

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

JUNIPER NETWORKS, INC.,
Petitioner,

v.

MONARCH NETWORKING SOLUTIONS LLC,
Patent Owner.

U.S. Patent No. 8,130,775

“Mechanism for protecting a pseudo-wire”

IPR2024-00561

**SUPPLEMENTAL DECLARATION OF DR. SAMRAT
BHATTACHARJEE IN SUPPORT OF PETITIONER’S REPLY
TO PATENT OWNER’S RESPONSE**

I.	INTRODUCTION	1
II.	RESPONDING TO PATENT OWNER’S CONSTRUCTIONS.....	1
A.	“link”	1
B.	“first link”	3
C.	“pseudo-wire”.....	3
D.	“said first link being shared by the first and second pseudo-wires”	5
1.	Dr. Mitzenmacher’s Example of Sharing a Link Requires Two Separate Virtual Interfaces	5
2.	Sharing a Link Requires Connecting to the Same Virtual Interface.....	11
III.	GROUND 1: WAINNER AND BOCCI TEACH THE CHALLENGED CLAIMS	16
IV.	GROUND 2: KAMITE’S FIGURE 3 TEACHES DR. MITZENMACHER’S UNDERSTANDING OF THE CHALLENGED CLAIMS	21
V.	GROUND 2: KAMITE’S FIGURE 10 AND BOCCI TEACH THE CORRECT UNDERSTANDING OF THE CHALLENGED CLAIMS	23
VI.	CONCLUSION.....	26

PETITIONER'S EXHIBIT LIST

EX1001	U.S. Patent No. 8,130,775 to Frederic Jounay et al. ("775 patent")
EX1002	Prosecution History of U.S. Patent No. 8,130,775 ("775 Prosecution History")
EX1003	Declaration of Dr. Samrat Bhattacharjee under 37 C.F.R. §1.68 (previously submitted, but not served)
EX1004	<i>Curriculum Vitae</i> of Dr. Bhattacharjee
EX1005	Declaration of Dr. Sylvia Hall-Ellis under 37 C.F.R. §1.68
EX1006	<i>Curriculum Vitae</i> of Dr. Hall-Ellis
EX1007	Declaration of Alexa Morris
EX1008	<i>Ex Parte</i> Reexamination History of the '775 patent as U.S. Application No. 90/014,701
EX1009	RFC 791, "Internet Protocol," IETF (Sept. 1981), available at https://datatracker.ietf.org/doc/html/rfc791
EX1010	RFC 3985, "Pseudo Wire Emulation Edge-to-Edge (PWE3) Architecture," IETF (Mar. 2005), available at https://datatracker.ietf.org/doc/html/rfc3985
EX1011	M. Bocci et al., Enhancing Converged MPLS Data Networks with ATM, Frame Relay and Ethernet Interworking, Alcatel (2004), available at https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=58f0c897e947ac3aa63a8cde807d2c360d74f1a2
EX1012	L. Ghein, "MPLS Fundamentals," Cisco Sys. (Nov. 2006)
EX1013	M. Sagheer & P. Shah, "L2VPN Tutorial: Path to Convergence," Cisco Sys. (2006)
EX1014	L. Martini et al., "Segmented Pseudo Wire," IETF (Oct. 2006), available at https://datatracker.ietf.org/doc/html/draft-ietf-pwe3-segmented-pw-03

EX1015	U.S. Patent No. 8,107,473 to Ijsbrand Wijnands et al. (“Wijnands”)
EX1016	U.S. Patent No. 7,477,642 to Rahul Aggarwal et al. (“Aggarwal”)
EX1017	U.S. Patent No. 7,411,964 to Yoshiniko Suemura (“Suemura”)
EX1018	U.S. Patent No. 8,799,472 to Alan Noble (“Noble”)
EX1019	B. Andrew & P. Machanick, “The Virtual Multicasting Approach to Bandwidth Conservation,” Univ. of the Witwatersrand (2000)
EX1020	T. Yu Lo et al., “Design of Tunnel-Based Protection Schemes in Multigranularity Optical Cross-Connect Networks,” Nat’l Chiao Tung Univ. (2005), available at https://ieeexplore.ieee.org/document/1589631
EX1021	U.S. Patent No. 5,115,495 to Paul Tsuchiya et al. (“Tsuchiya”)
EX1022	M. Gupta et al., “A Feasibility Study for Power Management in LAN Switches,” IEEE (Oct. 2004), available at https://ieeexplore.ieee.org/document/1348125
EX1023	T. Lo & C. Chen, “Tunnel Allocation and Protection in Hierarchical Cross-Connect WDM Networks,” Nat’l Chiao Tung Univ. (June 2004), available at https://ir.nctu.edu.tw/handle/11536/53458
EX1024	Y. Tsang et al., “Network Delay Tomography,” IEEE (July 15, 2003), available at https://ieeexplore.ieee.org/document/1212670
EX1025	J. Mogul et al., “Design, Implementation, and Evaluation of Duplicate Transfer Detection in HTTP,” USENIX Assoc. (Mar. 2004)
EX1026	Petition for <i>Inter Partes</i> Review, <i>Cisco Sys., Inc. v. Monarch Networking Sol’ns LLC</i> , IPR2020-01226, Paper 2 (PTAB July 6, 2020)
EX1027	Patent Owner’s Preliminary Response, <i>Cisco Sys., Inc. v. Monarch Networking Sol’ns LLC</i> , IPR2020-01226, Paper 8 (PTAB Dec. 8, 2020)
EX1028	Institution Decision, <i>Cisco Sys., Inc. v. Monarch Networking Sol’ns LLC</i> , IPR2020-01226, Paper 11 (PTAB Mar. 4, 2021)

EX1029	Claim Construction Memorandum and Order, <i>Monarch Networking Sol'ns LLC v. Cisco Sys., Inc.</i> , No. 2:20-cv-00015-JRG (E.D. Tex. Jan. 7, 2021)
EX1030	U.S. Application Publication No. 2007/0239891 to Wainner et al. ("Wainner")
EX1031	M. Bocci & S. Bryant, "An Architecture for Multi-Segment Pseudo Wire Emulation Edge-to-Edge," IETF (Jan. 11, 2006), available at https://www.ietf.org/proceedings/65/IDs/draft-ietf-pwe3-ms-pw-arch-00 ("Bocci")
EX1032	Exhibit 5 to Opposition to Motion to Strike Opinions of Cisco's Expert, <i>Monarch Networking Sol'ns LLC v. Cisco Sys., Inc.</i> , No. 2:20-cv-00015-JRG (Mar. 10, 2021), ECF No. 216
EX1033	Complaint, <i>Monarch Networking Sol'ns LLC v. Cisco Sys., Inc.</i> , No. 2:20-cv-00015-JRG (Jan. 21, 2020), ECF No. 1
EX1034	Motion to Strike Opinions of Cisco's Expert, <i>Monarch Networking Sol'ns LLC v. Cisco Sys., Inc.</i> , No. 2:20-cv-00015-JRG (Feb. 24, 2021), ECF No. 171
EX1035	Translation of JP Patent Application No. 2006-129359 to Kamite et al. (previously submitted, but not served)
EX1036	JP Patent Application No. 2006-129359 to Kamite et al.
EX1037	RFC 4447, "Pseudowire Setup and Maintenance Using the Label Distribution Protocol (LDP)," IETF (Apr. 2006), available at https://datatracker.ietf.org/doc/html/rfc4447
EX1038	Monarch's Opposition to Juniper's Motion to Transfer, <i>Monarch Networking Solutions LLC v. Juniper Networks, Inc.</i> , No. 1:23-cv-670-TSE-LRV (E.D. Va. Oct. 3, 2023), ECF No. 52
EX1039	Complaint, <i>Monarch Networking Sol'ns LLC v. Juniper Networks, Inc.</i> , No. 1:23-cv-670-TSE-LRV (E.D. Va. May 23, 2023), ECF No. 1
EX1040	Declaration of Dr. Samrat Bhattacharjee under 37 C.F.R. §1.68

Declaration of Dr. Bhattacharjee in Support of Petitioner's Reply

EX1041	Certified Translation of JP Patent Application No. 2006-129359 to Kamite et al. ("Kamite")
EX1042	Supplemental Declaration of Dr. Samrat Bhattacharjee under 37 C.F.R. §1.68
EX1043	L. Aguirre-Torres et al., "Convergence Through Packet-Aware Transport," Optical Society of Am. (Mar. 21, 2006)

I. INTRODUCTION

1. I have been retained by Quinn Emanuel Urquhart & Sullivan, LLP on behalf of Juniper Networks, Inc. (“Juniper” or “Petitioner”) as an independent expert in this *inter partes* review before the Patent Trial and Appeal Board of the United States Patent and Trademark Office to review claims 1 and 6 (“Challenged Claims”) of U.S. Patent No. 8,130,775 (“the ’775 patent”).

2. In forming my opinions, I have considered and relied on my education, knowledge of the relevant field, knowledge of scientific and engineering principles, and my general experience in the field of art. I have reviewed the Patent Owner Response (“POR”), all exhibits, and the declaration of Dr. Mitzenmacher, as well as other materials and references cited in this declaration.

II. RESPONDING TO PATENT OWNER’S CONSTRUCTIONS

3. I understand that Patent Owner and Dr. Mitzenmacher discuss several claim terms in the response and supporting declaration. I disagree with Dr. Mitzenmacher on certain aspects of his discussion, and I clarify below the meaning of the claim terms he discusses.

A. “link”

4. I agree with Dr. Mitzenmacher that, for purposes of this IPR only, I have applied the construction of “link” that means a connection between an interface of a first router and an interface of a second router.

5. However, I note that Dr. Mitzenmacher tries to exclude virtual connections by further limiting the construction of “link” to only a *physical* connection between router interfaces. *E.g.*, EX2006 ¶41 (“A pseudowire, unlike a link, is not a physical connection”), ¶43 (“It is therefore important to recognize that a ‘pseudowire’ (a type of emulated connection) is not the same thing as a ‘link’ (a type of physical connection between router interfaces).”), ¶58 (“A pseudowire (an emulated connection) is different from a link (a physical connection between interfaces) as I discussed above.”).

6. I disagree with Dr. Mitzenmacher's assertion that a link must be a physical connection and cannot be a virtual connection. First, I note that Dr. Mitzenmacher does not identify a disclosure in the '775 patent that supports interpreting link to mean only a physical connection. I have reviewed the '775 patent and found no such support. I further note that Dr. Mitzenmacher's discussion of what “link” means does not mention that a link is a physical connection. *See* EX2006 ¶¶36-38. Rather, Dr. Mitzenmacher says only that “link” means a “connection between an interface of a first router and an interface of a second router,” without ever mentioning that the interface must be a physical interface. EX2006 ¶36. It is not until the section titled “Pseudowire” that Dr. Mitzenmacher suggests that the interface must be a physical interface, when he says that “[a] pseudowire, unlike a link, is not a physical connection.” EX2006 ¶41.

7. A POSITA would have understood that the ordinary meaning of “link,” as it is being construed in this IPR, includes both physical and virtual connections, particularly in the context of pseudo-wires. The prior art, for example, says that pseudo-wires can connect to any interface, “whether it is a physical, logical, or virtual interface.” EX1043, 10; *see also* EX1010, 3 (explaining that pseudo-wires encapsulate “data arriving at the PE-bound port (logical or physical)”); EX1010, 4 (explaining that the attachment circuit over which the pseudo-wire is established can be a “physical or virtual circuit”).

B. “first link”

8. For purposes of this IPR only, I agree with Dr. Mitzenmacher that the “first link” is a connection between the interface of an input router and the interface of an intermediate router. EX2006 ¶¶39-40. But I again note that this term does not restrict the interface to a physical interface.

C. “pseudo-wire”

9. For purposes of this IPR only, I agree with Dr. Mitzenmacher that a “pseudo-wire” is an emulated connection that transmits data packets. EX2006 ¶41. However, I disagree with Dr. Mitzenmacher about two points. First, I disagree that “[t]he person skilled in the art has always considered a pseudo-wire as a point-to-point link set up between an input router and an output router.” EX2006 ¶30; *see also* EX2006 ¶41 (asserting that an IETF standardization group has defined pseudo-

wires as a “point-to-point link”). To the contrary, at the time of the '775 patent's invention, a POSITA would have understood that pseudo-wires were not limited to point-to-point connections and rather included point-to-multipoint connections. EX1030, 1 (“A method, apparatus and computer program product for providing point-to-multipoint multihop distribution using Pseudowires (PWs) is presented.”); EX1041, 7 (“This method allows pseudo wire traffic to be forwarded using a multicast tunnel because all VC labels advertised by the downstream PEs are identical.”).

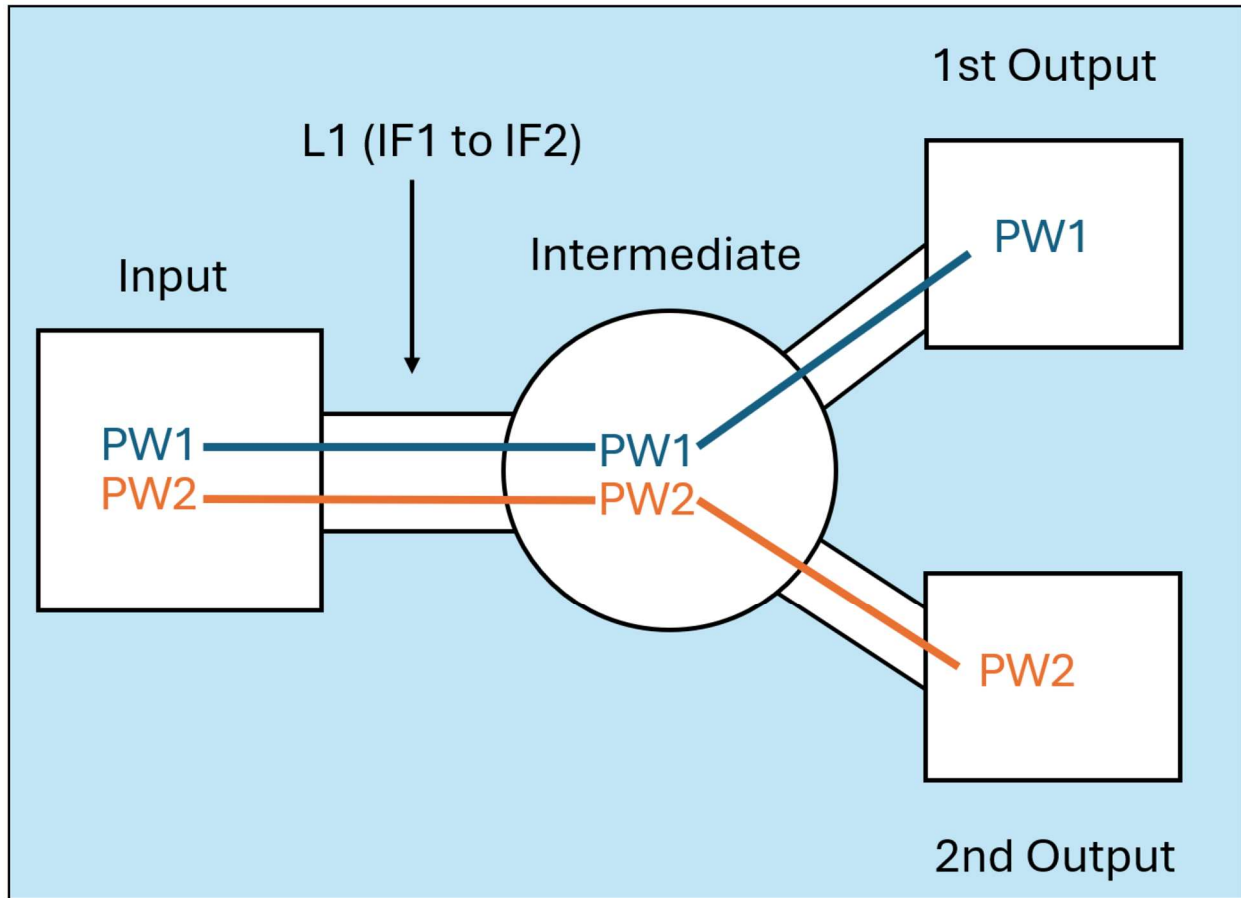
10. Second, pseudo-wires and links are not as distinct as Dr. Mitzenmacher suggests when he says that “[i]t is important to recognize that a ‘pseudowire’ (a type of emulated connection) is not the same thing as a ‘link’ (a type of physical connection between router interfaces).” EX2006 ¶43. As I discussed above, links are not necessarily physical connections. *See supra* § II.A. For example, the '775 patent discloses that a pseudo-wire comprises links: “[t]he first and second links **constitute** a first pseudo-wire pw1” and the second “pseudo-wire pw2 **consists of** the first link L1 and a second link L3.” EX1001, 6:29-43 (emphases added). If these links are physical connections, as Dr. Mitzenmacher asserts, then the pseudo-wire consists of these two physical connections as described in the patent.

D. “said first link being shared by the first and second pseudo-wires”

11. I disagree with Dr. Mitzenmacher's discussion of “said first link being shared by the first and second pseudo-wires.” I note that Dr. Mitzenmacher does not offer a construction of this term and instead distinguishes what he alleges the patent invented from the prior art. As discussed below, I disagree with Dr. Mitzenmacher's distinctions. Regardless, a POSITA would have understood that the meaning of this term in view of Patent Owner and Dr. Mitzenmacher's construction of “link” is simple; it requires the two pseudo-wires to connect to the same interface of the initial router and the same interface of the intermediate router. A POSITA would have understood that the prior art discussed in the petition and my original declaration share a first link between an input router and an intermediate router in this exact manner.

1. Dr. Mitzenmacher's Example of Sharing a Link Requires Two Separate Virtual Interfaces

12. Dr. Mitzenmacher says that the figure below depicts the alleged invention of the '775 patent:



EX2006, ¶72. I disagree. In the above image, the pseudo-wires are depicted as two pseudo-wires that are independent and not related. Although the two pseudo-wires pass through the same physical connection between the input router and the intermediate router—the white box labelled L1 (*i.e.*, link 1)—they appear to use separate virtual connections—the orange and blue lines within L1.

13. This is not what the '775 patent teaches. In fact, it is the opposite of what the '775 patent discloses, and the patent advises against it. As the '775 patent explains, there were allegedly two main problems with the prior-art approach of requiring separate physical and/or virtual connections between the input router and

the intermediate router. The '775 patent's alleged invention purportedly solves both inefficiencies, while Dr. Mitzenmacher's depiction of the alleged invention suffers both.

14. **First**, the '775 patent explains that prior art pseudo-wires wasted resources, like bandwidth, between the input router and the intermediate router. "In the prior art, the back-up pseudo-wire, although used only to broadcast data in the event of a fault affecting the main pseudo-wire, reserves resources used to set it up over the whole of the network between the input router and the output router." EX1001, 3:20-24. But after implementing the '775 patent's alleged invention, "[b]ecause the main pseudo-wire and the back-up pseudo-wire share the link set up between the input router and the intermediate router, the network resources that in the past were reserved for the back-up pseudo-wire are released and can be used in a manner closer to the optimum." EX1001, 3:24-29.

15. Dr. Mitzenmacher's demonstrative does not optimally use resources between the input router and intermediate router as the '775 patent teaches. His demonstrative depicts each pseudo-wire as independent and unrelated connections. Meaning, data packets sent down one pseudo-wire cannot be extracted midway—*i.e.*, at the intermediate router—and put in the other pseudo-wire for the last leg of the journey. Accordingly, the second pseudo-wire in Dr. Mitzenmacher's

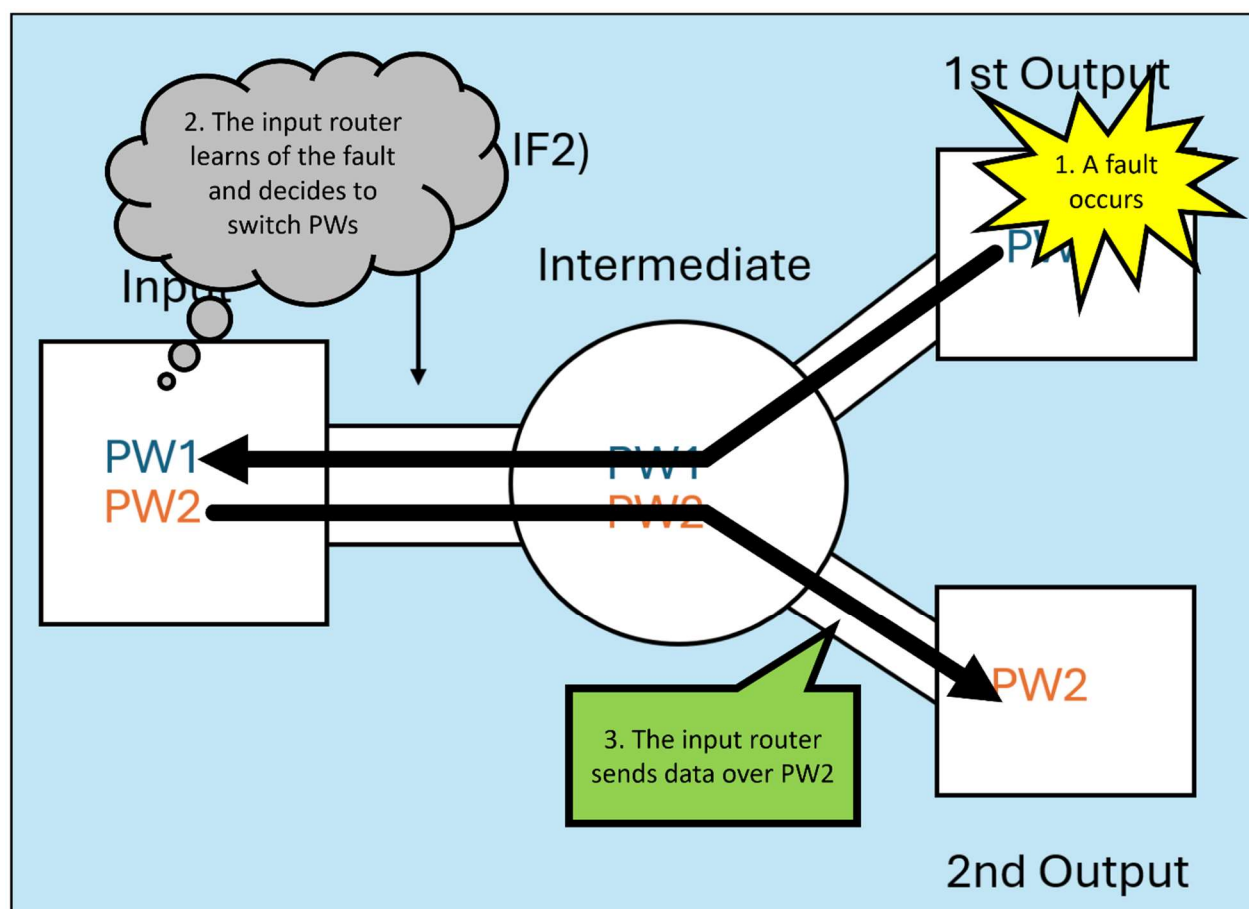
demonstrative must needlessly transmit duplicate information from the input router to the intermediate router in case of a fault affecting the first output router.

16. Further, Dr. Mitzenmacher's demonstrative depicts reserving a portion of the first link's bandwidth for the first pseudo-wire's virtual connection (in blue) and reserving a separate portion for the second pseudo-wire's virtual connection (in orange). Meaning, the second pseudo-wire occupies bandwidth in the first link, if reserved, even when it sits dormant. Thus, in my opinion, both inefficiencies in Dr. Mitzenmacher's demonstrative violate the '775 patent's teaching that the invention purportedly "optimizes use of the resources of the network between the first router and the intermediate router." *E.g.*, EX1001, 4:47-50.

17. ***Second***, the '775 patent explains that the prior-art approach needlessly sent information across the entire network—like a notification that a fault had occurred and instruction to switch over to the backup pseudo-wire—that could have been sent over a more limited distance. The '775 patent purportedly solves this problem by disclosing that, in the event of a fault affecting the first output router, the notification of the fault and the decision to switch output routers does not need to travel all the way across the network and back again. Instead, if the first output router experiences a fault, the notification of the fault needs to travel only to the intermediate router rather than all the way back to the input router. Additionally, the intermediate router is able to switch the data transfer to the second output router; the

input router no longer needs to make that decision. “This improves the responsiveness of the network because detection occurs as close as possible to the fault.” EX1001, 4:59-60; *see also* EX1001, 4:17-19. “Accordingly, a fault affecting the first output router is detected more quickly, as the information does not have to cross the network as far as the input router before being processed” and “[t]he function for switching the data stream” also “occurs faster because it is triggered on detection of the fault by the intermediate router.” EX1001, 4:60-5:2.

18. Dr. Mitzenmacher's configuration violates this optimization as well. In his configuration, each pseudo-wire is still an independent, unrelated connection between the input router and different output routers—data packets cannot be extracted and switched to a backup pseudo-wire midway, as described above. Meaning, if a fault affects the first output router in Dr. Mitzenmacher's proposed configuration, then notification of the fault would have to travel all the way back to the input router through the first pseudo-wire, the input router would need to decide to switch to the second output router, and then the input router would have to send duplicate information through the intermediate router to the second output router:



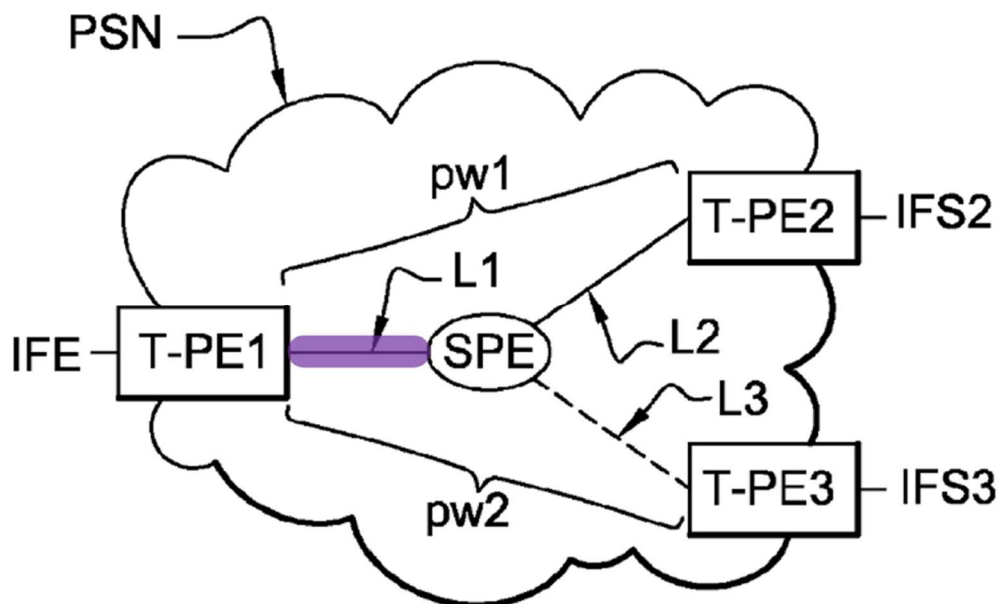
EX2006, ¶72 (annotated). Dr. Mitzenmacher's demonstrative thus does not depict "said first link being shared by the first and second pseudo-wires" because it suffers the same inefficiencies that the patent intends to avoid.

19. Further, Dr. Mitzenmacher's argument contradicts what Patent Owner previously represented to the Board about the '775 patent. I understand that in an IPR between Cisco and Patent Owner on this patent, Patent Owner distinguished a prior art reference that disclosed "two links that use different interfaces but share the same physical path." EX1027, 29 (emphasis in original). Yet, based on my review, that is exactly what Dr. Mitzenmacher is advocating for in his demonstrative above.

Based on this distinction that Patent Owner previously made, Patent Owner's interpretation of "links" must include virtual interfaces. Thus, in my opinion Dr. Mitzenmacher's demonstrative does not accurately depict the '775 patent's alleged invention, or at the least it is misleading.

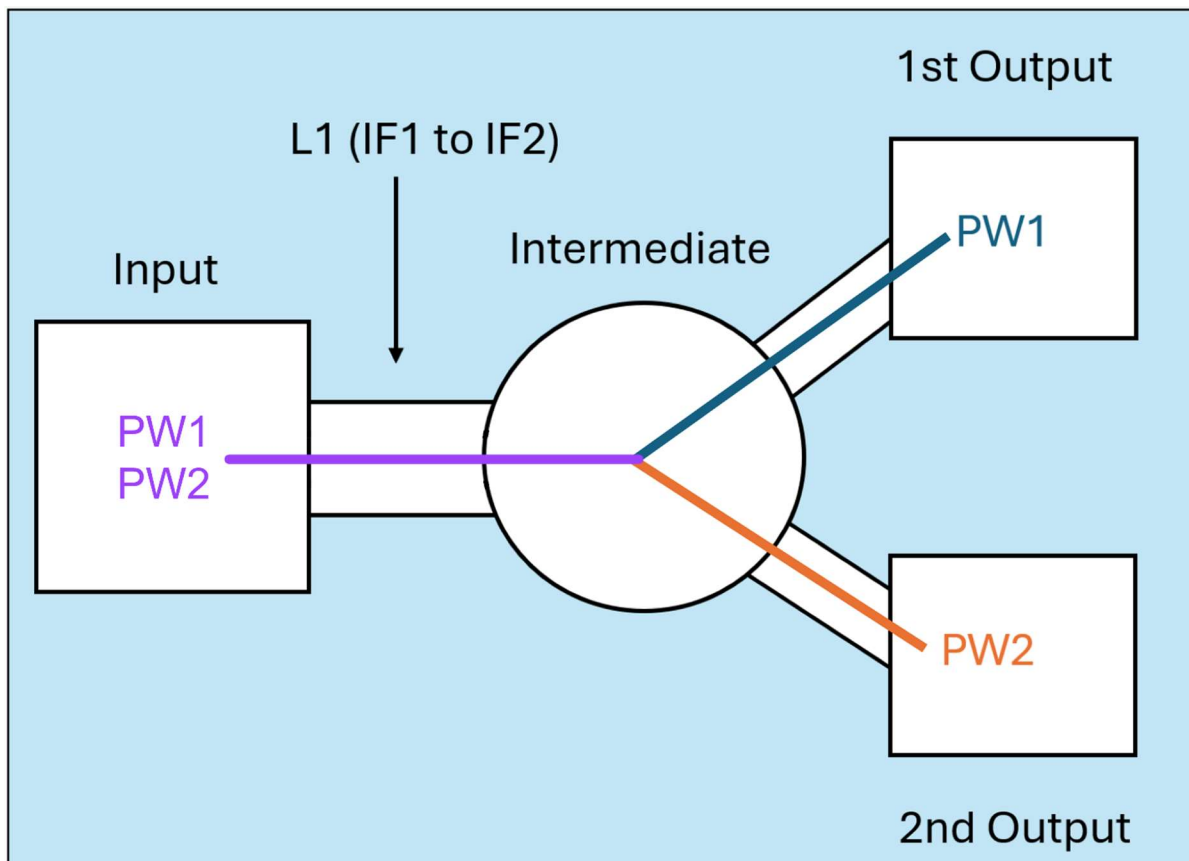
2. Sharing a Link Requires Connecting to the Same Virtual Interface

20. In my opinion, Dr. Mitzenmacher's demonstrative above misrepresents the patent's teachings in an attempt to distinguish the prior art. In view of Dr. Mitzenmacher's original construction of "link," which I am adopting solely for purposes of this IPR, what the '775 patent actually requires is that the two pseudo-wires connect from the same interface of the input router to the same interface of the output router. This is what the '775 patent teaches as the purported invention, and it is accurately depicted in Figure 3 of the '775 patent:

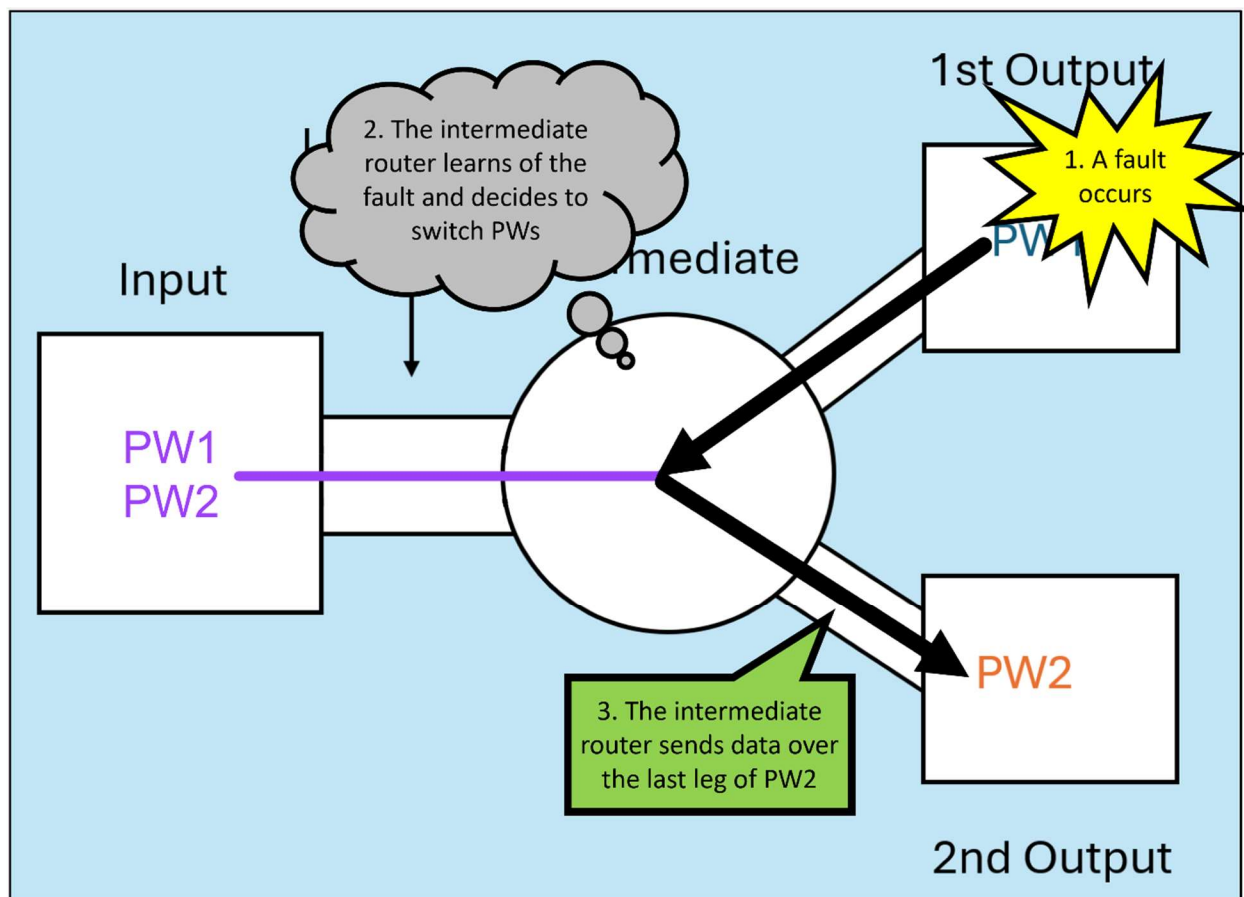


EX1001, Fig. 3 (highlighting added). As shown, Figure 3 does not draw two separate pseudo-wires from the input router all the way to each output router, as Dr. Mitzenmacher does in his figure above. Instead, Figure 3 intentionally uses curly braces (*i.e.*, “ { ”) to indicate that the pseudo-wires comprise the three links fully, rather than just portions of them as in Dr. Mitzenmacher's demonstrative. This comports with the patent's statement that “[t]he first and second links **constitute** a first pseudo-wire pw1” and that the second “pseudo-wire pw2 **consists of** the first link L1 and a second link L3.” EX1001, 6:29-43 (emphases added).

21. Thus, the '775 patent's purported invention is more accurately depicted in the following modification to Dr. Mitzenmacher's figure:

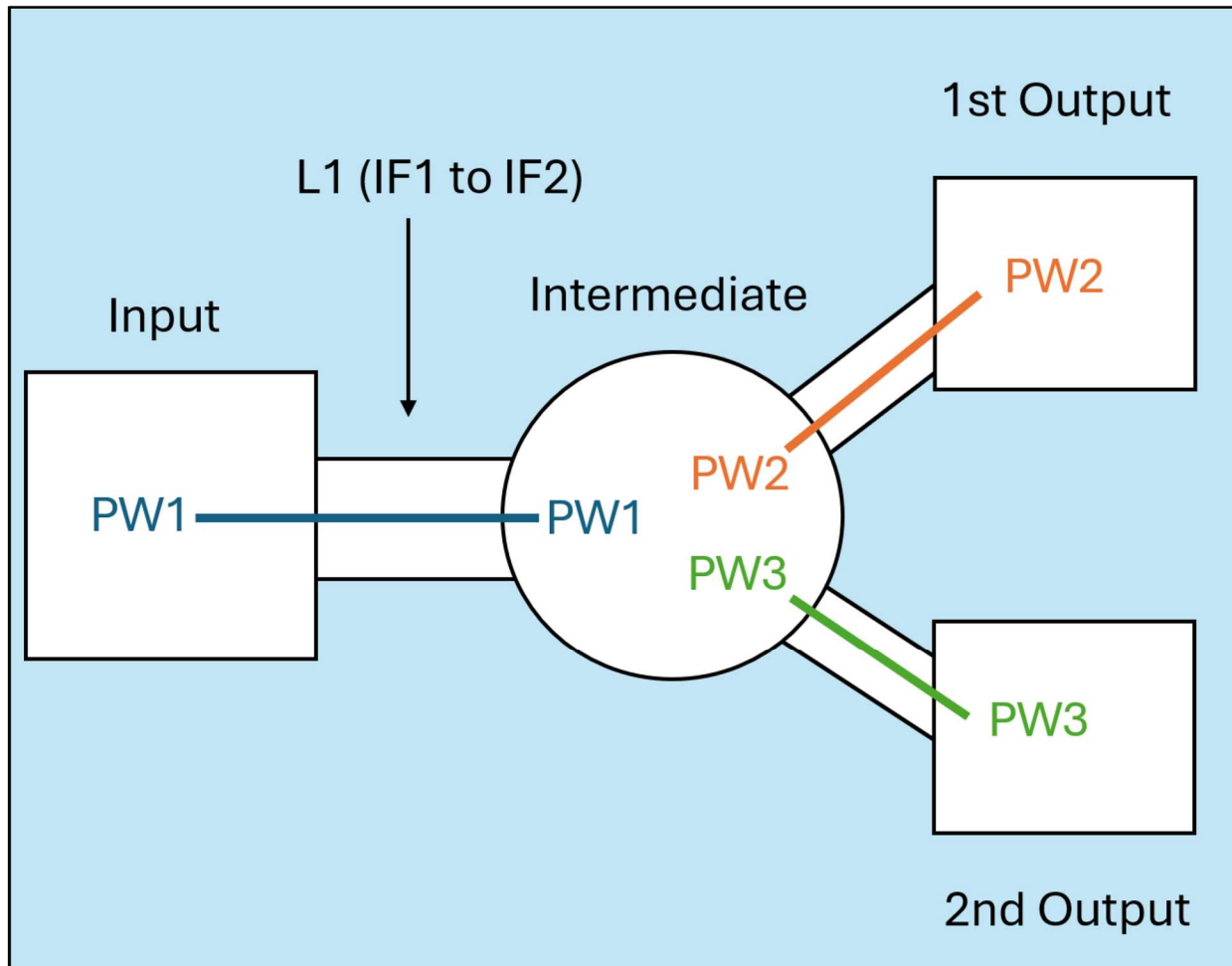


EX2006, ¶72 (modified). Here, the blue and orange connections from Dr. Mitzenmacher's figure combine to form a purple connection between the input router and the intermediate router, indicating that this connection is shared both physically and virtually between the two pseudo-wires. Then, the pseudo-wires separate into their component parts: the first pseudo-wire's blue connection from the intermediate router to the first output router, and the second pseudo-wire's orange connection from the intermediate router to the second output router. This configuration enables the '775 patent's purported invention:



EX2006, ¶72 (modified and annotated).

22. The above is similar to the configuration that Dr. Mitzenmacher disparages as a “‘one link, one pseudowire’ configuration [that] does not meet the claim limitation”:



EX2006 ¶55. That is not surprising, as the “one link, one pseudo-wire” configuration is functionally identical to what the ’775 patent teaches, as I explained in my original declaration in my analysis of Wainner. EX1040 ¶75. I understand that Patent Owner previously accused this very configuration of infringing the ’775 patent, and I previously explained that the prior art is indistinguishable from Patent

Owner's prior infringement allegations. EX1040 ¶75. Dr. Mitzenmacher does not appear to dispute this point. Thus, the modified figure above and Dr. Mitzenmacher's "one link, one pseudo-wire" figure are truer to the '775 patent's teachings than his "one link, two pseudo-wire" figure.

23. To the extent Patent Owner asserts that my analysis does not adequately address Dr. Mitzenmacher's demonstrative because the demonstrative purportedly depicts sharing a physical interface only, and not a virtual interface, I disagree with that hypothetical argument. First, I disagree that Dr. Mitzenmacher's demonstrative is limited to physical interfaces to the exclusion of virtual interfaces because the demonstrative shows two independent and unrelated virtual connections between the input router and the intermediate router. Second, implementing the invention over the same (*i.e.*, shared) physical interface—rather than a shared virtual interface—would look essentially identical to what is shown in Figure 3 of the '775 patent and in my modification to Dr. Mitzenmacher's demonstrative shown above, except that the purple connection from the input router to the intermediate router would occupy the entire space within the white box labelled L1 in the demonstrative. Thus, I arrive at the same conclusion even when analyzing this phrase in terms of only physical interfaces to the exclusion of virtual interfaces.

III. GROUND 1: WAINNER AND BOCCI TEACH THE CHALLENGED CLAIMS

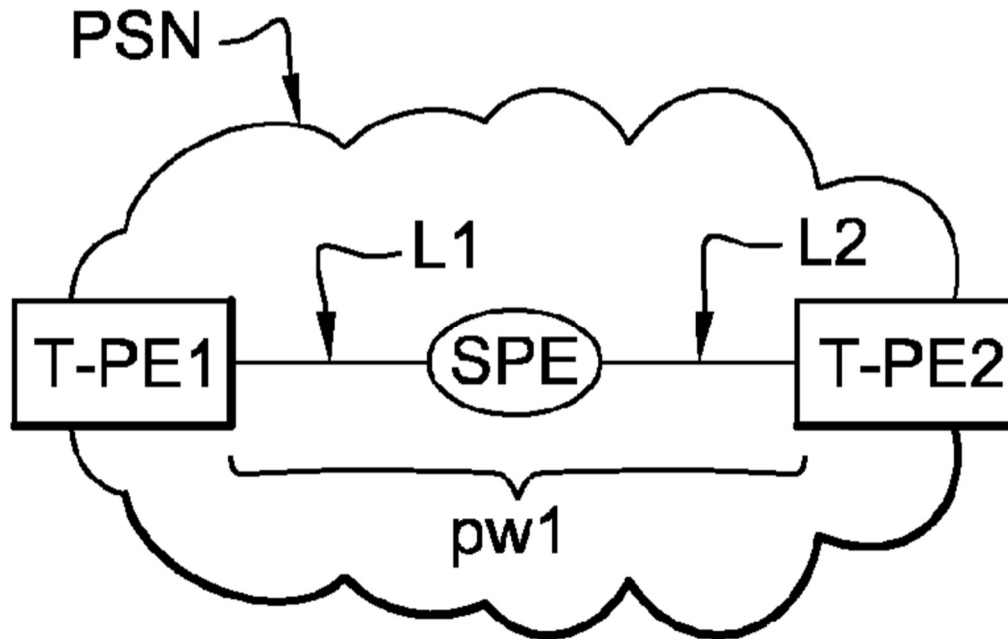
24. Regarding the combination of Wainner and Bocci, Dr. Mitzenmacher assumes that the pseudo-wires in Wainner can be combined to form multi-segment pseudo-wires that he titles “MSPW22-24” and “MSPW22-28,” which “both include PW22.” EX2006 ¶¶95-98; *see also* EX2006 ¶¶57-69. I therefore understand from this statement that Dr. Mitzenmacher accepts for the purposes of this IPR that Wainner combined with Bocci teaches two multi-segment pseudo-wires that span the network and that share the first pseudo-wire segment.

25. However, I further understand that Dr. Mitzenmacher asserts that even in this configuration, Wainner and Bocci do not share a link because “multi-segment pseudowires cannot connect to any interface of the intermediate router.” *E.g.*, EX2006 ¶96. Dr. Mitzenmacher's assertion is technically unsound. In order to send data to or through the intermediate router, the multi-segment pseudo-wire must be able to connect to an interface of the intermediate router. If it did not connect to an interface of the intermediate router, it would not be able to send data to or through that router at all. And Patent Owner does not suggest there is some other way to connect to the intermediate router without connecting to one of its interfaces.

26. To support his argument, Dr. Mitzenmacher asserts that “Bocci makes clear that multi-segment pseudowires can *only* connect to interfaces on [output] routers and cannot connect to interfaces on [intermediate] routers.” EX2006 ¶¶60,

97 (emphasis in original). Dr. Mitzenmacher's support for this assertion is that Bocci says a multi-segment pseudo-wire must "behave and function as a single *point-to-point* PW" and that "[e]ach end of a MS-PW by definition ***MUST terminate on***" an output router. EX2006 ¶97 (emphasis in original) (quoting EX1031, 6). I disagree with the conclusion that Dr. Mitzenmacher draws from these statements in Bocci. They say nothing about whether a multi-segment pseudo-wire connects to the interface of an intermediate router. Just because a multi-segment pseudo-wire traditionally looks, from the user's perspective, like a direct connection from an input router to an output router, that does not mean that the pseudo-wire cannot connect to interfaces of intermediate routers. In fact, a POSITA would understand that the pseudo-wire connects to an interface of the intermediate router in order to traverse that router.

27. Dr. Mitzenmacher's characterization of Bocci contradicts even what the '775 patent has to say about that reference. As Dr. Mitzenmacher acknowledges, Figure 1 of the '775 patent depicts a multi-segment pseudo-wire as described in Bocci. EX2006 ¶68.



EX1001, Fig. 1. The '775 patent labels—and describes in the specification—the connection from the input router to the intermediate router in this multi-segment pseudo-wire as a “link.” EX1001, 1:53-2:2. Under Dr. Mitzenmacher’s construction of “link,” that means the multi-segment pseudo-wire depicted in Figure 1 and described in Bocci connects to an interface of the intermediate router. Thus, the '775 patent itself contradicts Dr. Mitzenmacher’s argument.

28. I also disagree with Dr. Mitzenmacher and Patent Owner’s other attempts to distinguish Wainner and Bocci. Dr. Mitzenmacher suggests that because Wainner has one pseudo-wire segment between its input router and intermediate router, it does not teach the challenged claims that require two pseudo-wires across the entire network. EX2006 ¶56, 99. However, I already addressed this point in my original declaration, in which I explained that (1) Wainner discloses two pseudo-

wires that span the entire network and share the first link when it discloses that it “statically binds an upstream PW to *one or more* downstream PW” and (2) Patent Owner itself has asserted that the challenged claims encompass point-to-multipoint pseudo-wires in its prior infringement allegations against Cisco. EX1040 ¶¶73, 75.

29. Patent Owner and Dr. Mitzenmacher provide two more responses to Wainner. First, Patent Owner says that the '775 patent goes “against th[e] received wisdom of the person skilled in the art” who “has always considered a pseudo-wire as a point-to-point link set up between an input router and an output router.” POR 41-42 (quoting EX1001, 3:9-18). As I explained in the declaration in support of the petition, Wainner also discloses moving away from the prior point-to-point concept of a pseudo-wire, noting that its invention “deviates from previous L2VPN concepts that define a point-to-point PW.” EX1040 ¶53 (quoting EX1030 ¶20).

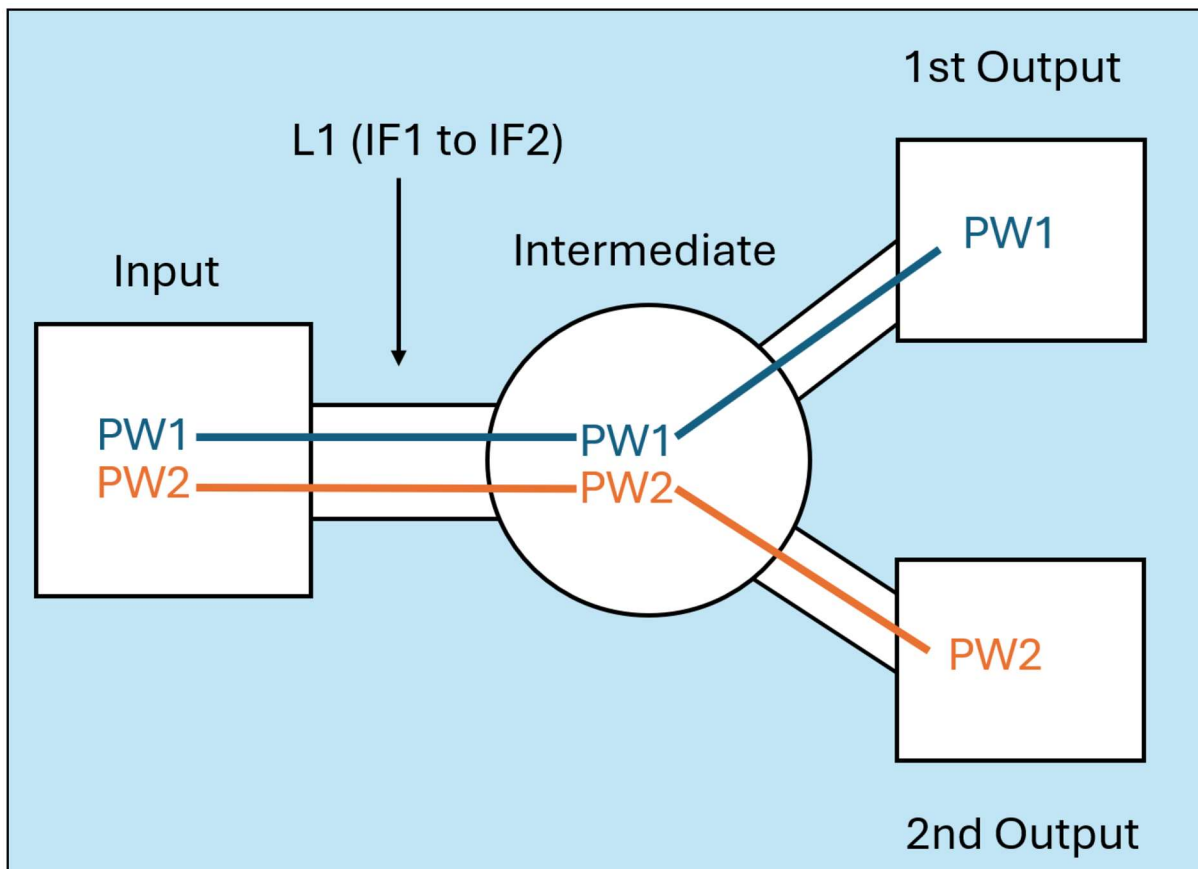
30. Second, Patent Owner and Dr. Mitzenmacher argue that the '775 patent discloses “seeing” an incoming pseudo-wire segment that connects to two outgoing pseudo-wire segments whereas Wainner does not. EX2006 ¶100; POR 36, 42-43. I disagree. As in the '775 patent, Wainner's intermediate router also “sees” an incoming connection and recognizes that the incoming connection branches out to multiple output routers. Dr. Mitzenmacher relies on a singular quote from Wainner to make his point: “The S-PE understands through the PW control plane that it is receiving the tail-end of the PW.” EX2006 ¶100 (quoting EX1030 ¶25). But he

leaves out the very next sentence that confirms Wainner “sees” incoming and outgoing pseudo-wire segments in the same manner as the ’775 patent: “Subsequently, the S-PE signals the establishment of PWs to *one or more* downstream receiving PE (R-PE).” EX1030 ¶25 (emphasis added).

31. To the extent Dr. Mitzenmacher is arguing that Wainner does not disclose populating a switching table as in Figure 5 of the ’775 patent, I note that is not required by the challenged claims. Even if it were required, a POSITA would understand that Wainner’s intermediate router keeps state in order to distinguish the separate pseudo-wires, just like the switching table in Figure 5 of the ’775 patent. If the intermediate router does not “see” that the incoming connection is associated with multiple outgoing connections, then it would route data packets from the input router to only one output router rather than all of them. That would contradict Wainner’s express teaching that “Packets received by PE1 from another network device (not shown) may be forwarded to *one or more* of PE2, PE3 and PE4.” EX1030 ¶19 (emphasis added); *see also* EX1030 ¶25 (“Subsequently, the S-PE signals the establishment of PWs to one or more downstream receiving PE (R-PE).”).

IV. GROUND 2: KAMITE'S FIGURE 3 TEACHES DR. MITZENMACHER'S UNDERSTANDING OF THE CHALLENGED CLAIMS

32. Kamite's Figure 3 invalidates the challenged claims even if the Board adopts Dr. Mitzenmacher's proffered constructions. Under Dr. Mitzenmacher's constructions, a link is a physical connection between router interfaces. *E.g.*, EX2006 ¶41 ("A pseudowire, unlike a link, is not a physical connection."). Thus, Dr. Mitzenmacher's interpretation of "said first link being shared by the first and second pseudo-wires" means there are two distinct pseudo-wires that pass through the physical connection between the input router and the intermediate router. *See* EX2006 ¶¶71-79. This is especially evident in his depiction of the alleged invention:



EX2006 ¶72. That is what Kamite's Figure 3 teaches. As shown below—identically to Dr. Mitzenmacher's demonstrative of the alleged invention—there is one physical connection between the input router PE11₁ and intermediate router P12₁, highlighted in blue, and three pseudo-wires passing through it, highlighted in yellow:

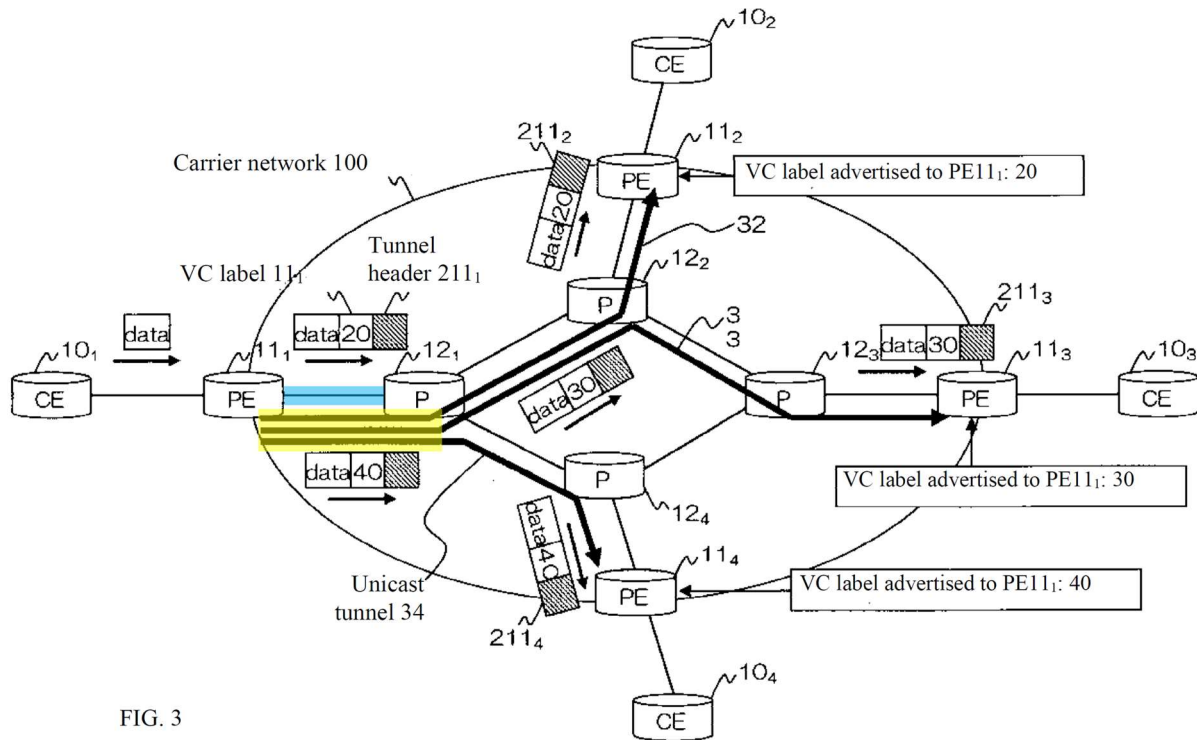


FIG. 3

EX1041, Fig. 3 (highlighted).

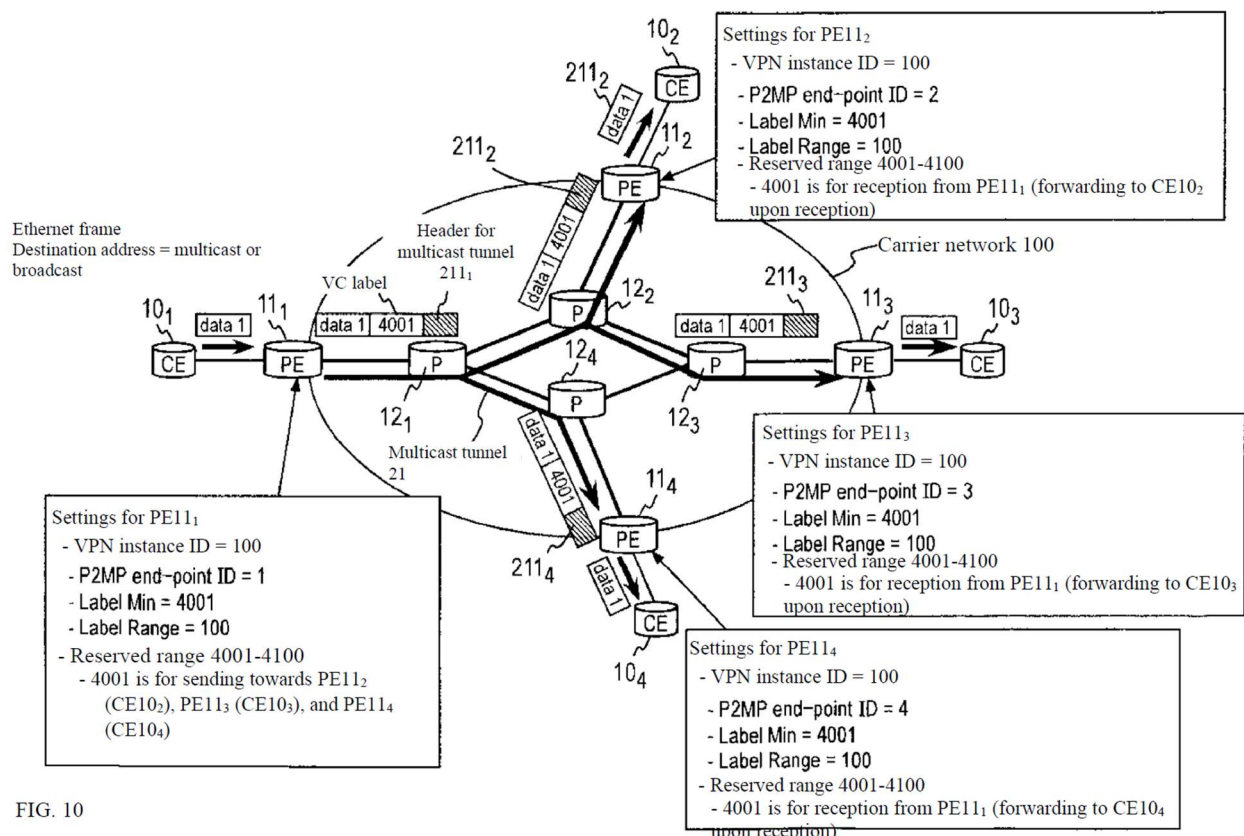
33. I disagree with Dr. Mitzenmacher's assertion that these three pseudo-wires are implemented on different physical connections between the input router and the intermediate router. EX2006 ¶¶53, 110-114. At best, Dr. Mitzenmacher suggests that the pseudo-wires in Kamite's Figure 3 pass through different physical connections because Kamite "assigns each pseudowire an 'Interface Parameter.'" EX2006 ¶113 (citing EX1041, 8). First, that statement does not suggest that Kamite

assigns different interface parameters to each pseudo-wire. Second, that statement is describing how Kamite uses the parameter “[i]n the present invention,” not in Figure 3. EX1041, 8, 13. Third, even if Kamite assigns different interface parameters to each pseudo-wire, the figure above indicates that these would be *different virtual interface parameters*, which are distinct from the physical interfaces that Dr. Mitzenmacher contends must be shared under its construction of “link.” A POSITA would have understood that the pseudo-wires in Figure 3 share a physical interface, represented by the connection between PE11₁ and P12₁ highlighted in blue above. Figure 3 therefore teaches the challenged claims even if the Board adopts Dr. Mitzenmacher's constructions.

V. GROUND 2: KAMITE'S FIGURE 10 AND BOCCI TEACH THE CORRECT UNDERSTANDING OF THE CHALLENGED CLAIMS

34. To the extent the Board disagrees with Dr. Mitzenmacher's constructions, then Kamite's Figure 10 teaches my understanding of the '775 claims. Here—as in the combination of Wainner and Bocci—Dr. Mitzenmacher assumes without agreeing that Kamite and Bocci teach setting up multi-segment pseudo-wires. EX2006 ¶104. Dr. Mitzenmacher then repeats the same arguments here as he made with Wainner above.

35. Dr. Mitzenmacher argues that Kamite's Figure 10 does not teach the challenged claims because it allegedly includes only one pseudo-wire between the input router and the intermediate router. EX2006 ¶105.



EX1041, Fig. 10. Dr. Mitzenmacher's only support for this assumption is that there is one line between the input router and intermediate router in Kamite's Figure 10. EX2006 ¶106. I fail to see how this suggests there is only one pseudo-wire passing through this connection. That connection is not a component pseudo-wire as Dr. Mitzenmacher suggests—*i.e.*, an individual pseudo-wire that starts at PE11₁ and ends at P12₁—it is a segment of the larger pseudo-wires that span the entire network in Figure 10. Further, Kamite's Figure 10 is functionally identical to Figure 3 of the '775 patent, which depicts the alleged invention and also shows only one line passing from the input router to the intermediate router. EX1001, Fig. 3. And this argument once again ignores the points I made in my original declaration that (1) Kamite

discloses multiple pseudo-wires that span the entire network and share the first link and (2) Patent Owner itself asserted that the claims encompass an identical pseudo-wire configuration in its prior infringement allegations against Cisco. EX1040 ¶¶118, 120.

36. Additionally, this argument is circular when viewed in context with Dr. Mitzenmacher's characterization of Kamite's Figure 3. Regarding Kamite's Figure 3, Dr. Mitzenmacher asserted that it does not teach the challenged claims even though it explicitly depicts three separate pseudo-wires passing through a physical connection. EX2006 ¶¶110-114. But now with Figure 10, Dr. Mitzenmacher asserts that it also fails to teach the challenged claims *because* it compresses these three pseudo-wires into one shared connection. EX2006 ¶¶103-109.

37. Dr. Mitzenmacher also argues that “multi-segment pseudowires cannot connect to interfaces on [intermediate] routers such as P12₁.” EX2006 ¶107. This argument contradicts the '775 patent's teaching that multi-segment pseudo-wires contain a “link” from an input router to an intermediate router that—under Dr. Mitzenmacher's proposed construction of “link”—is a connection from an interface on the input router to an interface on the intermediate router. *See supra* § III.

38. Finally, Dr. Mitzenmacher suggests that the tunnels in Kamite are not equivalent to pseudo-wires and links. EX2006 ¶89. Dr. Mitzenmacher says that “PWs are ‘a separate layer to the PSN tunnel’” and cites to only one sentence in Bocci for support. EX2006 ¶89 (citing EX1031, 7). This misrepresents Bocci, which actually teaches that Bocci differs from the known pseudo-wire protocol in that “the pseudo-wires *may be considered* to be a separate layer to the PSN tunnel”—not that they *are* a separate layer—and that they nevertheless “reuse the protocols of the PSN and may use information that is extracted from the PSN.” EX1031, 7 (emphasis added). Indeed, Bocci explains that its pseudo-wires are implemented on tunnels: Bocci “extends the architecture in” the known protocol “to enable pseudo wires to be extended through multiple PSN tunnels.” EX1031, 3. Additionally, Kamite teaches implementing pseudo-wires over a tunnel, (EX1041, 5), and Dr. Mitzenmacher does not explain how combining Kamite with Bocci would violate this teaching.

VI. CONCLUSION

39. For the reasons stated above, it is my opinion that the Challenged Claims would have been obvious at the time of the invention.

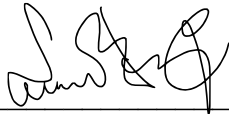
40. In signing this declaration, I recognize that the declaration will be filed as evidence in a contested case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I hereby declare that all statements

Declaration of Dr. Bhattacharjee in Support of Petitioner's Reply

made herein of my own knowledge are true and that all statements made on information and belief are believed to be true. I further declare that these statements were made with the knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under 18 U.S.C. § 1001.

Respectfully submitted,

Date: January 28, 2025



Samrat Bhattacharjee, Ph.D