine Weyman with Jain because “Weyman already discloses specific mechanisms by which to add a new unit to Weyman’s router configuration.” Prelim. Resp. 14–15 (citing Ex. 1005 ¶ 69); *see* Pet. 70–71; Ex. 1002 ¶¶ 227–229. Based on the current record, and for the reasons given by Petitioner and Dr. Houh, at this stage we find that Petitioner has made a sufficient showing that a POSITA would have been motivated to make this combination. *See* Pet. 70–71; Ex. 1002 ¶¶ 227–229. At this stage, we find a POSITA would have understood that commencing communications without initialization could cause the ports to exhibit “spurious logic conditions that may cause . . . commenc[ing] network traffic while the switch software . . . is still in an incomplete operational state” and “various deleterious effects with respect to the integrity of the traffic received at the network node.” Ex. 1010 ¶ 19; *see* Pet. 71; Ex. 1002 ¶¶ 227–228. Weyman does not specifically account for these deleterious effects, so, based on the current record, we are persuaded that a POSITA would find it beneficial to make the combination to account for them. Ex. 1005 ¶ 156; Pet. 71; Ex. 1002 ¶¶ 227–228.

For limitation 8l, “while the ports to which the new processing unit is assigned are deactivated, sending a multicast status request, receiving multicast membership reports . . . , constructing the list . . . based on the

received membership reports,” Petitioner contends that the combination of Weyman, Jain and LeMaire teaches deactivating the ports, sending the multicast status request, receiving a multicast member report, and constructing the list. Pet. 78–80. Patent Owner does not dispute this combination teaches limitation 8l. Based on the current record, Petitioner has shown sufficiently that Weyman, Jain, and LeMaire teach limitation 8l for the reasons set forth by Petitioner.

The final limitation, 8m, is “after constructing the list, activating the ports to which the new processing unit is assigned.” Petitioner contends that Jain discloses that “once the new unit completes the initialization process—including the construction of the forwarding table—the unit activates the previously disabled ports.” Pet. 80 (citing Ex. 1010 ¶¶ 7, 21). Patent Owner does not dispute that Jain teaches limitation 8m. Based on the current record, we are persuaded that Jain teaches limitation 8m for the reasons set forth by Petitioner.

Petitioner’s Ground 4 also contends that claim 18, which is an apparatus claim for a network element that otherwise has essentially the same limitations as claim 8, is rendered obvious for the same reasons discussed above for claim 8. Pet. 81–83. Patent Owner opposes Petitioner’s arguments for claim 18 for the same reasons as discussed above for claim 8. Prelim. Resp. 13–16. Therefore, based on the current record, we also find Petitioner has demonstrated a reasonable likelihood of prevailing for claim 18.

III. CONCLUSION

Based on the arguments presented in the Petition, we conclude that Petitioner has demonstrated a reasonable likelihood of prevailing with respect to at least one claim of the ’394 patent challenged in the Petition.

Accordingly, we institute a trial on all claims and all grounds asserted in the Petition. 37 C.F.R. § 42.108(a). The Board has not made a final determination under 35 U.S.C. § 318(a) with respect to the patentability of the challenged claims.

IV. 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, 2, 4–12, and 14–18 of the '394 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 '394 patent shall commence on the entry date of this Decision, and notice is hereby given of the institution of a trial.

IPR2024-00506
Patent 8,014,394 B2

FOR PETITIONER:

Taeg Sang Cho
Jonathan V. Lewis
DESMARAIS LLP
tcho@desmaraisllp.com
jlewis@desmaraisllp.com

FOR PATENT OWNER:

James R. Nuttall
Katherine D. Cappaert
Sadaf Misbah
STEPTOE LLP
jnuttall@steptoe.com
kcappaert@steptoe.com
smisbah@steptoe.com