

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

JUNIPER NETWORKS, INC.,
Petitioner,

v.

WSOU INVESTMENTS, LLC D/B/A
BRAZOS LICENSING AND DEVELOPMENT,
Patent Owner.

IPR2021-00769
Patent 8,284,656 B2

Before THU A. DANG, ROBERT J. WEINSCHENK, and
JOHN D. HAMANN, *Administrative Patent Judges*.

DANG, *Administrative Patent Judge*.

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

I. INTRODUCTION

A. *Background*

In response to a Petition (Paper 1, “Pet.”) filed by Juniper Networks, Inc. (“Petitioner”), we instituted *inter partes* review of claims 1, 2, 7–13, and 15 (the “challenged claims”) of U.S. Patent No. 8,284,656 B2 (Ex. 1001, “the ’656 patent”). See Paper 9 (“Dec. Inst.”). During the trial, WSOU Investments, LLC d/b/a Brazos Licensing and Development (“Patent Owner”) filed a Response (Paper 13, “PO Resp.”), to which Petitioner filed a Reply (Paper 15, “Pet. Reply.”). In turn, Patent Owner filed a Sur-Reply. Paper 16 (“PO Sur-Reply”). An oral hearing was held with the parties on August 18, 2022. A transcript of the hearing has been entered into the record. Paper 20 (“Tr.”).

We have jurisdiction under 35 U.S.C. § 6. This Decision is a Final Written Decision under 35 U.S.C. § 318(a) as to the patentability of the challenged claims. Based on the record before us, Petitioner has shown by a preponderance of the evidence that claims 1, 2, 7–13, and 15 of the ’656 patent are unpatentable.

B. *The ’656 Patent*

The ’656 patent, titled “System and Method for Resilient VPLS over Multi-Nodal APS Protected Provider Edge Nodes,” issued on October 9, 2012, from Application No. 11/443,101, with a filing date of May 31, 2006. Ex. 1001, codes (54), (45), (21), (22). The ’656 patent relates to “automatic protection switching (APS) in a communications network,” and more particularly to “a system and method for a multi-nodal APS (MN-APS) redundant pair of PE (provider edge) nodes for a virtual private [Local Area Network] LAN service (VPLS).” *Id.* at 1:13–17.

The '656 patent illustrates an exemplary prior art VPLS network in Figure 1, reproduced below:

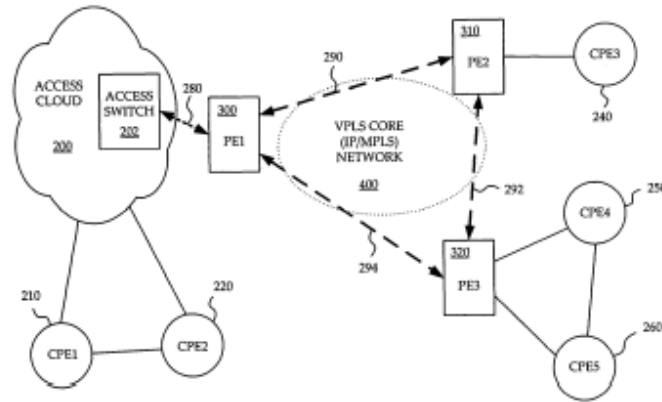


FIG. 1 (PRIOR ART)

Figure 1 shows a prior art system for “providing VPLS to a number of customer premise equipment sites.” *Id.* at 5:64–65.

In Figure 1, first customer premises equipment CPE1 210 and second customer premises equipment CPE2 220 are connected to access cloud 200 outside of VPLS core network 400 of the service provider, wherein access cloud 200 has access switch 202 linked to first provider edge node PE1 300 via access link 280. *Id.* at 1:45–53. First provider edge node PE1 300 is linked through VPLS core network 400 to other PE nodes through tunnels 290 and 294, wherein first tunnel 290 links first provider edge node PE1 300 to second provider edge node PE2 310 and third tunnel 294 links first provider edge node PE1 300 to third provider edge node PE3 320. *Id.* at 1:58–63. Second provider edge node PE2 310 is then linked via second tunnel 292 to third provider edge node PE3 320. *Id.* at 1:60–61. As shown in Figure 1, fourth customer premises equipment CPE4 250 and fifth customer premises equipment CPE5 260 are linked to third provider edge node PE3 320, and third customer premises equipment CPE3 240 is linked to second provider edge node PE2 310. *Id.* at 1:63–67.

Each provider edge node 300, 310, 320, possesses a media access control (MAC) address table having MAC address entries which provide information used by provider edge node 300, 310, 320 to link to each customer premises equipment 210, 220, 240, 250, 260. *Id.* at 2:1–5. Each MAC address entry in the MAC address table of a particular provider edge node contains the MAC address of a customer premises equipment (CPE) and a MAC address mapping value which designates the link to the CPE. *Id.* at 2:5–9.

The '656 patent recognizes that, in providing communications services to customers, service providers attempt to ensure that services are delivered without loss of data and with minimal interruption, especially to the links between the PE nodes on the edge of a VPLS network and the access equipment immediately downstream/upstream of the PE node towards customer premises equipment. *Id.* at 3:7–13. A well-known approach to ensuring data transfer services is APS. *Id.* at 3:13–15. In order to provide redundancy and protection from link failure, protection switching between the access cloud and the PE nodes is employed. *Id.* at 1:35–37.

The '656 patent also recognizes that, after an APS switchover, other provider edge nodes will keep sending traffic to the de-activated provider edge node, which causes “black-holing” of traffic. *Id.* at 4:37–44. According, the '656 patent provides for flushing the first MAC address entry from the third provider edge node. *Id.* at 5:45–57.

An exemplary network that employs APS is illustrated in Figure 3, reproduced below:

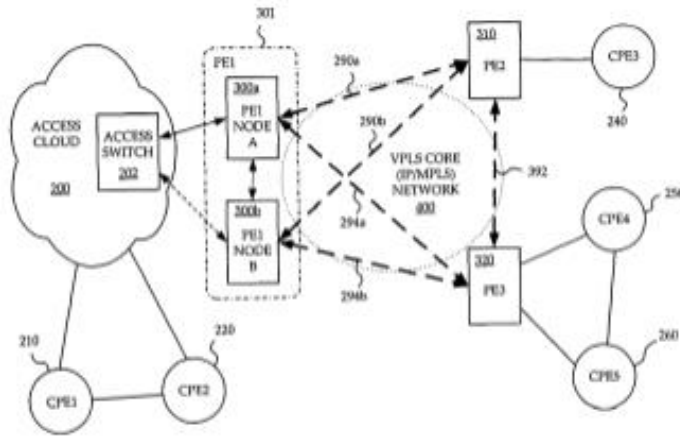


FIG. 3

Figure 3 shows a system for VPLS having multi-nodal APS configuration between an access cloud and PE nodes. *Id.* at 6:3–6.

In Figure 3, access switch 202 of access cloud 200 is linked to redundant pair of provider edge nodes PE1 301 that includes redundant provider edge node PE1 NODE A 300a, acting as the working node of the pair, and redundant provider edge node PE1 NODE B 300b, acting as the protection node of the pair. *Id.* at 6:37–45. Second provider edge node PE2 310 is linked via first tunnel 290a to working provider edge node 300a and via second tunnel 290b to protection provider edge node 300b, while third provider edge node PE3 320 is linked via third tunnel 294a to working provider edge node 300a and via fourth tunnel 294b to protection provider edge node 300b. *Id.* at 6:50–57.

In the event of an APS failover at redundant node pair 301, after working provider edge node 300a becomes inactive, protection provider edge node 300b becomes active, first and third tunnels 290a, 294a become invalid while second and fourth tunnels 290b, 294b become valid. *Id.*

at 7:14–18. That is, upon an APS switchover, working node 300a becomes inactive while protection node 300b becomes active. *Id.* at 7:50–52.

Working node 300a then sends an explicit request to second provider edge node 310 to flush its MAC address entries learned through working node 300a, which is the MAC address entry associated with access to first customer equipment 210 designating first tunnel 290. *Id.* at 7:52–57.

Working node 300a also sends a similar explicit request to third provider edge node 320 to flush its MAC address learned through working node 300a, which is the MAC address entry associated with access to second customer premises equipment 220 designating third tunnel 294a. *Id.* at 7:58–62.

C. The Challenged Claims

Of the challenged claims, claims 1 and 12 are independent. Independent claim 1 is illustrative of the challenged claims, and is reproduced below:

1. A system of redundant pair automatic protection switching at the edge of a Virtual Private LAN System (VPLS) network comprising a redundant pair of provider edge nodes comprising:

a first provider edge node that is a working node of the redundant pair before a switchover and a protection node of the redundant pair after the switchover, and

a second provider edge node that is the protection node of the redundant pair before the switchover and the working node of the redundant pair after the switchover; and

a third provider edge node possessing a media access control (MAC) address entry for the first provider edge node, previously learned by the third provider edge node, wherein the first provider edge node, when functioning as the working node, communicates with the third provider edge node, and, after the switchover in the redundant pair, sends an explicit request to

the third provider edge node to flush said MAC address entry for the first provider edge node.

Ex. 1001, 8:53–9:4.

D. Asserted Grounds of Unpatentability

Petitioner asserts that claims 1, 2, 7–13, and 15 of the '656 patent are unpatentable on the following grounds (Pet. 6):

Claim(s) Challenged	35 U.S.C. § ¹	Reference(s)/Basis
1, 2, 7–13, 15	103	Brockners, ² Lasserre ³
1, 2, 7–13, 15	103	Brockners, Lasserre, RFC 3386 ⁴

Petitioner relies on the Declaration of Jon Weissman, Ph.D. (Ex. 1003) in support of its unpatentability contentions.

II. ANALYSIS

A. Level of Ordinary Skill in the Art

In determining whether an invention would have been obvious at the time it was made, we consider the level of ordinary skill in the pertinent art at the time of the invention. *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966). Relying on the declaration of Dr. Weissman, Petitioner contends

¹ The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284, 287–88 (2011), amended 35 U.S.C. §§ 102, 103, effective March 16, 2013. Because the application from which the '656 patent issued was filed before this date, the pre-AIA versions of §§ 102, 103 apply.

² Frank Brockners et al., “Metro Ethernet – Deploying the extended Campus using Ethernet Technology,” 2003 (“Brockners”; Ex. 1004).

³ Mark Lasserre et al., “Virtual Private Lan Services over MPLS,” March 2003 (“Lasserre”; Ex. 1005).

⁴ Ed W. Lai et al., “Network Hierachy and Multilayer Survivability,” Request for Comments (RFC) 3386, Aug. 1994 (“RFC 3386”; Ex. 1006).

that a person of ordinary skill in the art (POSITA) related to the '656 patent would possess “a bachelor’s degree in electrical engineering, computer engineering, computer science, or a related field (or its equivalent), plus at least two years of experience working in networking environments, including at least some experience with networking protocols and network routing,” wherein “[a]dditional graduate education could substitute for professional experience, while significant experience in the field might substitute for formal education.” Pet. 19–20 (citing Ex. 1003 ¶ 34).

Patent Owner does not propose a definition for a POSITA but contends that “Petitioner fails to prove unpatentability even if the Board were to apply Petitioner’s proposed definition.” PO Resp. 2.

We adopt and apply Petitioner’s definition of the level of ordinary skill in the art at the time of the claimed invention because, based on the record, this proposal appears to be consistent with the '656 patent, the asserted prior art, and is supported by the testimony of Dr. Weissman. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (the prior art, itself, can reflect the appropriate level of ordinary skill in art).

B. Claim Construction

We construe each claim “using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. [§] 282(b), including construing the claim in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.” 37 C.F.R. § 42.100(b) (2020). Under this standard, claim terms are generally given their plain and ordinary meaning as would have been understood by POSITA at the time of the invention and in the context of the entire patent

disclosure. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) (*en banc*) (“*Phillips*”).

Petitioner contends that “no express constructions are necessary because the claims encompass the prior-art mappings under any construction consistent with *Phillips*.” Pet. 20. Although Patent Owner also does not provide any express construction, in its Sur-Reply, Patent Owner contends that, according to the recited language of claim 12, the “learning” step “must be based on communication between the first and third provider edge nodes,” and “such communication must occur while the first provider edge node is functioning as the working node.” See PO Sur-Reply 1. Further, Patent Owner contends that “all challenged claims require the ‘first provider edge node’ to be ‘a protection node’ (as opposed to a ‘working node’) when it sends the flush request.” *Id.* at 4.

We determine that it is unnecessary to construe any claim term expressly to resolve the disputed issues 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)). Rather, we address the “learning” step and “first provider edge node” based on the parties’ explicit arguments with respect to the prior art references of Brockners and Lasserre.

C. Principles of Law

A patent claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, “would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains.” *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 ordinary skill in the art; and (4) objective evidence of nonobviousness.⁵ See *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

D. Obviousness of Claims 1, 2, 7–13, and 15

Petitioner contends that claims 1, 2, 7–13, and 15 of the ’656 patent are obvious over the combination of Brockners and Lasserre (Pet. 24–58), or alternatively, over the combination of Brockners and Lasserre in further view of RFC 3386. *Id.* at 58–66. In response, Patent Owner contends that the cited references do not disclose a third provider edge node learning a MAC address (PO Resp. 5–11; PO Sur-Reply 8–16), or a first provider edge node sending an explicit request to a third provider edge node to flush a MAC address (PO Resp. 11–16; PO Sur-Reply 16–22), as claimed in independent claims 1 and 12.

1. Brockners

Brockners, titled “Metro Ethernet – Deploying the extended Campus using Ethernet Technology,” is a document presented in 2003 at the “Proceedings of the 28th Annual IEEE International Conference on Local Computer Networks (LCN’03).” Ex. 1004, 1.

⁵ Neither party presents evidence or arguments regarding objective evidence of non-obviousness in the instant proceeding.

Brockners is directed to redundancy and loop avoidance for large provider networks. Ex. 1004, Abstract. In particular, Brockners is directed to redundancy in VPLS. *Id.* §§ 4.1–4.2 (“Redundancy in (H-) VPLS”). An illustration of Brockners’s VPLS network is depicted in Figure 5, reproduced below.

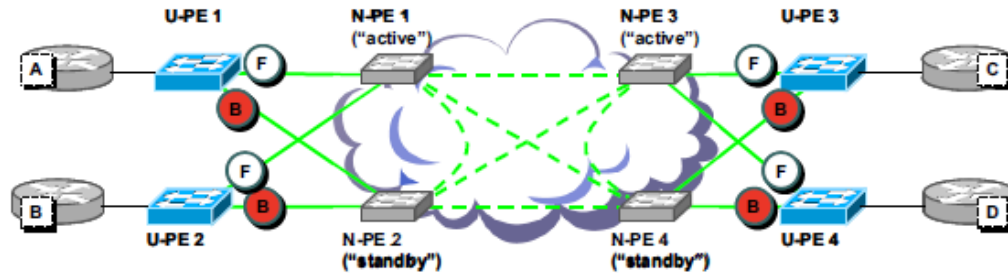


Figure 5

Figure 5 shows a VPLS network in which “active” network-facing provider edge devices (N-PEs) and “standby” N-PEs are employed to provide redundancy. *Id.* § 4.2.

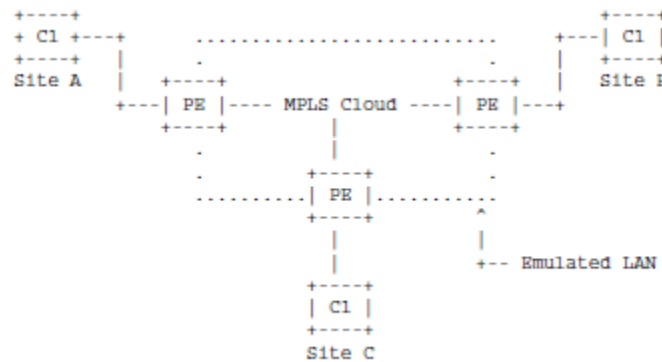
In the VPLS network in Figure 5, a loop exists between N-PE 1 and N-PE 2 across the MPLS network, wherein loop avoidance is required. *Id.* Once pseudo-wires (PWs) are established between a user-facing provider edge device (U-PE) and an N-PE, the U-PE must block the transmission and reception of packets on one of the PWs, or forwarding loops will occur. *Id.* Thus, if the PW between the U-PE and the N-PE or the forwarding N-PE were to fail, the U-PE simply activates the blocked PW to the standby N-PE. *Id.*

The N-PE then must send a MAC flush message to other N-PEs to inform them that the topology has changed as the MAC forwarding tables may be invalid. *Id.* Brockners recognizes that, without a MAC flushing

mechanism, traffic may be black-holed until the stale MAC entries age out in the forwarding tables. *Id.*

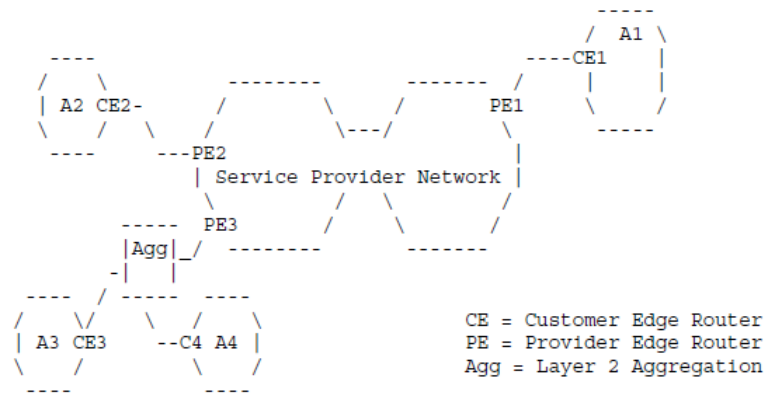
2. Lasserre

Lasserre, titled “Virtual Private LAN Services over MPLS,” is a working document (Internet Draft) of the Internet Engineering Task Force (IETF) issued in March 2003. Ex. 1005, 1. Lasserre describes “a virtual private LAN service (VPLS) solution,” wherein a VPLS “creates an emulated LAN segment for a given set of users.” *Id.* at Abstract. An illustration of Lasserre’s VPLS system is depicted in the figure reproduced below.



Id. at 5. The Figure shows a “Topological Model for VPLS,” wherein a set of PE devices interconnected via pseudowires appears as a single emulated LAN to customer C1 at Site A. *Id.* In the VPLS system shown in the Figure, each PE device will learn remote MAC address to pseudowire associations and will also learn directly attached MAC addresses on customer facing ports. *Id.*

The operation of Lasserre’s VPLS is depicted in the figure reproduced below.



Id. at 12–13. The Figure shows the operation of a VPLS, wherein the VPLS has been set up between provider edge routers, PE1, PE2, PE3. *Id.* at 12. In an embodiment, provider edge router PE1 signals virtual connection (VC) label 102 to provider edge router PE2 and VC label 103 to provider edge router PE3, while provider edge router PE2 signals VC label 201 to provider edge router PE1 and VC label 203 to provider edge router PE3. *Id.*

As shown in the Figure, when a packet from site A1 is bound for site A2, the packet leaves from customer edge route CE1, the packet having source MAC address of M1 and destination MAC address of M2. *Id.* If provider edge router P1 does not know where M2 is, it will multicast the packet to provider edge routers PE2 and PE3. *Id.* When provider edge router PE2 receives the broadcasted message from provider edge router PE1, it will have signaled VC label 201, and thus, can conclude that source MAC address M1 is behind provider edge router PE1 since provider edge router PE1 distributed VC label 201. *Id.* Thus, provider edge router PE2 can therefore associate source MAC address M1 with VC label 102. *Id.*

3. Obviousness over Brockners and Lasserre (Ground 1)

Petitioner contends that the '656 patent does not purport to have invented a new VPLS topology, but rather purport to solve the problem of

“black-holing” in the prior art “by having the working provider edge node send a MAC flush message to other provider edge nodes when it switches over to the protection node causing them to flush their MAC address tables.”

Pet. 1. However, according to Petitioner, “[t]he ’656 patent’s solution to black-holing—sending a MAC flush message—is disclosed in various prior art references, including the Brockners’s reference[] that forms the basis for this Petition.” *Id.*

Petitioner then contends that Lasserre and Brockners are both directed at VPLS. Pet. 25. Petitioner contends that “Lasserre discloses MAC address learning for VPLS network,” wherein it would have been obvious to combine “a known technique (MAC learning) to improve similar devices (the PEs in Brockners),” “allowing them to learn MAC addresses for network nodes.” *Id.* (citing Ex. 1003 ¶ 67). According to Petitioner, a POSITA “would have been motivated to combine Brockners and Lasserre at least because Brockners directly instructs as much and cites Lasserre.” *Id.* (citing Ex. 1004, § 4.1 (“The specification [6] uses a full mesh of pseudo-wires (PW) and split-horizon forwarding between the core N-PEs to provide loop free connectivity, and therefore does not require spanning tree for both Homogenous and Hybrid models.”)), § 7 (identifying Lasserre as item “[6]”); Ex. 1003 ¶ 67).

Having reviewed Petitioner’s arguments and supporting evidence in the complete record, we determine Petitioner has demonstrated by a preponderance of the evidence that claims 1, 2, 7–13, and 15 of the ’656 patent are obvious over Brockners and Lasserre, notwithstanding Patent Owner’s arguments to the contrary. We address in detail Petitioner’s

arguments and Patent Owner's responses with respect to the limitations of independent claims 1 and 12.

- i. *Preamble: A method/system of “redundant pair automatic protection switching at the edge of a . . . VPLS[] network comprising a redundant pair of provider edge nodes,” (claims 1, 12)*

We agree with Petitioner that Brockners discloses a “typical VPLS architecture,” wherein the core network shown in the middle of Figure 1, is “an MPLS or IP core.” Pet. 26–27 (citing Ex. 1004, § 2; Ex. 1003 ¶ 70). In particular, as Petitioner contends, at the edges of the VPLS network are N-PE 1 to N-PE 4, which are “network-facing provider *edge*’ nodes that are connected together using Pseudo-Wires.” *See id.* at 27 (citing Ex. 1004, § 4.1, Fig. 1; Ex. 1003 ¶ 70). As Petitioner further contends, outside of the VPLS core, customer equipment (CEs) are connected to the user-facing provider edge nodes (U-PE 1 to U-PE 3) through an access network. *See id.* (citing Ex. 1004, § 2, Fig. 1; 1003 ¶ 70).

We further agree with Petitioner that Brockners's VPLS network is a system with redundant pair automatic protection switching and comprises a redundant pair of provider edge nodes. Pet. 27. As Petitioner contends, Brockners' “VPLS network” shown in Figure 1 can be configured with N-PE 1 and N-PE 2 as redundant N-PEs. *Id.* (citing Ex. 1004, §§ 4.2, 4.5). In Brockners, if N-PE 1 or its links fails, the system automatically switches over to the standby N-PE 2. *Id.* at 28 (citing Ex. 1004, § 4.2, Fig. 5; Ex. 1003 ¶ 71).

Patent Owner does not address Petitioner's explanations and supporting evidence regarding this limitation in the preamble of claim 1.

See generally PO Resp.; PO Sur-Reply. Based on the complete record presented, we are persuaded that Petitioner has demonstrated by a preponderance of the evidence that the combination of Brockners and Lasserre teaches a “system of redundant pair automatic protection switching at the edge” of a VPLS network comprising a “redundant pair of provider edge nodes,” as recited in claims 1 and 12, regardless of whether or not the preamble is limiting.⁶

- ii. *“a first provider edge node that is a working . . . before a switchover and a protection node . . . after the switchover,” and “a second provider edge node that is the protection node . . . before the switchover and the working node . . . after the switchover” (claims 1, 12)*

As Petitioner contends, Brockners discloses that N-PE 1 and N-PE 2 are “a redundant pair of provider edge nodes,” wherein Figure 5 labels N-PE 1 the “active” node and N-PE 2 the “standby node.” Pet. 28–29 (citing Ex. 1004, Fig. 5). We agree with Petitioner, a POSITA would have understood that “the active node, N-PE 1, in Brockners is the claimed ‘working node’ because it is the node that is working to send and receive traffic before a switchover,” while “N-PE 2 is a protection node.” *Id.* at 29 (citing Ex. 1001, 6:40–50; Ex. 1004, § 4.2; Ex. 1003 ¶ 73).

Petitioner further contends that Brockners discloses that upon activation of the standby node N-PE 2, the system blocks the transmission and receipt of packets on previous active node N-PE 1. Pet. 29–30 (citing Ex. 1004, § 4.2). We agree with Petitioner that a POSITA would

⁶ Because Petitioner presents evidence that the prior art teaches the recitation in the preamble, we need not decide whether the preamble is limiting.

have understood that “by deactivating the previous active ‘working node’ that node becomes a protection node should the system need to switch back.” *Id.* at 30 (citing 1003 ¶ 74). That is, we agree with Petitioner that the POSITA would have also found it obvious “for N-PE 1 to serve as a protection node after the switchover.” *Id.* (citing Ex. 1003 ¶ 75).

Further, as Petitioner contends, Brockners discloses that prior to switchover, N-PE 2 is a “standby” provider edge node. Pet. 31 (citing Ex. 1004, Fig. 5; Ex. 1003 ¶ 75). We agree with Petitioner that a POSITA would have understood that “the standby node in Brockners is the claimed ‘protection node’ because it is inactive prior to the switchover and is active if the ‘forwarding N-PE were to fail.’” *Id.* (citing Ex. 1004, §4.2; Ex. 1003 ¶ 77). Thus, we agree with Petitioner that Brockners’ “N-PE 2 is the working node . . . after the switchover.” *Id.* at 32.

Patent Owner does not address Petitioner’s explanations and supporting evidence regarding this limitation in claim 1. *See generally* PO Resp.

Having reviewed Petitioner’s arguments and supporting evidence in the complete record, notwithstanding Patent Owner’s arguments to the contrary, we determine Petitioner has demonstrated by a preponderance of the evidence that the combination of Brockners and Lasserre teaches a “a first provider edge node” that is a “working node” before a switchover and a “protection node” after the switchover, and “a second provider edge node” that is the “protection node” before the switchover, and the “working node” after the switchover, as recited in claims 1 and 12.

- iii. *“a third provider edge node possessing a media access control (MAC) address entry for the first provider edge node, previously learned by the third provider edge node” (claim 1); “learning, with the third provider edge node, a first media access control (MAC) address for the first customer premises equipment, based on said communicating” (claim 12)*

We are persuaded by Petitioner’s contention that Brockners teaches that provider edge nodes in its system use “MAC learning.” Pet. 32–33 (citing Ex. 1004, § 3.4; Ex. 1003 ¶ 80). In particular, supported by Dr. Weissman’s testimony, Petitioner contends that provider edge nodes, such as each of the N-PEs in Brockners, learn the MAC addresses of other devices in the network using MAC learning “so that they know how to forward messages to those devices.” *Id.* (citing Ex. 1003 ¶ 80).

As Dr. Weissman testified, in “MAC address learning,” a provider edge node in a VPLS network sends packets to devices using their MAC address, and “must therefore learn the MAC addresses of those devices so that the provider edge nodes may communicate with the devices.” Ex. 1003 ¶ 46. Dr. Weissman pointed out that the VPLS network of the ’656 patent also “uses ‘known’ MAC address learning so that ‘[e]ach MAC address entry in the MAC address table of a particular provider edge node contains the MAC address of a customer premises equipment and a MAC address mapping value which designates the link to the CPE.’” *Id.* ¶ 47 (citing Ex. 1001, 2:5–14 (“each provider edge node 300, 310, 320, possesses a MAC address table having MAC address entries which provide information used by the provider edge node 300, 310, 320 to link with each customer premises equipment 210, 220, 240, 250, 260.”)). In particular, in its

“BACKGROUND OF THE INVENTION,” the ’656 patent discloses Figure 1 as “*known delivery of VPLS*” wherein provider edge nodes possess MAC address tables providing information used by the provider edge nodes to link with customer premises equipment. *See* Ex. 1001, 1:19–2:31 (emphasis added).

Accordingly, we agree with Petitioner that “Brockners in view of the general knowledge of a POSITA renders obvious that N-PE 3 possesses a MAC address entry for the first provider edge node, previously learned by the third provider edge node.” Pet. 34.

Nevertheless, as Petitioner contends, alternatively this limitation also “would have been obvious in view of Lasserre.” Pet. 35. Citing Dr. Weissman’s testimony explaining “MAC learning,” Petitioner contends that Lasserre provides an example of how provider edge nodes use MAC learning to store a MAC address. *Id.* at 36 (citing Ex. 1005 § 9; Ex. 1003 ¶ 82). We also agree with Petitioner that, “at least in view of Lasserre it is obvious that [Brockers’s] N-PE 3 uses MAC learning to build a forwarding table that possesses MAC address entries for N-PE 1.” *Id.* at 37.

As Dr. Weissman testified, in view of the combination of Brockners and Lasserre, “a POSITA would have understood that using MAC learning the third provider edge node (N-PE 3) would learn the MAC address for a first customer premises equipment (e.g., customer premises equipment labeled A in Figure 5) based on communicating.” Ex. 1003 ¶ 114 (citing Ex. 1005, § 5 (“Each PE device will learn remote MAC address to pseudowire associations and will also learn directly attached MAC addresses on customer facing ports”). According to Dr. Weissman, Lasserre provides “a simple example of how provider edge nodes learn the MAC addresses of

customer equipment in the VPLS network,” and shows “how a provider edge node, for example PE2 would learn the MAC address of customer premises equipment A1 that is at site CE1.” *Id.* We are persuaded by Petitioner’s contention, supported by Dr. Weissman’s testimony, that applying the example in Lasserre to Brockners shows that “N-PE 3 would store in its MAC address table a MAC address entry that identifies the pseudowire between N-PE 3 and N-PE 1 as the pseudowire for accessing the customer premises equipment A connected to N-PE 1.” Pet. 37 (citing Ex. 1003 ¶ 83). That is, we agree that “at least in view of Lasserre it is obvious that N-PE 3 uses MAC learning to build a forwarding table that possesses MAC address entries for N-PE 1.” *Id.*

Patent Owner argues that claim 1 does not just require the third provider edge node “to simply learn a MAC address that happens . . . to belong to a so-called ‘sending device,’” but rather, “requires ‘a third provider edge node possessing a media access control (MAC) address entry *for the first provider edge node.*’” PO Resp. 10; see also PO Sur-Reply 15. Similarly, Patent Owner contends that the plain reading of the claim language of claim 12 requires “the MAC address learned by third provider edge node must be *for the first customer premises equipment.*” PO Resp. 5; see also PO Sur-Reply 9. Patent Owner contends that, in Petitioner’s proposed combination of Brockners and Lasserre, N-PE 3 “would not know *where or to what* MAC address ‘M1’ actually appertains,” wherein “N-PE3 could only surmise that the source MAC address ‘M1’ is *somewhere behind* N-PE1,” which, at most “would allow N-PE3 to only ‘associate MAC address M1 for Customer Equipment at site A with the pseudowire it arrived on.’” PO Resp. 7–8 (quoting Ex. 1003 ¶ 115). That is, according to Patent

Owner, “this purportedly would allow N-PE3 to only “associate MAC address M1 for Customer Equipment at site A *with . . . the pseudowire that connects N-PE1 and N-PE3.*” *Id.* at 8 (citing Pet. 56). We find Patent Owner’s contentions unpersuasive.

In particular, as Petitioner points out, Patent Owner’s contention that “N-PE3 must have some specific understanding that MAC address M1 is the MAC address for Customer Equipment at site A . . . is not supported by the claim language.” Pet. Reply 8. We agree with Petitioner that there is “no requirement that the third provider edge node be cognizant of the fact that the MAC address is specifically for customer premises equipment A.” *Id.* at 8–9.

As for claim 1, Patent Owner acknowledges that the claim merely “requires ‘a third provider edge node possessing a media access control (MAC) address entry *for the first provider edge node*’” (PO Resp. 10), and thus, in the combination of Lasserre and Brockners, N-PE 3 is required to possess a MAC address *for N-PE 1*. By contending that “N-PE3 could only surmise that the source MAC address ‘M1’ is *somewhere behind* N-PE1” and wherein M1 is associated “with . . . the pseudowire that connects N-PE1 and N-PE3” (*id.* at 7–8), Patent Owner is acknowledging that N-PE 3 possesses the MAC address entry (M1) for N-PE 1 for determining the source for M1 behind N-PE 1. In particular, Lasserre discloses that the receiving provider edge router receives (and thus possesses) the packet having source MAC address entry *M1 from the first provider edge router*, to then determine that the source is behind the first provider edge router. *See* Ex. 1005, 12. On the complete record before us, we find that, in the

combination of Lasserre and Brockners, N-PE 3 possesses MAC address entry M1 that is *for N-PE 1*.

Claim 12 requires “learning, with the third provider edge node, a first media access control (MAC) address *for the first customer premises equipment*, based on said communicating.” Thus, claim 12 requires that the combination of Lasserre and Brockners at least suggest that N-PE 3 possesses a MAC address for the source behind N-PE 1.

As discussed, Patent Owner acknowledges that N-PE 3 surmises that “the source MAC address ‘M1’ is *somewhere behind* N-PE1” and wherein M1 is associated “with . . . the pseudowire” leading to the source. PO Resp. 7–8. As Petitioner points out, Lasserre’s “N-PE3 (the third provider edge node) learns the MAC address M1 (which is for customer premises equipment A) by communicating with N-PE1 (the first provider edge node), and then stores in its forwarding table an entry associating MAC address M1 with the pseudowire over which it can be accessed.” Pet. Reply 8; *see also* Ex. 1005, 12. Even Patent Owner acknowledges that Lasserre’s N-PE 3 associates the MAC address M1 for Customer Equipment at site A with the pseudowire it arrived on. PO Resp. 7–8. In others words, N-PE 3 possesses MAC address M1 and associates it with the pseudowire that connects N-PE 1 and N-PE 3, wherein Customer Equipment at site A is the source behind N-PE 1. *Id.*

Lasserre discloses that, when a packet from site A1 is bound for site A2, PE1 multicasts the packet having source MAC address of M1 and destination MAC address of M2 to provider edge routers PE2 and PE3, where when provider edge router PE2 receives the broadcasted message from provider edge router PE1, *it can conclude that source MAC address*

M1 is behind provider edge router PE1 since provider edge router PE1 distributed VC label 201. Ex. 1005, 12.

As Petitioner explained during oral arguments, in Lasserre, once provider edge router PE2 receives the packet, it will know that it received it over tunnel 201 and that the return path for tunnel 201 is tunnel 102, and it then creates a MAC address entry in the MAC table to reach M1 over tunnel 102. Tr. 8:13–16 (“a table that says, look, if I want to reach M1, I know I can reach it over tunnel 102, that that’s the tunnel that can take me to that MAC address 1”); see also Ex. 1005, 12. Petitioner contends that “[t]he PE learns both the MAC address and a tunnel for associating to the equipment,” and that “[t]he claims require learning a MAC address for the first customer-premises equipment,” wherein “we can see that the entry stored a MAC address, M1, that is for the first customer-premises equipment, A1.” Tr. 12:7–11. On the complete record before us, we find availing Petitioner’s contention that N-PE 3 possesses MAC address entry M1 that is for first customer-premises equipment, A1, by associating M1 with tunnel 102, identifying A1 as the source behind N-PE 1. As Petitioner points out, similar to Lasserre, the description of “MAC address learning that the [’656] patent consistently gives” is, with a broadcast message received by a provider edge node, the provider edge node “associates the source MAC address within [the broadcast message] with a tunnel that is leading to that equipment.” Tr. 11:2–5; see also Ex. 1001, 2:67–3:6.

Having reviewed Petitioner’s arguments and supporting evidence in the complete record, notwithstanding Patent Owner’s arguments to the contrary, we determine Petitioner has demonstrated by a preponderance of the evidence that the combination of Brockners and Lasserre teaches 1) “a

third provider edge node possessing a media access control (MAC) address entry for the first provider edge node,” as recited in claim 1; and 2) “leading, with the third provider edge node, a first media access control (MAC) address for the first customer premises equipment, based on said communicating,” as recited in claim 12.

- iv. *“the first provider edge node, when functioning as the working node, communicates with the third provider edge node,” and, “after the switchover . . . , sends an explicit request to the third provider edge node to flush said MAC address entry for the first provider edge node” (claim 1); “in response to the switchover, sending from the first provider edge node an explicit request to the third provider edge node to flush said first MAC address” (claim 12)*

We agree with Petitioner that “Brockners further discloses that the first provider edge node (e.g., N-PE 1), when functioning as the working node, communicates with the third provider edge node (e.g., N-PE 3).” Pet. 37–38 (citing Ex. 1003 ¶ 85 (citing Ex. 1004, Fig. 4); Ex. 1004, §4.2). We also find availing Petitioner’s contention that “Brockners also discloses that N-PE 1 sends to N-PE 3 a MAC flush message upon a switchover.” *Id.* at 34 (citing Ex. 1004, § 4.2). In particular, as Petitioner contends, Brockners teaches that “the third provider edge node deletes MAC address entries in the flush message in order to avoid black-holing traffic to the failed node.” *Id.* (citing Ex. 1003 ¶ 81).

According to Petitioner, “Brockners also discloses that after the switchover in the redundant pair (from N-PE 1 to N-PE 2), the working node (N-PE 1) sends an explicit request (a MAC flush message) to the third

provider edge node (N-PE 3) to flush said MAC address entry for the first provider edge node (N-PE 1).” Pet. 38. In particular, Petitioner contends that, in Brockners, “upon switchover, the active N-PE, initially N-PE1, ‘must send a MAC flush message to other N-PEs,’ including N-PE 3, ‘to inform them that the topology has changed.’” *Id.* at 38–39 (citing Ex. 1004, § 4.2). We find persuasive Petitioner’s contention, with the support of Dr. Weissman’s testimony, that “a POSITA would have understood that the first provider edge node (N-PE 1), after the switchover in the redundant pair, sends an explicit request to the third provider edge node (N-PE 3) to flush the MAC address entry for the first provider edge node.” *Id.* at 39 (citing Ex. 1003 ¶ 86).

As Petitioner points out, both the ’656 patent and Brockners use MAC flushes for the same reason, wherein Brockners state that “[w]ithout a MAC flushing mechanism traffic may be black-holed until the stale MAC entries age out in the forwarding table.” *Id.* (citing Ex. 1004, § 4.2; Ex. 1003 ¶ 87). Although Brockners states that “*the N-PE []* must send a MAC flush message to other N-PEs to inform them that the topology has changed” (Ex. 1004, § 4.2 (emphasis added)), we agree with Petitioner, as supported by Dr. Weissman’s testimony, that a POSITA would understand that “N-PE1 (the first provider edge node)” can be “the N-PE” referenced.

As Petitioner explained during oral arguments, in such a system, there are only two options, either N-PE 1 or N-PE 2 is configured to send the MAC flush message. Tr. 16:4–11. We are persuaded by Petitioner’s contention that, “when you have a genus of only two options, then both options are disclosed and at least obvious, that both options would be disclosed by the reference.” *Id.* (citing Pet. Reply at 16 (“Given that the

disclosure in Brockners identifies a genus of at most two provider edge nodes that may be configured to send the MAC flush message (N-PE1 or N-PE2), there can be no dispute that a POSITA would at once envisage both options (sending the MAC flush message from N-PE1 and sending the MAC flush message from N-PE2)”; *see* Ex. 1003 ¶¶ 85–86; *see also Kennametal, Inc. v. Ingersoll Cutting Tool Co.*, 780 F.3d 1376, 1380 (Fed. Cir. 2015) (holding that disclosure in prior art identified a class containing “fifteen possibilities” of metals and coatings which was a “sufficiently definite and limited class so that each member of the class was anticipated”); *VirnetX Inc. v. Apple, Inc.*, 665 Fed. Appx 880, 887–88 (Fed. Cir. 2016) (non-precedential) (“The disclosure of a small genus may anticipate the species of that genus even if the species are not themselves recited.”) (internal citations and quotation omitted).

Patent Owner contends that the claim 1 requires that the flush “request” be “sent by the ‘first provider edge node’ *after* the switchover,” which means that, at the time the flush request is sent, “the sending *first provider edge node* is the protection node (as opposed to functioning as the *working node*).” PO Resp. 11–12; *see also* PO Sur-Reply 18–21. Although we agree with Patent Owner that the claim language requires “the ‘flush’ request as being sent by the ‘first provider edge node,’” which means that “the node that had been functioning as the working node prior to the switchover” (PO Resp. 12), we find unpersuasive Patent Owner’s contention that “Petitioner’s concession that Brockners’ ‘active’ node sends the flush message is itself dispositive.” *Id.* at 14. The ’656 patent itself states that “[t]he working node 300a [] sends a[n] explicit request to the third provider

edge node 320 to flush its MAC address entries learned through the working node 300a.” See Ex. 1001, 7:58–62 (emphasis added).

As Patent Owner acknowledges, Petitioner represents that Brockners discloses that “N-PE1 sends to N-PE3 a MAC flush message upon a switchover.” PO Resp. 13. We disagree with Patent Owner that sending of the flush message by N-PE 1, i.e., the “first provider edge node,” is “contrary to the claim language.” *Id.* In particular, claim 1 specifically requires that “*the first provider edge node*, when functioning as the working node, communicates with the third provider edge node,” and, “after the switchover . . . , *sends* an explicit request to the third provider edge node *to flush said MAC address entry* for the first provider edge node.” See Ex. 1001, 8:63–9:4 (emphasis added). As discussed above in section II(D)(3)(ii), we find persuasive Petitioner’s reliance on Brockners’s N-PE 1 as “the first provider edge node,” wherein N-PE 1 is the “working node” before a switchover and a “protection node” after the switchover.

Although Patent Owner contends that “Petitioner’s own expert and the petition itself both concede that under the proposed combination . . . it is the active node that allegedly sends the flush request, whereas the claim language requires the protection node” (Tr. 19:11–17 (citing Pet. 38–39; Ex. 1003 ¶ 87)), Petitioner instead contends that a POSITA would have understood that it is “the first provider edge node (N-PE 1), after the switchover in the redundant pair,” that sends the request to flush its MAC address entry. Pet. 39. That is, although first provider edge node N-PE 1 is the “active node,” here, Petitioner is discussing the first provider edge node N-PE 1 *after the switchover*, wherein, even Patent Owner acknowledges that claim 1 similarly requires that the flush “request” be “sent by the ‘first

provider edge node' after the switchover.” PO Resp. 11–12. This is consistent with the '656 patent itself states that the “working node 300a” that sends the request after the switchover. *See* Ex. 1001, 7:58–62.

Brockners discloses that, upon switchover, “the N-PE must send a MAC flush message to other N-PEs to inform them that the topology has changed as the MAC forwarding tables may be invalid.” Ex. 1004, § 4.2. Brockners recognizes that, without a MAC flushing mechanism, traffic may be black-holed (being sent to the invalid MAC address) until the stale MAC entries age out in the forwarding tables. *Id.* That is, after switchover, N-PE1's MAC address is invalid and must be flushed to avoid black-holing. *Id.* Thus, as Petitioner explained, after switch over, “N-PE2 is now going to be the main communication node,” wherein “the last thing that N-PE1 is going to do is send out the MAC flush message” and “becoming the inactive node in terms of its normal communication.” Tr. 14:22–15:2.

We also find unpersuasive Patent Owner's contention that “‘upon the switchover' [] is contrary to the claim language.” PO Resp. 13. As Petitioner points out, the Specification of the '656 patent itself also states that the first provider edge node is “adapted to **upon a switchover** in the redundant pair: send an explicit request . . . to flush said MAC address entry.” Pet. Reply 14; *see also* Ex. 1001, 4:55–5:2. We are persuaded by Dr. Weissman's testimony that Brockners' MAC flush message is sent to inform the other N-PEs “that the topology has changed” and “contains the MAC addresses to be withdrawn,” wherein such message could not be sent before the switchover because at that time the network topology has not changed and the MAC addresses to be withdrawn are unknown. *See* Ex. 1003 ¶ 86; Ex. 1004, § 4.2.

Patent Owner also contends that “[t]he Petition fails to establish that Brockners’ flush message is an ‘explicit’ request to flush the specific ‘MAC address’ claimed.” PO Resp. 15. That is, “the request must make explicit that the ‘MAC address’ to be flushed is ‘for the first provider edge node.’” *Id.* According to Patent Owner, “merely deleting MAC entries within a flush message, where Brockners fails to specify *what those MAC entries are for*, fails at least to render obvious ‘an explicit request . . . to flush said MAC address entry for the first provider edge node.’” *Id.* at 16. We find this contention unpersuasive.

As discussed above in section II(D)(3)(iii), we find persuasive Petitioner’s reliance on the combination of Brockners and Lasserre for teaching that N-PE 3 possesses MAC address entry M1 that is *for N-PE 1*. In particular, Lasserre discloses that PE1 multicasts the packet having source MAC address of M1 and destination MAC address of M2 to provider edge routers PE2 and PE3, where provider edge router PE2 receives the broadcasted message from provider edge router PE1 containing MAC address of M1. Ex. 1005, 12. In Brockners, upon switchover, “the N-PE must send a MAC flush message to other N-PEs to inform them that the topology has changed.” Ex. 1004 § 4.2. We are persuaded by Petitioner’s contention that a POSITA would understand that the “addresses to be withdrawn” in the MAC flush message are those MAC addresses learned through the first provider edge node, such as the MAC address “for the first provider edge node” and the “first MAC address for the customer premises equipment.” Pet. Reply 19 (citing Ex. 1003 ¶ 86). That is, Brockners recognizes that, without flushing MAC address M1 for N-PE 1 and the

associated customer premises equipment, traffic may be black-holed (being sent to the invalid MAC address). *Id.*; see Ex. 1004 § 4.2.

Having reviewed Petitioner’s arguments and supporting evidence in the complete record, notwithstanding Patent Owner’s arguments to the contrary, we determine Petitioner has demonstrated by a preponderance of the evidence that the combination of Brockners and Lasserre teaches “a third provider edge node possessing a media access control (MAC) address entry for the first provider edge node,” wherein “the first provider edge node, when functioning as the working node, communicates with the third provider edge node,” and, “after the switchover . . . , sends an explicit request to the third provider edge node to flush said MAC address entry for the first provider edge node,” as recited in claim 1. Similarly, we determine Petitioner has demonstrated by a preponderance of the evidence that the combination of Brockners and Lasserre teaches “in response to the switchover, sending from the first provider edge node an explicit request to the third provider edge node to flush said first MAC address,” as recited in claim 12.

v. *Claims 2, 7–11, 13, 15*

Petitioner contends that the combination of Brockners and Lasserre teaches the claim limitations as recited in claims 2, 7–11, 13, and 15, citing Dr. Weissman’s testimony for support. Pet. 39–58 (citing Ex. 1004, §§ 2, 3.4, 3.5, 4.1, 4.2, Figs. 1, 5; Ex. 1005, Abstract, §§ 4, 5, 5.1, 5.3, 7.2, 7.2.1, 9; Ex. 1003 ¶¶ 83, 88–94, 96–100, 102–103, 105, 108–120). Patent Owner does not address separately Petitioner’s explanations and supporting evidence regarding the additional limitations in claims 2, 7–11, 13, and 15. *See generally* PO Resp.; PO Sur-Reply.

Having reviewed Petitioner's arguments and supporting evidence in the complete record, we determine Petitioner has demonstrated by a preponderance of the evidence that claims 2, 7–11, 13, and 15 would have been obvious over Brockners and Lasserre.

4. RFC 3386

RFC 3386, titled “Network Hierarchy and Multilayer Survivability,” published in November 2002, is a memorandum providing information for the Internet community, and presents a proposal of the “near-term and practical requirements for network survivability and hierarchy in current service provider environments.” Ex. 1006, at 1 (Abstract).

RFC 3386 discusses survivability as the capability of a network to maintain service continuity in the presence of faults within a network, wherein survivability mechanism such as protection and restoration are implemented to alleviate service disruption. Ex. 1006, 7 (2.1 Survivability).

A working entity is the entity that is used to carry traffic in normal operation mode and a protection entity is used to carry protected traffic in recovery operation mode, i.e., when the working entity is in error or has failed. *Id.* (2.2 Generic Operations). Protection (also called “protection switching”) technique as a survivability technique based on predetermined failure recovery, wherein, as the working entity is established, a protection entity is also established. *Id.* at 8 (Sect. 2.2.3 Survivability Techniques).

5. Obviousness over Brockners, Lasserre and RFC 3386
(Ground 2)

In Ground 2, Petitioner relies on the combination of Lasserre and Brockners as set forth in Ground 1, and further contends that “RFC 3386

provides additional disclosures regarding Automatic Protection Switching (‘APS’),” wherein “[t]he Challenged Claims are further obvious in view of RFC 3386.” Pet. 58–59 (citing Ex. 1007 ¶ 53; Ex. 1003 ¶ 121). In particular, Petitioner relies on the combination of Lasserre and Brockners as set forth in Ground 1, and further in view of RFC 3386 for further rendering obvious the preamble and a “first provider edge node” that is a “working node of the redundant pair before a switchover,” and a “protection node of the redundant pair after the switchover” recited in independent claims 1 and 12. *Id.* at 61–64.

Patent Owner does not provide additional arguments concerning Petitioner’s further reliance on RFC 3386 in Ground 2. *See generally* PO Resp.; PO Sur-Reply.

Having reviewed Petitioner’s arguments and supporting evidence in the complete record, we determine Petitioner has demonstrated by a preponderance of the evidence that claims 1, 2, 7–13, and 15 of the ’656 patent are obvious over Brockners and Lasserre, in further view of RFC 3386. We particularly address in detail Petitioner’s arguments with respect to the “first provider edge node” limitation and the preamble of independent claims 1 and 12.

- i. *“a first provider edge node that is a working . . . before a switchover and a protection node . . . after the switchover,” and “a second provider edge node that is the protection node . . . before the switchover and the working node . . . after the switchover” (claim 1, 12)*

Petitioner contends RFC 3386 explains that “a protection entity is dedicated to each working entity,” wherein, in the combined system of Brockners in view of RFC 3386, prior to a switchover, N-PE 1 would act as

a working node, while N-PE 2 would be the protection node. Pet. 63 (citing Ex. 1006, § 2.2.3; 1003 ¶ 129). Further, Petitioner contends that RFC 3386 teaches that N-PE 1 would be the protection node of the redundant pair after the switchover, wherein a POSITA would have understood that “upon switchover[,] a working node (e.g., N-PE 1) should become a protection node so that it may then switch back –otherwise, the system would be unable to handle multiple faults.” *Id.* at 63–64 (citing Ex. 1006, § 2.2.2; Ex. 1003 ¶ 130).

Petitioner contends that a POSITA “would have been further motivated to combine Brockners and Lasserre with RFC 3386 to implement the redundant pair automatic protection switching using the specific automatic protection scheme,” wherein incorporating such teaching of RFC 3386 “provide additional reliability.” Pet. 59 (citing Ex. 1003 ¶¶ 122, 124). According to Petitioner, the combination would also have been obvious “at least because it involved simple substitution of one known element . . . for another . . . to obtain predictable results.” *Id.* at 60–61 (citing Ex. 1003 ¶ 125).

Having reviewed Petitioner’s arguments and supporting evidence in the complete record, we determine Petitioner has demonstrated by a preponderance of the evidence that the combination of Brockners and Lasserre, in further view of RFC 3386, teaches a “first provider edge node” that is a “working node” before a switchover and a “protection node” after the switchover,” and a “second provider edge node” that is the protection node before the switchover and the working node after the switchover, as recited in claims 1 and 12.

ii. *Preamble of claims 1 and 12*

Petitioner contends that, as discussed above in Ground 1, Brockners discloses the limitations recited in the preamble of claims 1 and 12, wherein these limitations are further rendered obvious in view of RFC 3386. Pet. 61, 66 (citing Ex. 1003 ¶¶ 126, 138).

Having reviewed Petitioner's arguments and supporting evidence in the complete record, we determine Petitioner has demonstrated by a preponderance of the evidence that the limitations recited in the preamble of claims 1 and 12 would have been obvious over the combination of Brockners, Lasserre, and RFC 3386, regardless of whether or not the preamble is limiting.

III. CONCLUSION⁷

For the foregoing reasons, we are persuaded on the record at hand that Petitioner has demonstrated by a preponderance of the evidence that the challenged claims 1, 2, 7–13, and 15 of the '656 patent are unpatentable.

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

IV. ORDER

For the reasons given, it is

ORDERED that, based on the preponderance of the evidence, claims 1, 2, 7–13, and 15 of the '656 patent have been shown to be unpatentable; and

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

In summary:

Claims	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1, 2, 7– 13, 15	103	Brockners, Lasserre	1, 2, 7–13, 15	
1, 2, 7– 13, 15	103	Brockners, Lasserre, RFC 3386	1, 2, 7–13, 15	
Overall Outcome			1, 2, 7–13, 15	

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