

**UNITED STATES PATENT AND TRADEMARK OFFICE**

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**BEFORE THE PATENT TRIAL AND APPEAL BOARD**

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JUNIPER NETWORKS, INC.,  
Petitioner,

v.

MONARCH NETWORKING SOLUTIONS LLC,  
Patent Owner.

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

“Mechanism for protecting a pseudo-wire”

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IPR2024-00561

**DECLARATION OF DR. SAMRAT BHATTACHARJEE IN SUPPORT OF  
PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 8,130,775**

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### PETITIONER'S EXHIBIT LIST

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| 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                                                                                                                                                                                                                                                                                                                                        |
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| 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 <a href="https://datatracker.ietf.org/doc/html/rfc791">https://datatracker.ietf.org/doc/html/rfc791</a>                                                                                                                                                                                                               |
| EX1010 | RFC 3985, "Pseudo Wire Emulation Edge-to-Edge (PWE3) Architecture," IETF (Mar. 2005), available at <a href="https://datatracker.ietf.org/doc/html/rfc3985">https://datatracker.ietf.org/doc/html/rfc3985</a>                                                                                                                                                                        |
| EX1011 | M. Bocci et al., Enhancing Converged MPLS Data Networks with ATM, Frame Relay and Ethernet Interworking, Alcatel (2004), available at <a href="https://citeseerx.ist.psu.edu/document?repid=rep1&amp;type=pdf&amp;doi=58f0c897e947ac3aa63a8cde807d2c360d74f1a2">https://citeseerx.ist.psu.edu/document?repid=rep1&amp;type=pdf&amp;doi=58f0c897e947ac3aa63a8cde807d2c360d74f1a2</a> |
| 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 <a href="https://datatracker.ietf.org/doc/html/draft-ietf-pwe3-segmented-pw-03">https://datatracker.ietf.org/doc/html/draft-ietf-pwe3-segmented-pw-03</a>                                                                                                                                                |

|        |                                                                                                                                                                                                                                                                      |
|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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 <a href="https://ieeexplore.ieee.org/document/1589631">https://ieeexplore.ieee.org/document/1589631</a> |
| 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 <a href="https://ieeexplore.ieee.org/document/1348125">https://ieeexplore.ieee.org/document/1348125</a>                                                  |
| EX1023 | T. Lo & C. Chen, “Tunnel Allocation and Protection in Hierarchical Cross-Connect WDM Networks,” Nat’l Chiao Tung Univ. (June 2004), available at <a href="https://ir.nctu.edu.tw/handle/11536/53458">https://ir.nctu.edu.tw/handle/11536/53458</a>                   |
| EX1024 | Y. Tsang et al., “Network Delay Tomography,” IEEE (July 15, 2003), available at <a href="https://ieeexplore.ieee.org/document/1212670">https://ieeexplore.ieee.org/document/1212670</a>                                                                              |
| 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 <a href="https://www.ietf.org/proceedings/65/IDs/draft-ietf-pwe3-ms-pw-arch-00">https://www.ietf.org/proceedings/65/IDs/draft-ietf-pwe3-ms-pw-arch-00</a> ("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 <a href="https://datatracker.ietf.org/doc/html/rfc4447">https://datatracker.ietf.org/doc/html/rfc4447</a>                                                                   |
| 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                                                                                                                                                                                                                                        |

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|--------|--------------------------------------------------------------------------------------------|
| EX1041 | Certified Translation of JP Patent Application No. 2006-129359 to Kamite et al. (“Kamite”) |
|--------|--------------------------------------------------------------------------------------------|

## **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”). I have been asked by Petitioner to assist in evaluating the claims and the disclosure of the ’775 patent.

2. I understand that the ’775 patent is currently asserted in a litigation by Monarch Networking Solutions LLC (“Monarch” or “Patent Owner”) against Petitioner in *Monarch Networking Solutions LLC v. Juniper Networks, Inc.*, Case No. 3:23-cv-05076-RFL (N.D. Cal.).

### **A. Qualifications**

3. I provide below an overview of my background and qualifications.

4. I earned a Ph.D. in Computer Science from Georgia Institute of Technology in 1999. Before that, I earned Bachelor of Science degrees in Mathematics and Computer Science from Georgia College and State University in 1994. I was a Teaching Assistant at the Georgia Institute of Technology from 1994 to 1995 and an Instructor in 1998.

5. From 1999 through 2005, I was an Assistant Professor at the University of Maryland, College Park, in the Department of Computer Science, and then an

Associate Professor with tenure from 2005 through 2009. In 2006, I was a Visiting Professor at Max Planck Institut für Software Systems in Saarbrücken, Germany. In 2007, I was a Visiting Researcher at AT&T Labs in Florham Park, New Jersey.

6. Since 2009, I have been a tenured Professor at the University of Maryland. My teaching and research have focused on computer networking and other aspects of the technologies pertaining to the '775 patent. As part of my research, I have also extensively worked with MPLS, which is a protocol that can be used to point-to-point links for layer-3 protocols, much like pseudo-wires do for layer-2 protocols. I have also worked extensively with the layer-2 protocols that are carried over pseudo-wires, including Ethernet, and published papers on efficient multicast/point-to-multipoint protocols.

7. I served as a reviewer for ACM/IEEE Transactions on Networking, IEEE Journal on Selected Areas in Communications, Computer Communications Journal (Special Issue on Network Security), ACM Transactions on Computer Systems, Performance Evaluation Journal, Computer Communications Review, European Transactions on Telecommunications, IEEE Transactions on Parallel and Distributed Systems, and ACM Transactions on Internet Technology.

8. I am the author of numerous publications in the field of networking, including journal articles, book chapters, publications in proceedings, technical reports, and invited papers.

9. I have been active in a number of professional organizations and conferences. I have served with the National Science Foundation (NSF) Workshop on Network Testbeds, the NSF Networking Research Panel, the Department of Education High Performance Networking Panel, and as an Evaluator for the Intel Science Talent Search.

10. I have received several honors and awards. These include the Alfred P. Sloan Jr. Fellowship; the Best Paper Award, 14th Annual IEEE International Conference on High Performance Computing (HiPC) (with Vijay Gopalakrishnan, Ruggero Morselli, Peter Keleher, and Aravind Srinivasan); the Best Paper Award, 7th IEEE/ACM Conference on Grid Computing (with Jiksoo Kim, Byomsuk Nam, Peter Keleher, Michael Marsh, and Alan Sussman); and the NSF CAREER Award. I also received Teaching Excellence Awards in 2004, 2008, and 2012.

11. In 2017, along with colleagues from Cornell University and the Max Planck Society in Germany, I started an annual school for introducing undergraduate students from across the world to research. This school is partially supported by the NSF and had student participants from 29 countries.

12. I am also the co-director of a new joint Ph.D program in computer science between the University of Maryland and the Max Planck Society in Germany.

13. Additional details of my education and employment history, professional service, patents, publications, and other testimony are set forth in my current curriculum vitae, which is attached as Petitioner's Exhibit 1004.

**B. Materials Considered**

14. In forming my opinions, I have considered the '775 patent specification, including the Abstract, the figures, and the claim language itself, as would have been understood by a person having ordinary skill in the art. I have also reviewed the file history of the '775 patent, the exhibits listed within the petition, and any other material cited in the petition and this declaration.

15. In forming my opinions, I have relied on my personal knowledge and professional experience in designing, developing, deploying, or using software related to computer networks, pseudo-wires, and related technologies, and on the documents and information referenced in this declaration.

16. I am being compensated for my time spent on this matter at a rate of \$700 per hour, and my compensation is in no way contingent upon the outcome of this matter or on the opinions I offer.

**II. LEGAL UNDERSTANDINGS**

17. In this section, I describe my understanding of certain legal standards that I have relied upon in forming my opinions set forth in this declaration. I am not an attorney. I have been informed of these legal standards by Petitioner's attorneys.

18. I understand that the claims define the invention. I also understand that an unpatentability analysis is a two-step process. First, the claims of the patent are construed to determine their meaning and scope. Second, after the claims are construed, the content of the prior art is compared to the construed claims.

19. I understand that a claimed invention is only patentable when it is new, useful, and non-obvious in light of the “prior art.” That is, the invention, as defined by the claims of the patent, must not be anticipated by or rendered obvious by the prior art.

**A. Claim Construction**

20. I understand that the United States Patent and Trademark Office interprets claim terms in an *inter partes* review proceeding under the “*Philips*” claim construction standard. I understand that under this standard, the meaning of claim terms is considered from the viewpoint of one of ordinary skill in the art at the time of the alleged invention. For this declaration, I have been asked to apply February 26, 2007 as the priority date for the ’775 patent, which is the date I have used for claim interpretation purposes. However, the interpretations that I provide below would have also been correct if the date of alleged invention was a year earlier or later.

21. I have been informed that, for the purposes of my analysis in this IPR proceeding, the terms appearing in the claims of the ’775 patent should be interpreted

according to how a POSITA would have understood the claim terms at the time of the earliest priority date, in light of the patent specification, the prosecution history, and any other relevant intrinsic and extrinsic evidence.

**B. Anticipation**

22. I understand that a patent claim is anticipated when a single piece of prior art describes every element of the claimed invention, either expressly or inherently, arranged in the same way as in the claim. For inherent anticipation to be found, it is required that the missing descriptive material is necessarily present in the prior art. I understand that, for the purpose of an *inter partes* review, prior art that anticipates a claim can include both patents and printed publications from anywhere in the world.

**C. Obviousness**

23. I understand that a patent may not be valid even though the invention is not identically disclosed or described in the prior art if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious to a person having ordinary skill in the art in the relevant subject matter at the time the invention was made.

24. I understand that the following factors are evaluated to determine whether the claimed subject matter is obvious: (1) the scope and content of the prior art; (2) the difference or differences, if any, between each claim of the patent and the

prior art; and (3) the level of ordinary skill in the art at the time the patent was filed. Unlike anticipation, which allows consideration of only one prior art reference, I understand that obviousness may be shown by considering more than one prior art reference.

25. I understand that the following rationales may be used to determine whether a piece of prior art can be combined with other prior art or with other information within the knowledge of one of ordinary skill in the art:

- Combining prior art elements according to known methods to yield predictable results;
- Simple substitution of one known element for another to obtain predictable results;
- Use of known techniques to improve similar devices (methods, or products) in the same way;
- Applying a known technique to a known device (method, or product) ready for improvement to yield predictable results;
- “Obvious to try”: choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success;
- Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives

or other market forces if the variations would have been predictable to one of ordinary skill in the art; or

- Some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention.

26. Moreover, I understand that certain secondary considerations may be considered in evaluating obviousness in order to prevent hindsight bias. These secondary considerations may include: (1) commercial success; (2) long-felt but unresolved needs; (3) copying of the invention by others in the field; (4) initial expressions of disbelief by experts in the field; (5) failure of others to solve the problem that the inventor solved; and (6) unexpected results. I also understand that evidence of objective indicia of non-obviousness must be commensurate in scope with the claimed subject matter.

27. Finally, I understand that independently made, simultaneous inventions, made within a comparatively short space of time, are persuasive evidence that the claimed apparatus was the product only of ordinary mechanical or engineering skill. I understand that simultaneous invention can occur as late as one year after the patent's priority date.

### III. TECHNOLOGY BACKGROUND

#### A. Pseudo-Wires

28. At the time of the invention, in computer networks, data was typically transmitted in the form of a data packet from a source computer, through intermediary computers, to a destination computer. EX1009, 1, 6.<sup>1</sup> There were several network “services” that could be used to send data packets across a network; for example, “Frame Relay, ATM, Ethernet, TDM, and SONET/SDH.” EX1010, 1. Each service had its own advantages and disadvantages, and customers chose one network service over another depending on the customers’ particular needs. EX1011, 2. The differing advantages of each service, as well as customers’ unique needs, motivated service providers to “converge existing and new services onto a common” network that could support multiple services. *Id.*

29. Pseudo-wires enabled service providers to deploy such a “common network.” At a high level, pseudo-wires were connections between computers that could emulate any of the above services. *Id.*, 3; EX1010, 1. Essentially, pseudo-

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<sup>1</sup> Exhibit citations—excluding exhibits, like patents, that designate their own paragraph and line numbers—refer to the page stamped on the bottom right of each exhibit, following the words “Juniper Exhibit.”

wires could transmit data packets across a network—from an input computer to an output computer—regardless of the service used. EX1011, 3.

**B. Multi-Segment Pseudo-Wires**

30. Prior to the priority date of the '775 patent, it was common and well-understood that consecutive pseudo-wires could be combined to form a multi-segment—also known as multi-hop—pseudo-wire. *See* EX1031, 7 (“A MS-PW is a single PW that for technical or administrative reasons is segmented into a number of concatenated hops.”). For example, the Cisco textbook titled “MPLS Fundamentals,” first printed in November 2006, explained that “L2VPN Pseudowire Switching allow[ed] the stitching of two pseudowire segments.” EX1012, 457. A 2006 Cisco presentation on L2VPN expanded on this statement, teaching that end-to-end pseudo-wire connections were “not possible across multiple” autonomous systems. EX1013, 69. “Tunnel stitching solve[d] this problem by inter-connecting pseudo wires belonging to different autonomous systems and thus providing an end-2-end path.” *Id.*, 70. Accordingly, multiple “pseudo wire segment[s]” could be stitched together to form a multi-segment pseudo-wire. *Id.*, 71.

31. In October 2006, Luca Martini and other inventors published an Internet Draft confirming this understanding. EX1014. This publication explained

that multi-segment pseudo-wires comprised a “set of two or more continuous PW segments that behave[d] and function[ed] as a single point-to-point PW.”<sup>2</sup> *Id.*, 4.

32. Similarly, M. Bocci and S. Bryant published an Internet Draft on January 11, 2006 (further discussed in the grounds below), entitled “An Architecture for Multi-Segment Pseudo Wire Emulation Edge-to-Edge,” which defined a multi-segments pseudo-wire as “a single PW that for technical or administrative reasons is segmented into a number of concatenated hops.” EX1031, 7. Bocci referred to these segments as “PW segments that behave and function as a single point-to-point PW.” *Id.*, 6. Thus, it was known at the time that consecutive pseudo-wires could be combined to form a multi-segment pseudo-wire. Indeed, the ’775 patent admits the multi-segment pseudo-wires used in the patent were known in the art. EX1001, Fig. 1 (depicting a multi-segment pseudo-wire), 5:40-42 (“FIG. 1 represents a pseudo-wire *set up as in the prior art* between an input router and an output router of a packet-switched network.” (emphasis added)), 1:65-2:2 (explaining that the pseudo-

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<sup>2</sup> An earlier draft of this document, published in July 2005, contained this disclosure as well. *See* L. Martini et al., “Segmented Pseudo Wire,” IETF (July 2005), available at <https://datatracker.ietf.org/doc/html/draft-ietf-pwe3-segmented-pw-00> (last accessed Feb. 7, 2024).

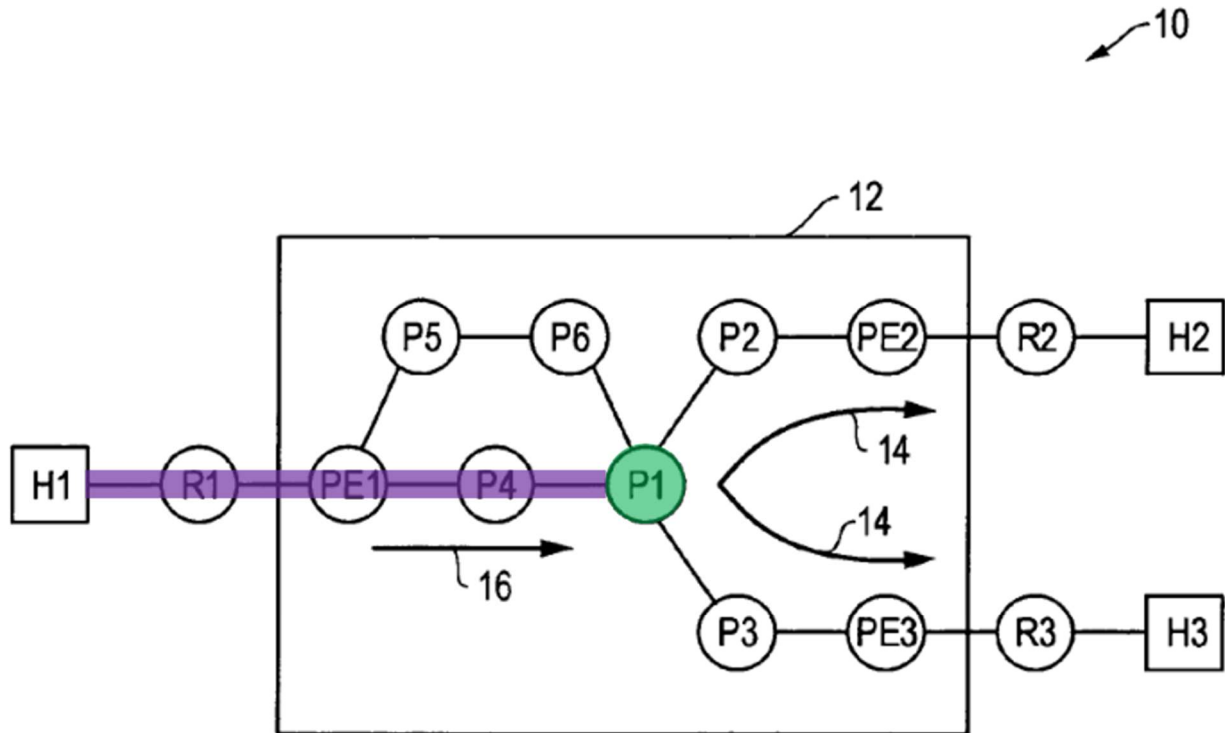
wire in Figure 1 “is defined in more detail in the document ‘An Architecture for *Multi-Segment Pseudo-Wire Emulation* Edge-to-Edge.’” (emphasis added)).

### C. Sharing Connections or Links in Computer Networks

33. Prior to the priority date of the '775 patent, it was also common and well-understood that networks could share connections or links between computers and that sharing connections conferred well-known benefits.

34. U.S. Patent No. 8,107,473 (“Wijnands”), filed on March 16, 2006 and issued on January 31, 2012, is directed to “simultaneous transmission of data packets between a source and select receivers.” EX1015, 1:30-41. This network setup was known in the art as a “point-to-multipoint” network. *Id.*, Abstract, 2:15-19.

35. Wijnands explained that certain junctures in the point-to-multipoint network, called “bifurcation points” (*i.e.*, “the point of the [network] where branches fork”), were “responsible for replicating multicast data packets.” *Id.*, 1:41-44. “This means that only one copy of the multicast data packets travel[ed] over any particular link in the network, making multicast distribution trees extremely efficient for distributing the same information to many receivers.” *Id.*, 1:44-47. Put simply, the connection from the source to the bifurcation point was shared between multiple paths. For example, Wijnand’s Figure 1 depicted two paths: (1) from source **H1** to destination **H2** and (2) from source **H1** to destination **H3**:

*FIG. 1*

EX1015, Fig. 1 (highlighted). Link **16**, highlighted in purple, is shared between these two paths such that source **H1** sends a single data packet over the shared link **16** (purple) to bifurcation point **P1** (green), and **P1** then replicates the data packet before sending it to the destinations. EX1015, 3:28-42, 7:42-8:3.

36. Similarly, U.S. Patent No. 7,477,642 (“Aggarwal”), filed on January 27, 2005 and issued on January 13, 2009, depicted a point-to-multipoint network in which a source **102** is connected to multiple receivers **104** through **110**.

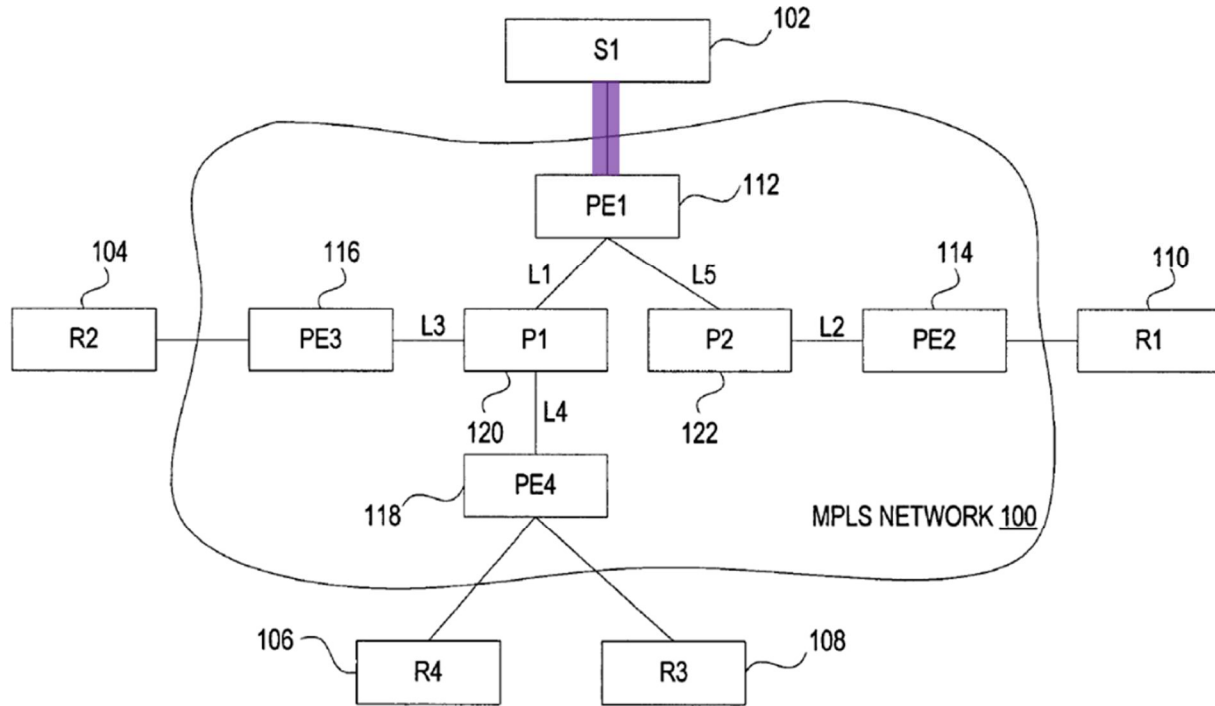
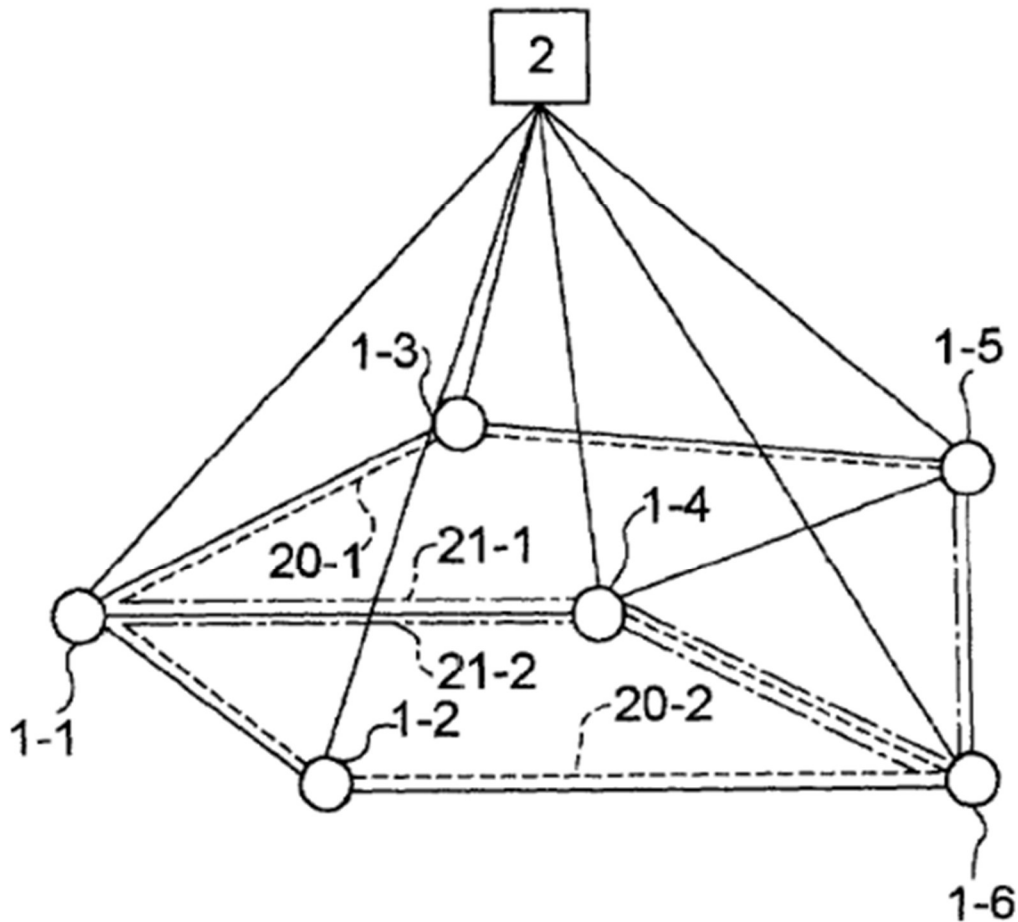


FIG. 1

EX1016, Fig. 1 (highlighted). These multiple connections all share a link (purple) from source **102** to edge router **112**. *Id.*, 3:20-25. Edge router **112** replicates any data packets received from source **102** before sending the replicated data packets to the receivers. *Id.*, 3:20-42. By sharing a link, Aggarwal did not need to establish multiple connections across multiple interfaces between source **102** and edge router **112** or send multiples of the same data packet from source **102** to edge router **112**.

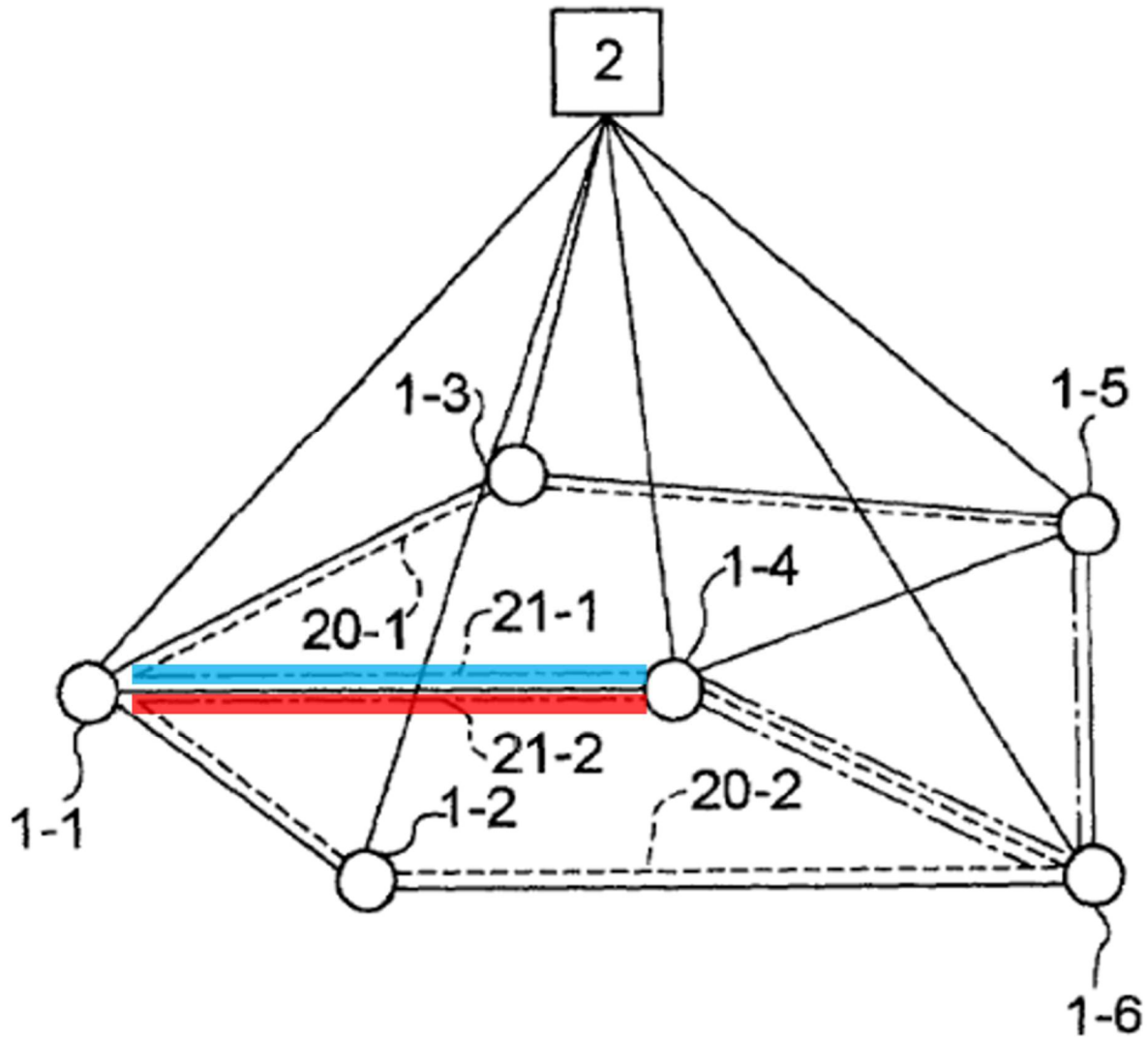
37. Further, U.S. Patent No. 7,411,964 (“Suemura”), filed on March 11, 2002 and issued on August 12, 2008, depicted an example computer network configuration in its Figure 1:

FIG. 1



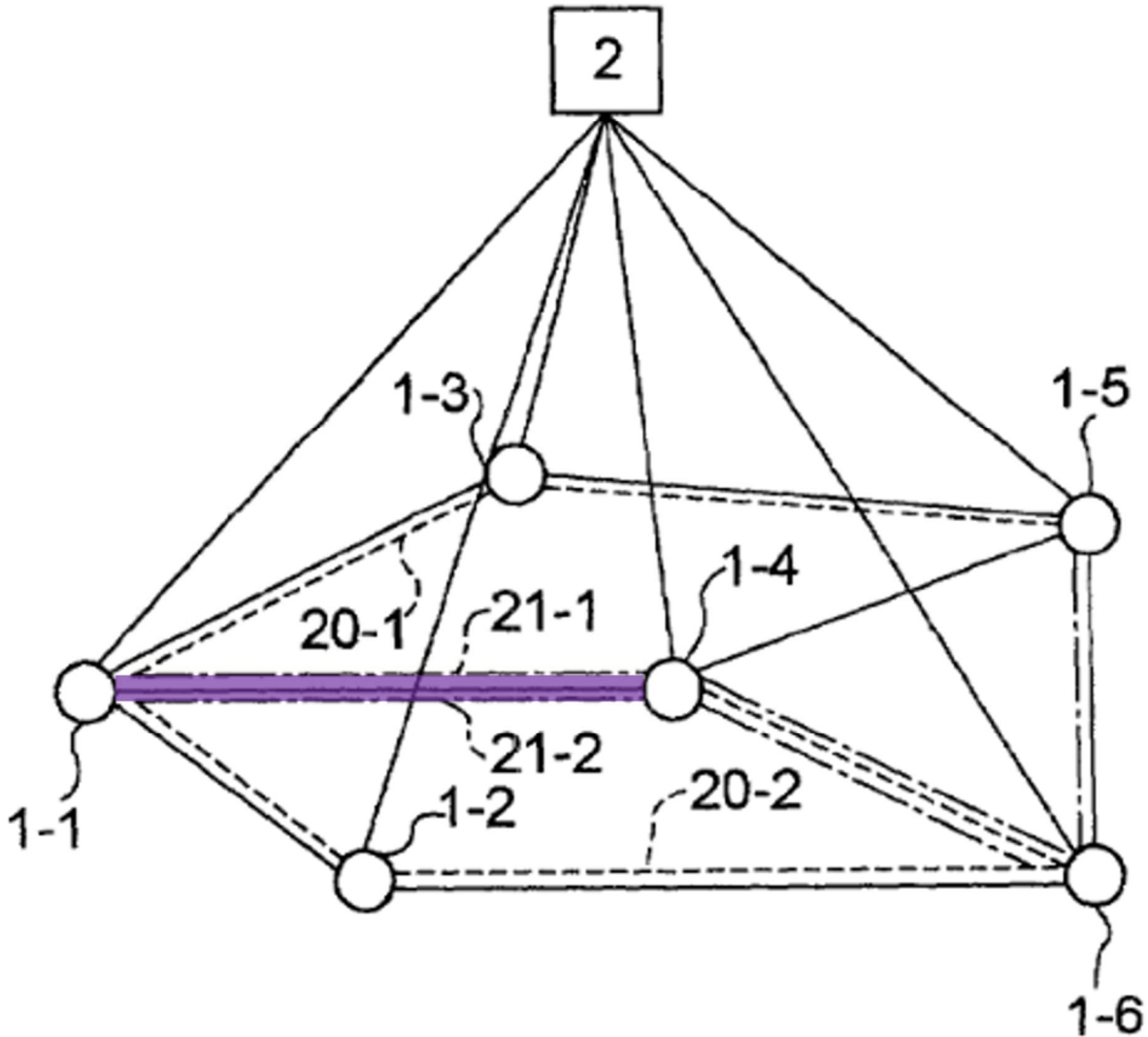
EX1017, Fig. 1. The network comprises six nodes, **1-1** through **1-6**, that are connected by paths **20-1**, **20-2**, **21-1**, and **21-2**. *Id.*, 5:27-39. Several of these paths contain links that overlap links in other paths. *Id.*, 8:28-34 (“[T]he route of the alternate path **21-1** overlap the route of the alternate path **21-[2]** in the link groups (1, 4), (4, 6).”). For example, in the figure below, a first path **21-1** contains a link (blue) that overlaps a link (red) in a second path **21-2**:

# FIG. 1



*Id.*, Fig. 1 (annotated). Suemera explained that the network could be configured to share these overlapping links by assigning the same ports to the overlapping links. *Id.*, 8:44-51, 9:5-36. For example, “downstream port” 10 is assigned to the connection between node 1-1 and node 1-4 for both paths 21-1 and 21-2 such that they shared the link (purple). *Id.*, 9:5-36.

# FIG. 1



*Id.*, Fig. 1 (annotated).

38. Similarly, U.S. Patent No. 8,799,472 (“Noble”), filed on October 3, 2005 and issued on August 5, 2014, explained that “[s]mall networks, comprising multiple endpoint devices, such as desktop computers, notebook computers and handheld computers, *usually share a link to the external network*, such as the

Internet or Wide Area Network (WAN), via a common access device, such as a DSL modem and/or router. EX1018, 1:10-14 (emphasis added).

39. In 2000, Brynn Andrew and Philip Machanick published an article describing the same idea. EX1019. The article depicted the following example network in Figure 1:

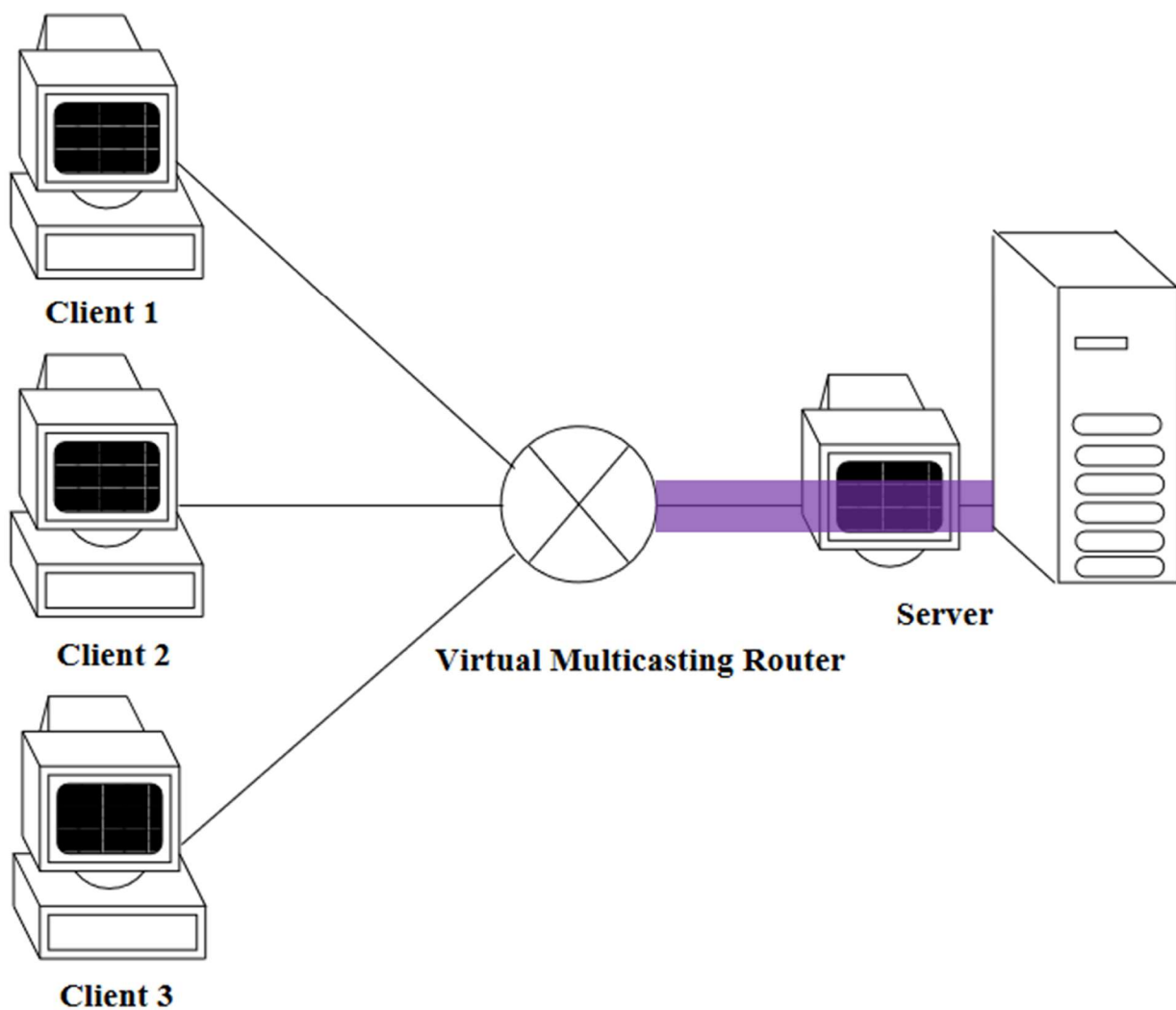


Figure 1: Example Network

*Id.*, 3 (highlighted). The article walked through a scenario in which client 1 requests data from the right-most web server. *Id.* Then, client 2 and client 3 request the same data. *Id.* The server sends a single copy of the data over a shared link (purple) to the virtual multicasting router, which then forwards the data to clients 1 through 3. *Id.* By doing so, the server “save[s] bandwidth and reduce[s] congestion” in the network. *Id.*, 1.

40. Even U.S. Patent No. 5,115,495 (“Tsuchiya”), filed in 1988 and issued on May 19, 1992, explained that routes in a network could share “communications links.” EX1021, 7:3-23; *see also* EX1022, 11 (“We suggest that during periods of low load, the VLANs recompute their spanning trees so that the[y] ***use the same ports and links as far as possible.***” (emphasis added)); EX1023, 43 (“TSP can save ports by letting a pair of working and protection tunnel[s] ***use the same ports*** thus it will have better performance.” (emphasis added)); EX1024, 2, 5-7 (describing a network that contains “shared links” between an input router and multiple output routers).

41. As the examples above show, sharing a connection or link in a network was widely known and utilized because it eliminated redundant data packet transfers. Essentially, by sharing a connection, a source host was no longer required to send identical data packets throughout the network to multiple output hosts. Instead, the source host could send a single data packet through the network, and when the data

packet hit a bifurcation point, the appropriate intermediate router could duplicate the data packet and route it the rest of the way. Eliminating redundant data packet transfers carried several known benefits, including improving bandwidth—*i.e.*, sending less data through the network—and improving latency—*i.e.*, enabling data to reach the output host more quickly. EX1025, 3. Indeed, the '775 patent identified these benefits as the motivating reasons for its “invention”: According to the patent, sharing a link “optimizes the use of network resources, for example bandwidth, between the input router and the intermediate router by setting up between them a single link common to the two pseudo-wires.” EX1001, 3:1-4. As I will show below, not only was sharing a link in a various computer network environments conventional before the '775 patent’s priority date, but doing so in a pseudo-wire environment specifically was conventional as well.

#### **IV. OVERVIEW OF THE '775 PATENT**

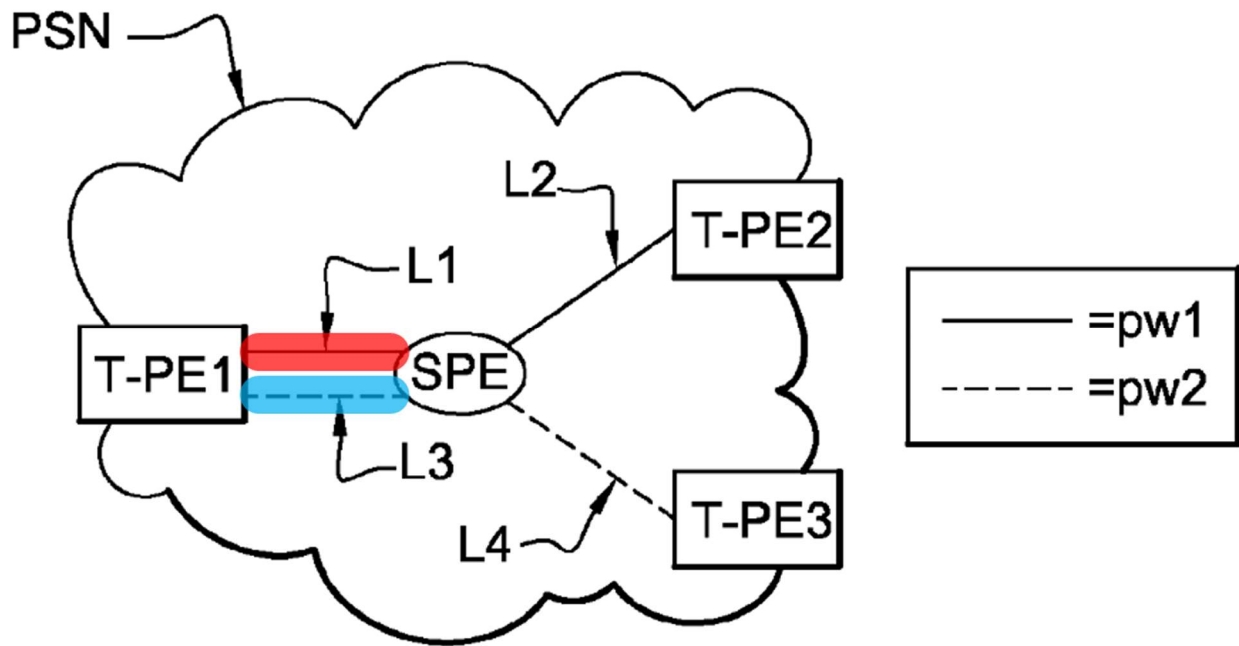
##### **A. Priority**

42. I am informed that because the prior art cited in the petition pre-dates the earliest possible priority date of the '775 patent (February 26, 2007), each cited reference herein qualifies as prior art.

##### **B. Specification**

43. The '775 patent is directed to “telecommunications, and more particularly packet-switched networks.” EX1001, 1:24-25. The patent states that standard network protocols, at the time, could “process only packets conforming to”

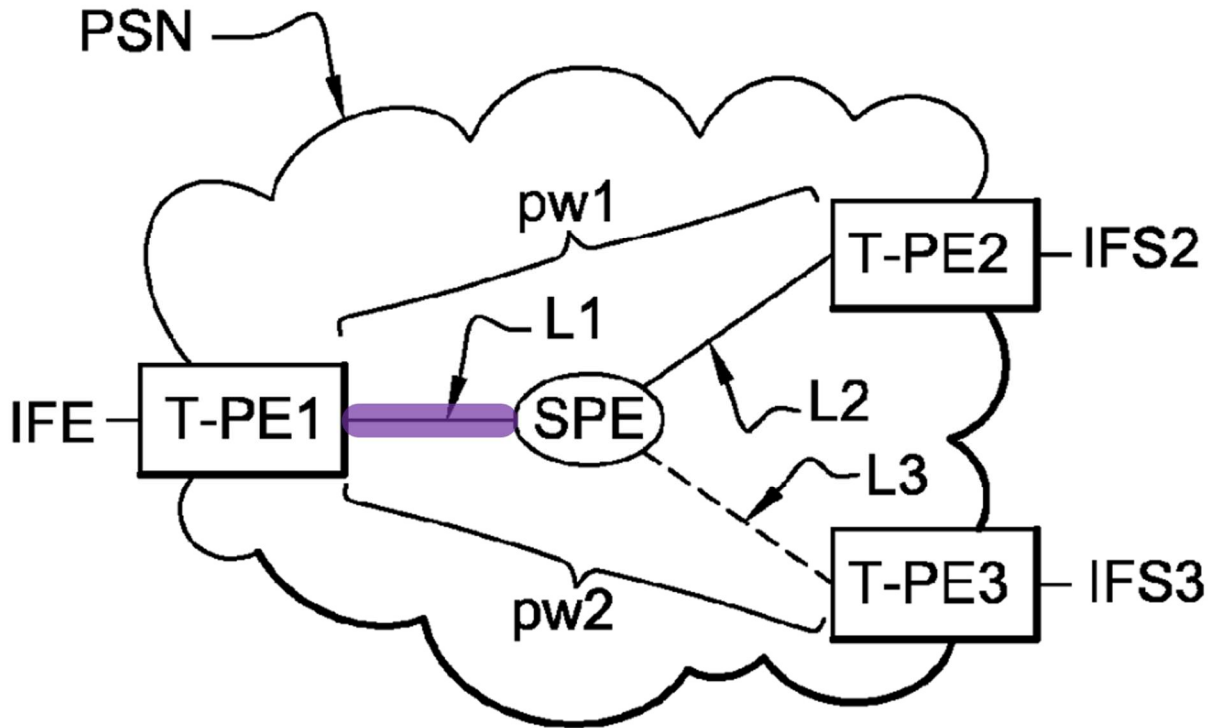
a specific protocol, “the Internet Protocol.” *Id.*, 1:30-44. However, not all data packets conform to the Internet Protocol. Accordingly, “the IETF Pseudo-Wire Emulation Edge-To-Edge (PWE3) standardization group... defined a pseudo-wire concept for emulating” connections that use other services and therefore “do not conform to the Internet Protocol.” EX1001, 1:45-52. Figure 2(AA) of the ’775 patent depicts a pseudo-wire configuration that the patent admits was known in the prior art:



*Id.*, Fig. 2(AA) (highlighted); *see also id.*, 3:43-44 (“FIG. 2 represents a solution ***implemented in the prior art*** to ensure continuity of service in a packet-switched network.” (emphasis added)). The network in Figure 2(AA) contains two pseudo-wires. The first pseudo-wire comprises links **L1** and **L2**. *Id.*, 2:12-27. **L1** connects an input router, T-PE1, to an intermediate router, S-PE, and **L2** connects the

intermediate router, S-PE, to an output router, T-PE2. *Id.* The second pseudo-wire comprises links **L3** and **L4**. *Id.* **L3** connects the input router, T-PE1, to the intermediate router, S-PE, and **L4** connects the intermediate router, S-PE, to an output router, T-PE3. *Id.* Data is typically transmitted across the first pseudo-wire to output router T-PE2, but if the input router T-PE1 detects a fault that affects this connection, it switches to transmitting the data across the second pseudo-wire to output router T-PE3. *Id.*, 2:28-39.

44. Relevant here, links **L1** (red) and **L3** (blue) are separate, even though they (1) connect the same input router to the same intermediate router and (2) transmit the same data in the event of a fault. The '775 specification asserts that this prior-art configuration was standard because a “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.” *Id.*, 3:9-11 (emphasis added). The '775 patent proposes combining links **L1** (red) and **L3** (blue) into a single shared link, depicted in Figure 3 and highlighted in purple—essentially turning the “point-to-point” pseudo-wires into a well-known point-to-multipoint network, described above, (*see* §III.C):



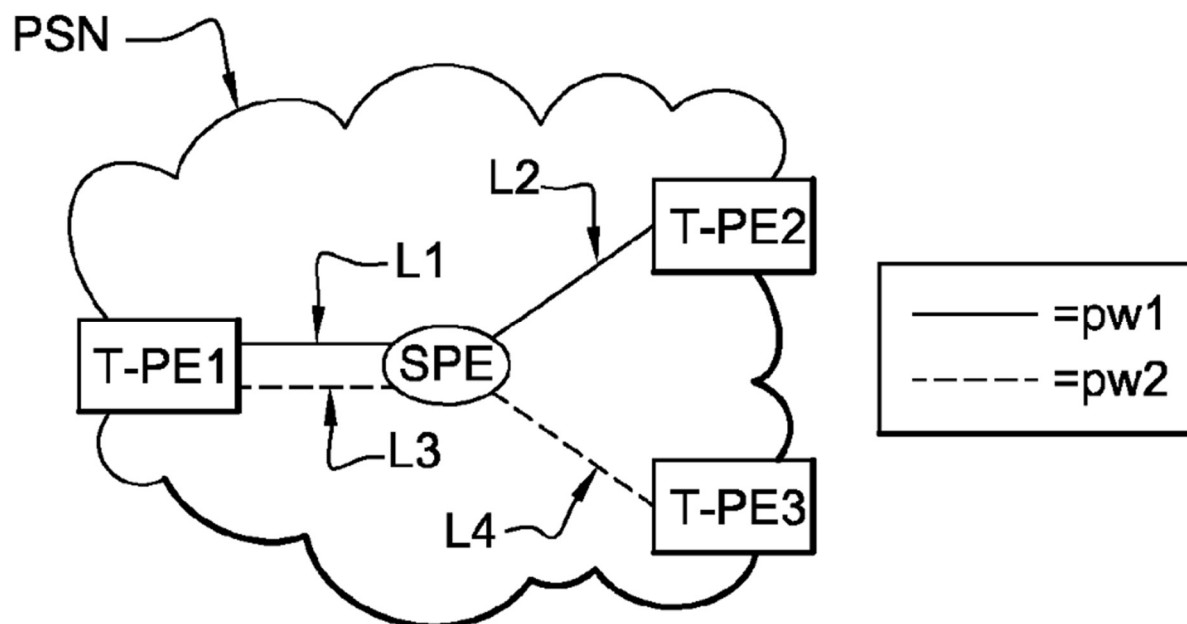
EX1001, Fig. 3 (highlighted); *see also id.*, 5:45-46 (“FIG. 3 represents two pseudo-wires *set up by the method of an embodiment of the invention.*” (emphasis added)). The majority of claims 1 and 6 describe the prior-art embodiment disclosed in Figure 2(AA).

### C. Applicant Admitted Prior Art

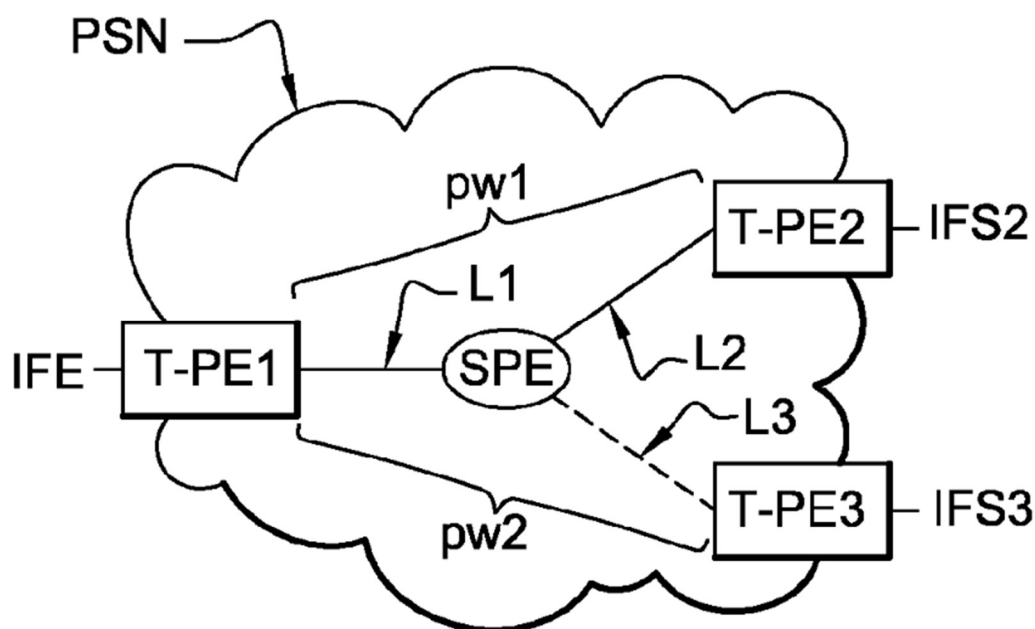
45. The majority of the technology claimed by the ’775 patent is applicant admitted prior art (“AAPA”), and the only “invention” over the prior art is sharing a first link between a first and second pseudo-wire.

46. The applicant admits that the general network configuration that the ’775 patent uses throughout its claims was known in the prior art. The ’775 patent explains that “FIG. 2 represents a solution implemented in the prior art to ensure

continuity of service in a packet-switched network.” EX1001, 5:43-44. Figure 2(AA) depicts the following network:

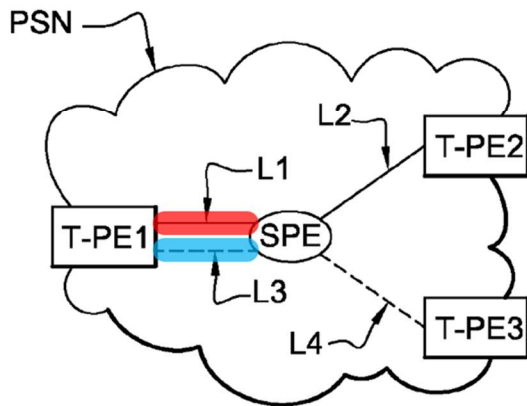


*Id.*, Fig. 2(AA). The purported “invention” described in claims 1 and 6 of the ’775 patent is depicted in Figure 3:

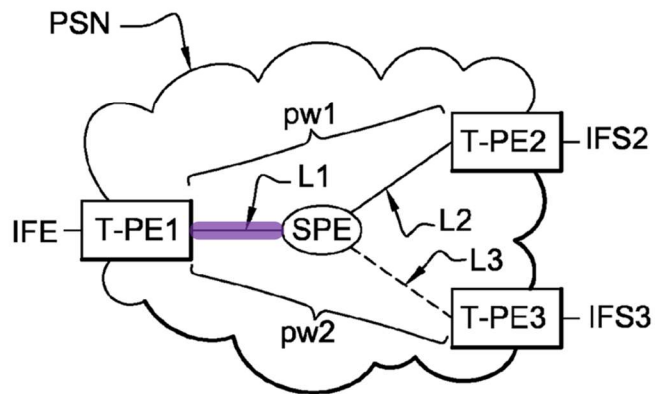


*Id.*, Fig. 3. As these figures show, the only difference between the “invention” and the admitted prior art is that links **L1** and **L3** in the prior art (Figure 2(AA)) are combined to form a shared link **L1** in the invention (Figure 3):

**Admitted Prior Art (Fig. 2(AA))**



**'775 “Invention” (Fig. 3)**



*Id.*, Figs. 2(AA) & 3 (highlighted and annotated).

47. Thus, the only “advance” in these claims—which, as discussed below, was already known in the prior art—is sharing a first link between the two pseudo-wires. *Id.*, 12:14-27.

## V. LEVEL OF ORDINARY SKILL IN THE ART

48. I understand that a person of ordinary skill in the art (“POSITA”) is a hypothetical person who is presumed to be aware of all pertinent art, thinks along conventional wisdom in the art, and is a person of ordinary creativity—not an automaton. In deciding the level of ordinary skill, I understand that the following factors may be considered: the levels of education and experience of persons

working in the field, the types of problems encountered in the field, and the sophistication of the technology.

49. I understand that the asserted patents must be evaluated from the perspective of a POSITA. In my opinion, the relevant art for this patent relates to the field of computer networks and routing packets in a computer network. I understand that the relevant point in time for determining the qualifications of a POSITA is the time of the alleged invention, which I assume to be the earliest filing date for the patent. Here, I understand that the earliest invention date contended by Patent Owner is February 26, 2007.

50. In my opinion, a person of ordinary skill in the art (“POSITA”) in February 2007 would have had a Bachelor of Science degree in electrical engineering, computer engineering, computer science, or a related subject, and three years of work experience in computer networking or a related field. Lack of professional experience can be remedied by additional education, and vice versa. I meet these criteria and have applied it in my analysis.

## **VI. CLAIM CONSTRUCTION**

51. I have been informed that, in a prior district court litigation brought by Patent Owner, the district court construed a term of the ’775 patent. EX1029, 33-38. This construction is identified below, and I have been instructed to apply it in my analysis for the purposes of this proceeding.

| Claim(s) | Term   | Construction                                                                            |
|----------|--------|-----------------------------------------------------------------------------------------|
| 1-7      | “link” | “connection between an interface of a first router and an interface of a second router” |

EX1029, 33-38. I have also applied Patent Owner’s proposed constructions in my analysis below, to the extent they are different. For example, I have been informed that Patent Owner advocated for a nearly identical construction during EPR, asserting that “the term ‘link’ should be construed to mean ‘a connection between an interface on a first device and an interface on a second device.’” EX1008, 69.

## **VII. IDENTIFICATION OF HOW THE CHALLENGED CLAIMS ARE UNPATENTABLE**

### **A. Ground 1: Claims 1 and 6 Would Have Been Obvious in View of Wainner and Bocci**

#### **1. Wainner (EX1030)**

52. Wainner explains that prior-art methods of routing data to multiple output hosts are inefficient and “scalability is constrained by bandwidth efficiency or operational complexity.” EX1030, ¶1. “Embodiments of the invention significantly overcome such deficiencies” by implementing “point-to-multipoint distribution using pseudowires.” *Id.*, ¶5. One embodiment of Wainner’s invention is depicted in its Figure 2:

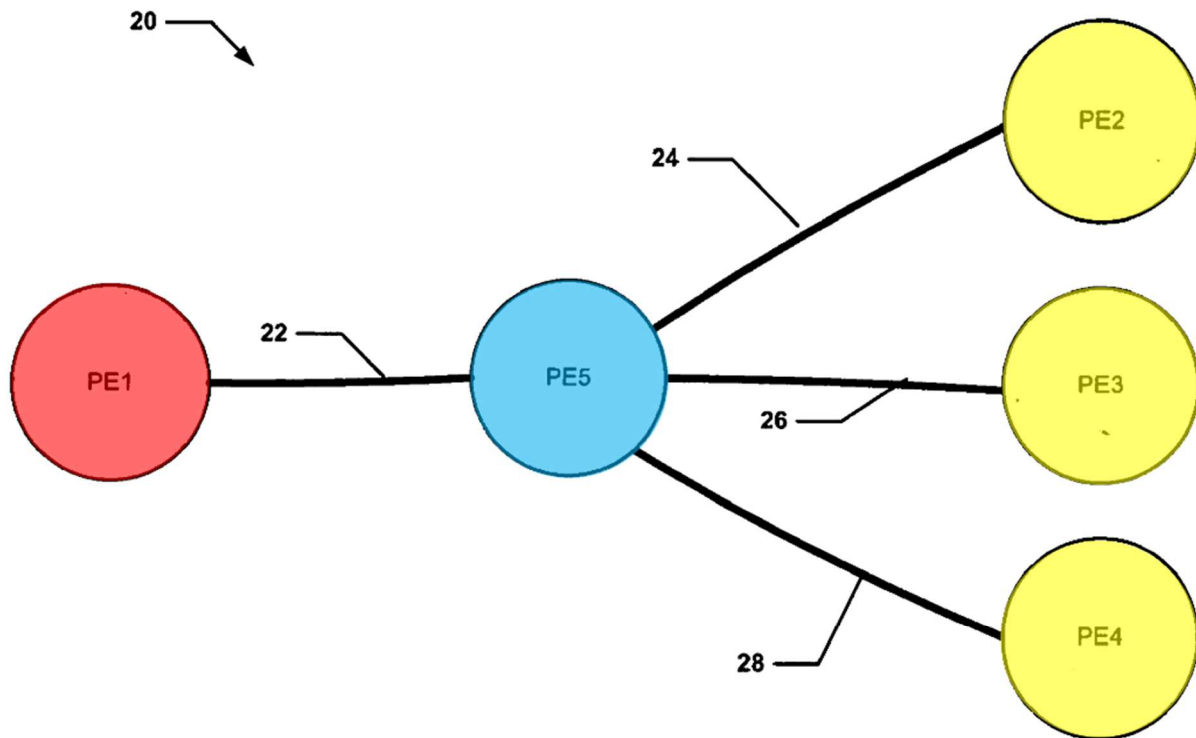


**FIGURE 2**

*Id.*, Fig. 2 (highlighted). In this embodiment, an origination provider edge (PE1, red) routes data packets over a pseudo-wire **22**<sup>3</sup> to a switching provider edge (PE5, blue). *Id.*, ¶¶23-24, 28-33. The switching provider edge then replicates the data packets before routing the replicated data packets to the receiving provider edges (PE2, PE3, and PE4, yellow) over the respective pseudo-wires **24**, **26**, and **28**. *Id.*

<sup>3</sup> Wainner refers to each segment as a pseudo-wire—for example, pseudo-wires 22 and 26—and a POSITA would have known that these pseudo-wires are pseudo-wire segments that form a multi-hop pseudo-wire.

Sequential pseudo-wire segments—for example, pseudo-wires **22** and **24**—combine to form “multi-hop/multi-point pseudowires.” EX1030, ¶20 (“This model statically binds an upstream PW to one or more downstream PW” to form “multi-hop/multi-point pseudowires.”). Wainner’s network configuration therefore shares a link (*e.g.*, pseudo-wire **22**) between the origination provider edge (red) and the switching provider edge (blue), reducing redundant data transfers.

53. Indeed, Wainner explains that “[b]y way of the present environment **20**, the transport provider is able to specify the location of [switching provider edge(s)] branchpoints in order to *conserve bandwidth and provide optimal utilization of the system.*” Compare EX1030, ¶24 (emphasis added), with EX1001, 3:1-2 (“This optimizes the use of network resources, for example bandwidth.”). Like the ’775 patent, Wainner explains that its point-to-multipoint approach “deviates from previous L2VPN concepts that define a *point-to-point* PW.” Compare EX1030, ¶20, with EX1001, 3:9-11 (A “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.” (emphasis added)).

## 2. Bocci (EX1031)

54. Bocci (EX1031) is an Internet Engineering Task Force (“IETF”) Internet Draft entitled “An Architecture for Multi-Segment Pseudo Wire Emulation Edge-to-Edge,” published on January 11, 2006.

55. The IETF is an “Internet Engineering Task Force” that was founded in 1986 to “make[] voluntary standards that are often adopted by Internet users, network operators, and equipment vendors.” *Introduction to the IETF*, IETF, available at <https://www.ietf.org/about/introduction/> (last accessed Feb. 7, 2024). The IETF is a well-known, reputable organization and its website is routinely used and known by POSITAs to access technical documents, like Internet Drafts, that are publicly published on the IETF website.

56. The IETF has a “commitment to making [its] documents, [its] Working Group mailing lists, [its] attendance lists, and [its] meeting minutes publicly available on the Internet.” *Introduction to the IETF*, IETF, available at <https://www.ietf.org/about/introduction/> (last accessed Feb. 7, 2024). One type of document that the IETF makes publicly available are Internet Drafts, which are “working documents of the IETF, its Areas, and its Working Groups.” *Internet-Drafts*, IETF, available at <https://www.ietf.org/how/ids/> (last accessed Feb. 7, 2024). The IETF makes Internet Drafts publicly available on its website and provides a way to search Internet Drafts by using the IETF Datatracker. *Id.*

57. As disclosed on the face of the document, Bocci was submitted on January 11, 2006. EX1031, 1. In my experience, the date that is disclosed on the face of an Internet Draft is the date that the Internet Draft was made publicly

available, and thus in my opinion Bocci would have been sufficiently accessible to POSITAs as of that date.

58. Bocci “describes an architecture for extending pseudo wire emulation across multiple packet switched network segments.” EX1031, 2. “It presents an architectural framework for such multi-segment pseudo wires, defines terminology, and specifies the various protocol elements and their functions.” *Id.* Bocci sometimes refers to pseudo-wires as “PWs,” multi-segment pseudo-wires as “MS-PWs,” and single-segment pseudo-wires as “SS-PWs.” *Id.*, 3, 6.

59. At the time, networks consisting of multiple nodes contained a pseudo-wire between each node “via a single, direct tunnel.” *Id.*, 4. While “[t]his solution is adequate for small numbers of [nodes],... the number of [nodes] and signaling adjacencies will grow in proportion to the square of the number of [nodes].” *Id.* Bocci therefore proposes “[a] more efficient solution” that involves concatenating pseudo-wire segments. *Id.* For example, Bocci explains for the network depicted in its Figure 1, “[t]his requires a capability in PE2 that can concatenate PW segments PE1-PE2 to PW segments PE2-PE3. The end-to-end PW is known as a multi-segment PW.” *Id.*

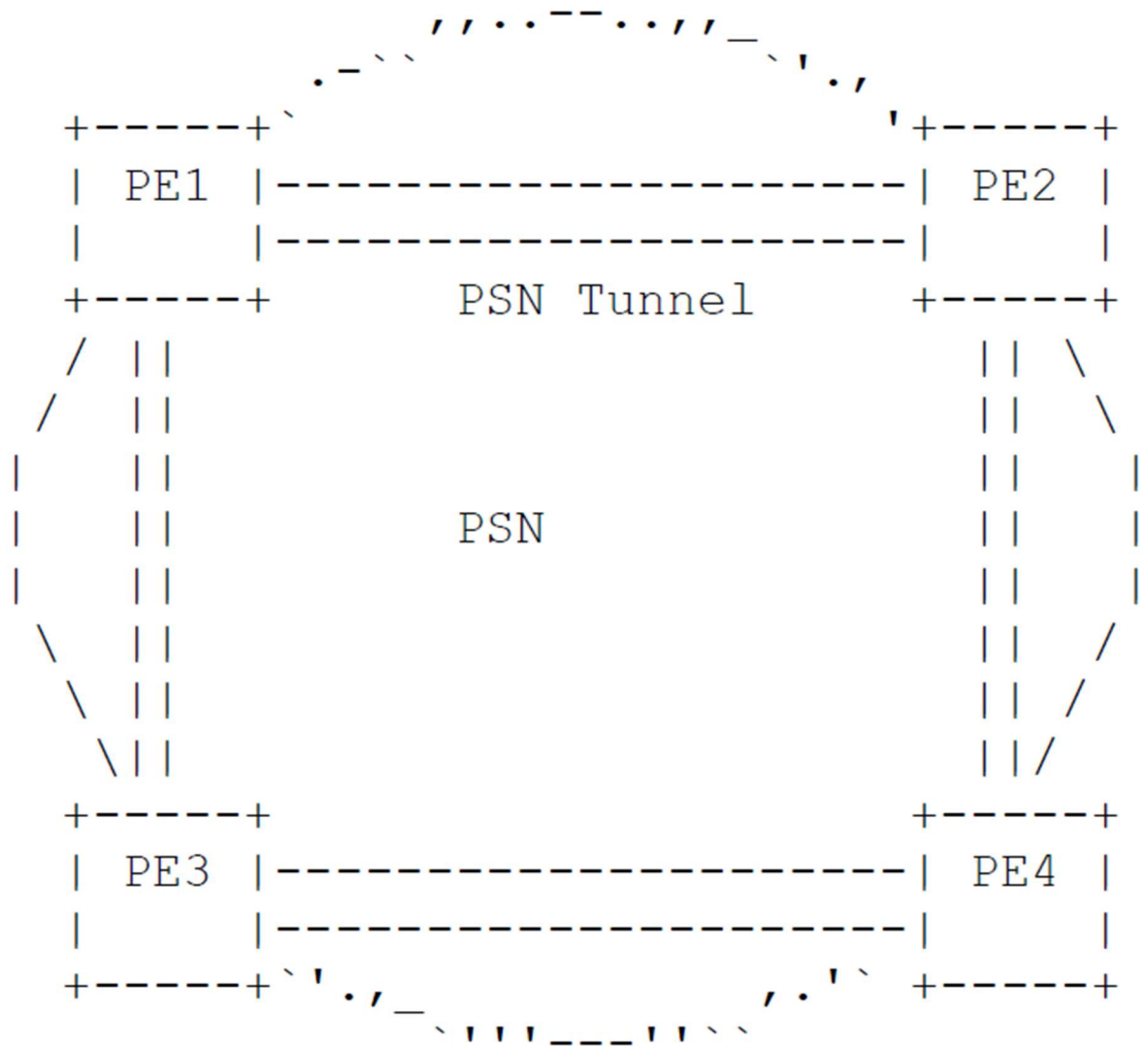


Figure 1 Single PSN PWE3 Scaling

*Id.* Bocci later re-affirms that a multi-segment pseudo-wire comprises a “set of two or more contiguous **PW segments** that behave and function as a single point-to-point PW.” *Id.*, 6 (emphasis added). The resulting multi-segment pseudo-wire, Bocci explains, “is a single PW” that “is indistinguishable from a SS-PW,” *i.e.*, a single-

segment pseudo-wire. *Id.*, 7. “Thus, the following are equivalent from the perspective of the” source node:

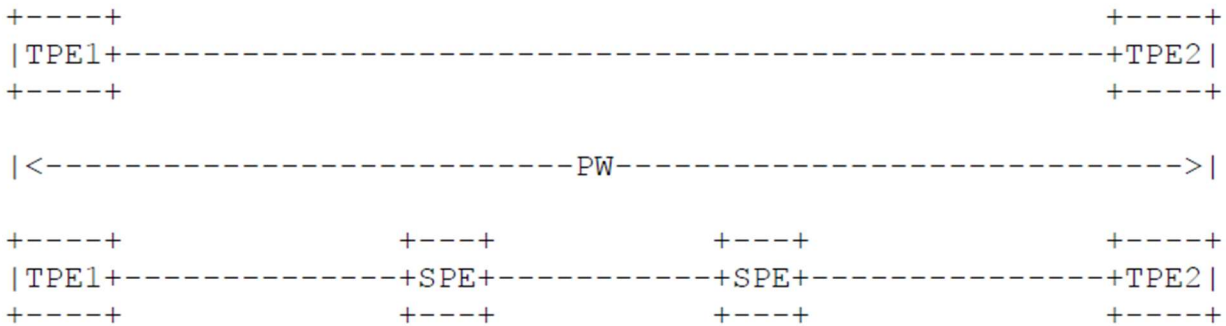


Figure 3 MS-PW Equivalence

*Id.*, 7. Similarly, Figure 4 depicts combining two single-segment pseudo-wires, PW.Seg't 1 and PW.Seg't3, to form one multi-segment pseudo-wire:

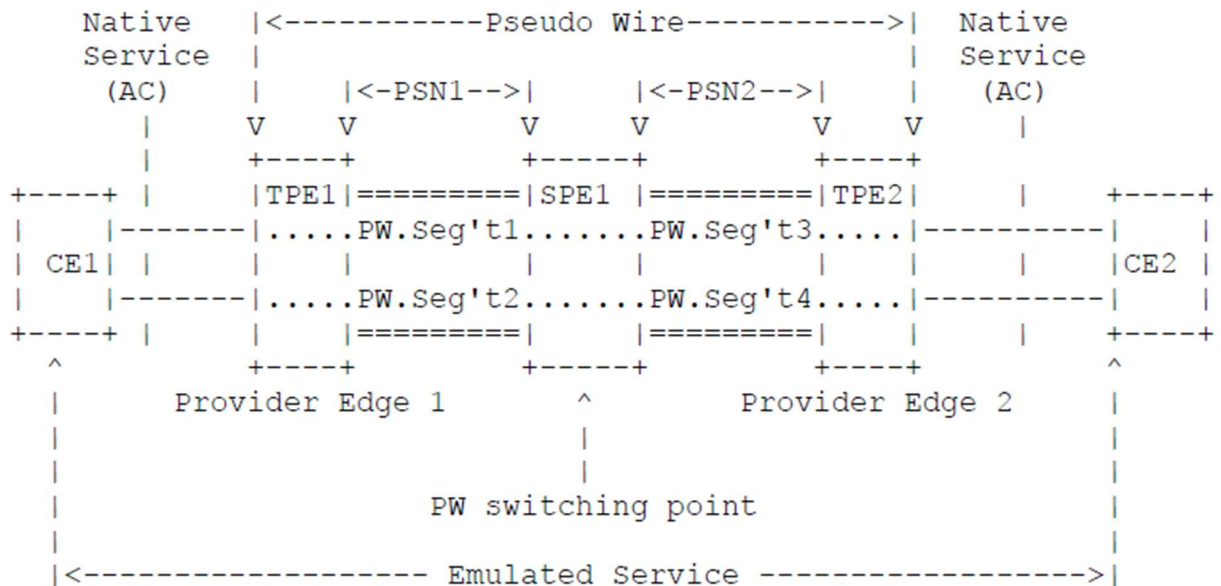


Figure 4 PW switching Reference Model

*Id.*, 9; *see also id.*, 11 (Fig. 5), 13 (Fig. 7). Thus, Bocci teaches combining consecutive pseudo-wires to form a multi-segment pseudo-wire.

### **3. The Wainner-Bocci Combination**

60. In the Wainner-Bocci combination, Wainner discloses the entirety of claims 1 and 6—in particular, setting up two pseudo-wires that share a first link. However, Patent Owner previously argued—in a case that Patent Owner brought against Cisco Systems, Inc.—that Wainner does not disclose multi-segment pseudo-wires and accordingly does not disclose “two pseudo-wires traversing” the first link. EX1032, 4-6. Wainner does disclose these elements, as shown in the analysis below. Additionally, Bocci would have supplemented Wainner’s disclosures and further taught combining consecutive pseudo-wire segments into a multi-segment pseudo-wire. Thus, in the Wainner-Bocci combination, Wainner would operate in its disclosed manner and, to the extent necessary, implement Bocci’s teaching of combining consecutive pseudo-wires to form a multi-segment pseudo-wire.

### **4. Motivations to Combine Wainner and Bocci**

61. In my opinion, a POSITA would have been motivated to combine the teachings of Wainner and Bocci and would have had a reasonable expectation of success of doing so.

62. *First*, the prior art contained teachings, suggestions, and motivations that would have led a POSITA to combine Wainner and Bocci. Wainner itself explains that it teaches a “particular embodiment of a method for providing point-to-multipoint multihop distribution using Pseudowires (PWs).” EX1030, ¶6.

Wainner explains that “an architecture that uses multi-hop/multi-point pseudowires is utilized” such that “[t]his model statically binds an upstream PW to one or more downstream PW.” *Id.*, ¶20. Wainner explains that this multi-hop implementation “avoid[s] the scalability problem at the head-end.” *Id.* A POSITA would have therefore been motivated to search for references, like Bocci, that describe the technical process of combining consecutive pseudo-wires to form a multi-segment (also known as a “multi-hop”) pseudo-wire in order to implement Wainner’s teachings. In fact, Bocci—like Wainner—explains that implementing multi-segment pseudo-wires provides scalability benefits. *See* EX1031, 3-4. Bocci’s teachings are applicable to a variety of network configurations. *See id.*, 8-11 (describing how to implement multi-segment pseudo-wires on both inter-network and intra-network architectures), 3 (identifying “[h]ow to provide PWE3 across multiple PSN routing domains or areas in the same provider” as a motivation). Thus, both Wainner and Bocci contain teachings, suggestions, and motivations to combine the references together. In my opinion, a POSITA would have had a reasonable expectation of success in combining Wainner and Bocci because Bocci extensively describes the process and technical details of how to combine consecutive pseudo-wires to form a multi-segment pseudo-wire. *See generally* EX1031.

63. ***Second***, the Wainner-Bocci combination would have involved merely combining prior art elements according to known methods to yield predictable

results. As shown in the analysis below, Wainner and Bocci include each element in claims 1 and 6. As I show below, Wainner teaches all elements of claims 1 and 6. To the extent the Board finds otherwise, then the only difference between the combination of Wainner and Bocci and the '775 claims is the lack of actual combination of the elements in a single prior art reference. A POSITA could have combined the elements as claimed by known methods. In fact, Bocci describes in detail how to combine consecutive pseudo-wires to form a multi-segment pseudo-wire, and explains that its teachings are applicable to a variety of network configurations. *E.g.*, EX1031, 8-11. Thus, the combination merely would have involved applying the teachings of Bocci to the particular network configuration described in Wainner. In this combination, each element merely performs the same function as it does separately—Wainner's network operates in its disclosed manner and Bocci would have supplemented Wainner's teachings by disclosing combining consecutive pseudo-wire segments to form multi-segment pseudo-wires. In my opinion, a POSITA would have recognized that the results of the combination were predictable, especially because Bocci extensively describes the process and technical details of how to implement its teachings on networks that implement pseudo-wires.

64. ***Third***, the combination would have involved the use of a known technique to improve similar devices in the same way. Wainner contains a base device—*i.e.*, the network described in Wainner and depicted in Wainner's Figure 2.

As I show below, Wainner teaches all elements of claims 1 and 6. To the extent the Board finds otherwise, the '775 patent's disclosure of multi-segment pseudo-wires can be seen as an "improvement" to Wainner. Bocci contains a comparable device—*i.e.*, the networks described throughout Bocci and particularly the network configuration depicted in Bocci's Figures 3 and 4—that has been improved in the same way as the claimed invention. Specifically, Bocci discloses combining consecutive pseudo-wires into multi-segment pseudo-wires. *See* EX1031, 3-4. A POSITA could have applied the known improvement—*i.e.*, Bocci's teaching of combining consecutive pseudo-wires to form a multi-segment pseudo-wire—in the same way to the base device—*i.e.*, Wainner's network configuration. Indeed, Bocci describes in detail how to combine consecutive pseudo-wires to form a multi-segment pseudo-wire, and explains that its teachings are applicable to a variety of network configurations. *E.g.*, EX1031, 8-11. In my opinion, the results would have been predictable to a POSITA, especially because Bocci extensively describes the process and technical details of how to implement its teachings on networks that implement pseudo-wires.

65. ***Fourth***, the combination would have involved applying a known technique to a known device ready for improvement to yield predictable results. Wainner contains a base device—*i.e.*, the network configuration described in Wainner and depicted in Wainner's Figure 2. As I show below, Wainner teaches all

elements of claims 1 and 6. To the extent the Board finds otherwise, the '775 patent's disclosure of multi-segment pseudo-wires can be seen as an "improvement" to Wainner. Bocci discloses a known technique that is applicable to the base device. Specifically, Bocci discloses combining consecutive pseudo-wires into multi-segment pseudo-wires. *See* EX1031, 3-4. A POSITA would have known that Bocci's teachings are generally applicable to networks that deploy consecutive pseudo-wires. In my opinion, a POSITA would have recognized that applying the known technique—*i.e.*, Bocci's teaching of combining consecutive pseudo-wires to form a multi-segment pseudo-wire—would have yielded predictable results and resulted in an improved system. Indeed, Bocci extensively describes the process and technical details of how to implement its teachings on networks that implement pseudo-wires.

66. ***Finally***, Wainner, Bocci, and the '775 patent are analogous art because the references are in the same field of endeavor as each other. All references disclose improvements to conventional pseudo-wire technology. Wainner and the '775 patent, for example, both disclose improving pseudo-wires by sharing connections among multiple pseudo-wires in a network, thereby saving network resources. EX1001, 3:15-29 ("Because 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.”); EX1030, ¶24 (“By way of the present environment **20**, the transport provider is able to specify the location of [switching provider edge(s)] branchpoints in order to conserve bandwidth and provide optimal utilization of the system.”). And Bocci and the ’775 patent, for example, both disclose extending pseudo-wires across multiple network segments by combining segments together into one multi-segment pseudo-wire—in fact, the ’775 patent explicitly references Bocci’s disclosures as relevant to the patent. EX1001, at Other Publications (citing Bocci); EX1001, at 1:53-2:2 (explaining that multi-segment pseudo-wires are “defined in more detail in [Bocci]”); EX1031, 2 (Bocci “presents an architectural framework for such multi-segment pseudo wires.”).

## 5. Claim 1

- (a) 1[pre]: A method of setting up at least two pseudo-wires able to broadcast a data stream, comprising:

67. To the extent the preamble is limiting, Wainner and Bocci would have rendered obvious 1[pre]: “A method of setting up at least two pseudo-wires [*e.g.*, **in Figure 2, a first pseudo-wire comprising links 22 and 24 and a second pseudo-wire comprising links 22 and 28**] able to broadcast a data stream, comprising:”.

68. Wainner explains that it uses at least two pseudo-wires to broadcast a data stream. EX1030, ¶6 (“In a particular embodiment of a method for providing point-to-multipoint multihop distribution *using Pseudowires* (PWs), the method

includes *receiving data...*” (emphases added)). The data in Wainner corresponds to the ’775 patent’s data stream. The ’775 patent explains that a data stream is merely “the packets for transmission.” EX1001, 1:30-33. Similarly, Wainner discloses transmitting data packets. *See, e.g.*, EX1030, ¶¶19, 24.

69. Thus, Wainner discloses (and depicts, in Figure 2) setting up a first pseudo-wire comprising links **22** and **24**, and a second pseudo-wire comprising links **22** and **28** to route data across a network. EX1030, ¶20 (“This model statically binds an upstream PW to one or more downstream PW” to form “multi-hop/multi-point pseudowires.”).

70. Indeed, Wainner’s network configuration is nearly identical to the configuration described in the ’775 patent. For example, Wainner depicts a first router (red) that routes a data packet over a shared link **22** to an intermediate router (blue), which then routes the data packet over separate links **24**, **26**, and **28** to each output router (yellow):

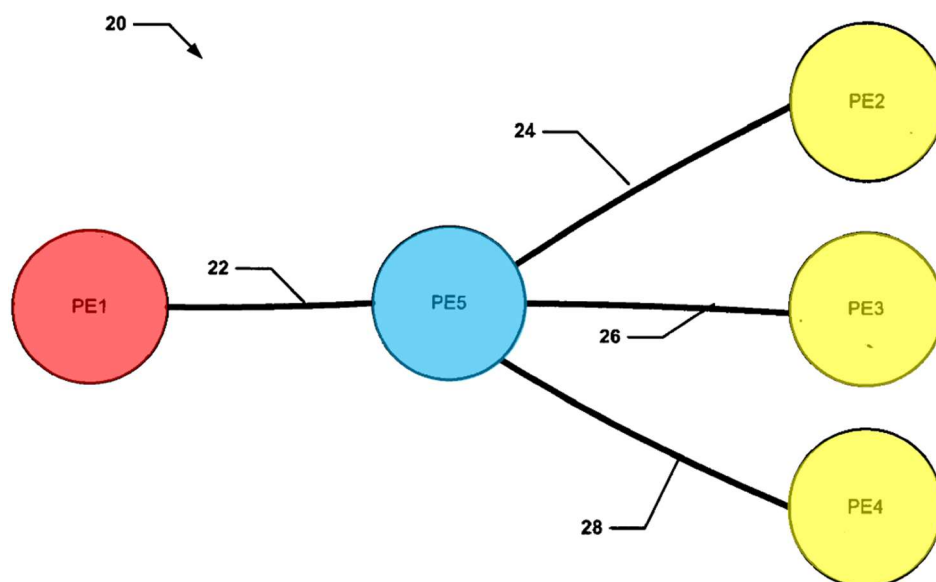
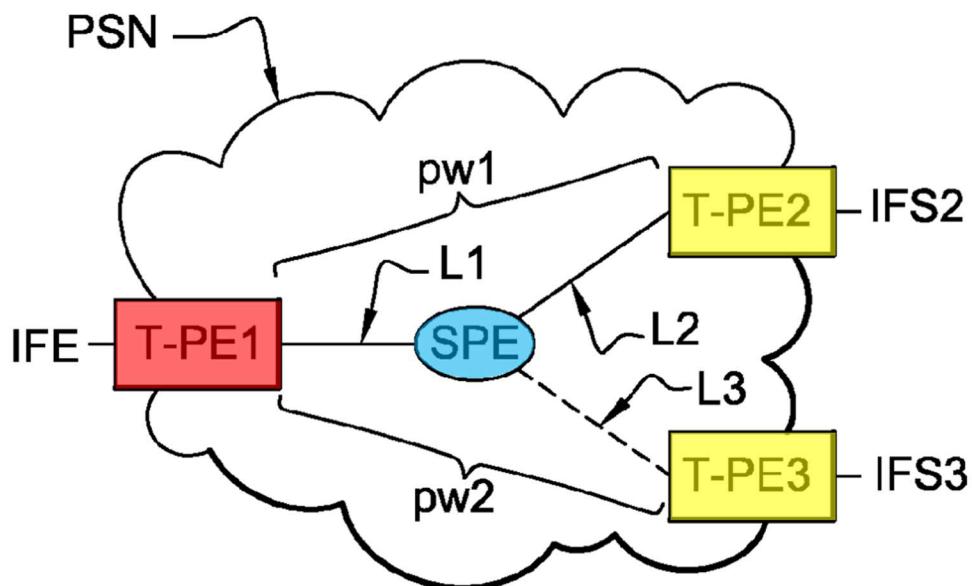


**FIGURE 2**

EX1030, Fig. 2; *see also* EX1030, ¶¶23-24, 28-33.

71. Identically, the '775 patent depicts a first router (red) that routes a data packet over a shared link **L1** to an intermediate router (blue), which then routes the data packet over separate links **L2** and **L3** to each output router (yellow):



EX1001, Fig. 3 (highlighted); *see also* EX1001, 6:25-48.

72. In a past proceeding that Patent Owner brought against a third party, Cisco Systems, Inc., Patent Owner appears to have argued that Wainner does not anticipate the '775 patent because Wainner discloses one point-to-multipoint pseudo-wire rather than multiple point-to-point pseudo-wires that share a first link. For example, Patent Owner's expert asserted,

However, just for the sake of discussion, let us assume it is true that PW 22 [in Wainner] is shared between two MS-PWs as Dr. Jeffay claims. Even if this were true (it is not), in order for a link to be "shared" by two pseudo-wires, there must be two pseudowires traversing that link. Dr. Jeffay only identifies one pseudowire (PW22) that allegedly traverses the link between PE1 and PE5. As such, even if there were MS-PWs present in Wainner (which there are not), the link between PE1 and PE5 would still only include one pseudowire 22, and that link is not shared by any other pseudowires.

EX1032, ¶782 (internal citation omitted).

73. I disagree. First, Wainner discloses two point-to-point pseudo-wires that share the first link. Wainner explains that it employs a "model [that] statically binds an upstream PW to *one or more* downstream PW." EX1030, ¶20 (emphasis added). In other words, Wainner teaches creating multiple multi-hop (*i.e.*, multi-segment) pseudo-wires that share a first upstream pseudo-wire (*i.e.*, first link). For example—as discussed further below with respect to the appropriate limitations—upstream pseudo-wire **22** is bound to downstream pseudo-wire **24** to form the '775 patent's "first pseudo-wire" in limitation 1[a] and upstream pseudo-wire **22** is further

bound to downstream pseudo-wire **28** to form the '775 patent's "second pseudo-wire" in limitation 1[b].

74. Second, at the very least Wainner in combination with Bocci would have rendered obvious two point-to-point pseudo-wires that share a first link. In this combination, Wainner's Figure 2 depicts four pseudo-wire segments, the first of which—pseudo-wire **22**—is shared between the other three—pseudo-wires **24**, **26**, and **28**. EX1030, ¶20; *see* EX1030, Fig. 2. As discussed in further detail below, Bocci teaches combining consecutive pseudo-wire segments to form a multi-segment point-to-point pseudo-wire. *E.g.*, EX1031, 4 ("This requires a capability in PE2 that can concatenate PW segments PE1-PE2 to PW segments PE2-PE3. The end-to-end PW is known as a multi-segment PW."). A POSITA would have found it obvious to use Bocci's teachings to combine pseudo-wire **22** in Wainner with downstream pseudo-wire **24** to form the '775 patent's "first pseudo-wire" in limitation 1[a] and further combine upstream pseudo-wire **22** with downstream pseudo-wire **28** to form the '775 patent's "second pseudo-wire" in limitation 1[b].

75. Third, Patent Owner itself has asserted that the '775 patent encompasses point-to-multipoint pseudo-wires. In Patent Owner's previous litigation with Cisco, Patent Owner accused Cisco of infringing the '775 patent because the accused product "implements Label Switched *Multicast* with *point-to-multipoint* traffic engineering (P2MP-TE) for delivering broadcast, *multicast* and

certain unicast streams to a VPLS domain using pseudo-wires.” EX1033, ¶123 (emphasis added). Patent Owner again insisted that the Cisco product infringed because it “provides *point to multipoint* (P2MP) communication over IP or MPLS networks . . . by connecting nodes through P2MP Pseudo-wires.” *Id.*, ¶127 (emphasis added). Similarly, Wainner discloses “[a] method, apparatus and computer program product for providing *point-to-multipoint* multihop distribution using Pseudowires (PWs).” EX1030, Abstract (emphasis added). Wainner further explains that it employs “an architecture that uses multi-hop/*multi-point pseudowires*.” *Id.*, ¶20 (emphasis added). Under Patent Owner’s infringement allegations, sharing a first link between two point-to-point pseudo-wires is functionally identical to implementing a point-to-multipoint pseudo-wire. There is no technical distinction between the two; describing an implementation as “two point-to-point pseudo-wires that ‘share’ a same link” is equivalent to “point-to-multipoint pseudo-wires” in which common segments are shared such that data is not duplicated.

76. Thus, Wainner and Bocci would have rendered obvious limitation 1[pre].<sup>4</sup>

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<sup>4</sup> As briefly indicated above, Patent Owner also argued with respect to limitation 1[pre] that Wainner does not teach combining its pseudo-wire links into multi-

- (b) 1[a]: setting up a first pseudo-wire comprising a first link set up between an input router of a packet-switched network and an intermediate router of the packet-switched network and a second link set up between said intermediate router and a first output router of the packet-switched network; and

77. Wainner and Bocci would have rendered obvious limitation 1[a]: “setting up a first pseudo-wire comprising a first link [*e.g.*, **pseudo-wire 22**] set up between an input router [*e.g.*, **PE1**] of a packet-switched network [*e.g.*, **network depicted in Figure 2**] and an intermediate router [*e.g.*, **PE5**] of the packet-switched network and a second link [*e.g.*, **pseudo-wire 24**] set up between said intermediate router [*e.g.*, **PE5**] and a first output router [*e.g.*, **PE2**] of the packet-switched network.”

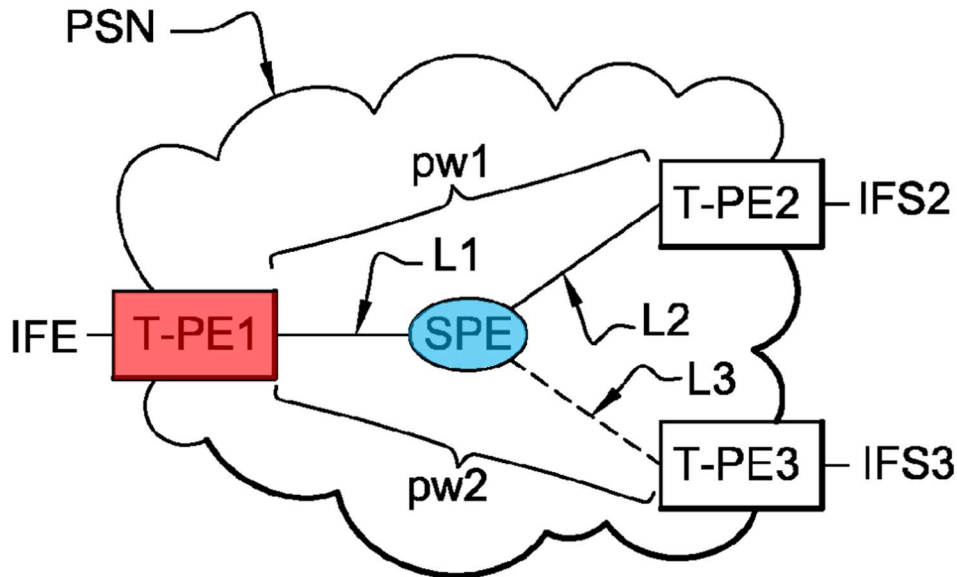
78. Wainner and Bocci disclose this limitation. I break down the elements of this limitation below:

79. *setting up a first pseudo-wire comprising a first link set up between an input router of a packet-switched network and an intermediate router of the*

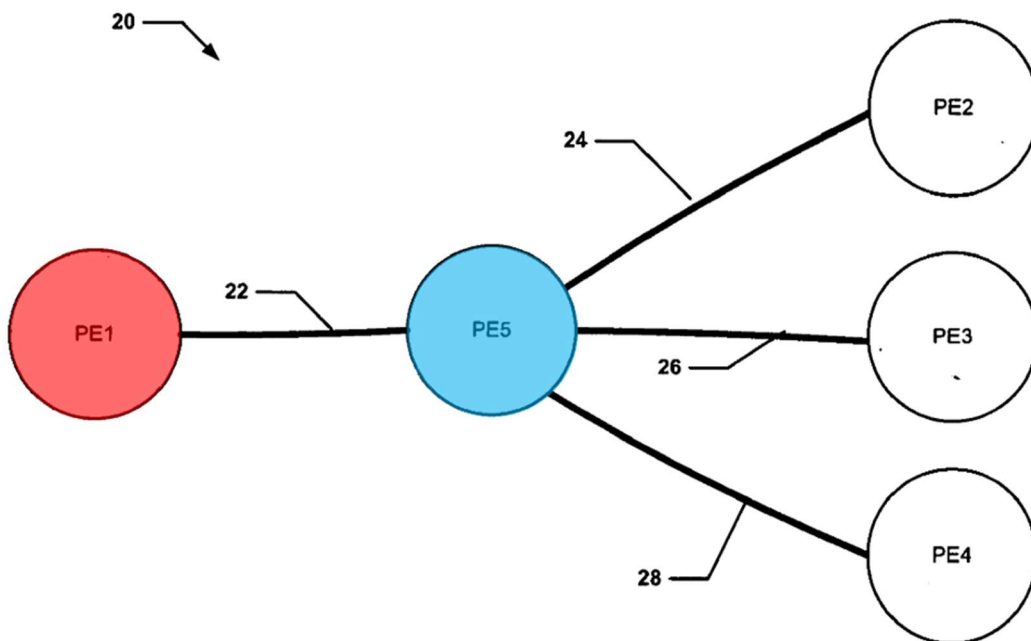
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segment pseudo-wires. *See* EX1032, 4-6. I disagree, and this is better addressed in the analysis for limitation 1[a]. I therefore explain in §VII.A.5(b) that Wainner and—at the very least—Wainner in combination with Bocci teach multi-segment pseudo-wires.

*packet-switched network*. The '775 patent depicts the following network configuration that comprises an input router (red) and an intermediate router (blue):



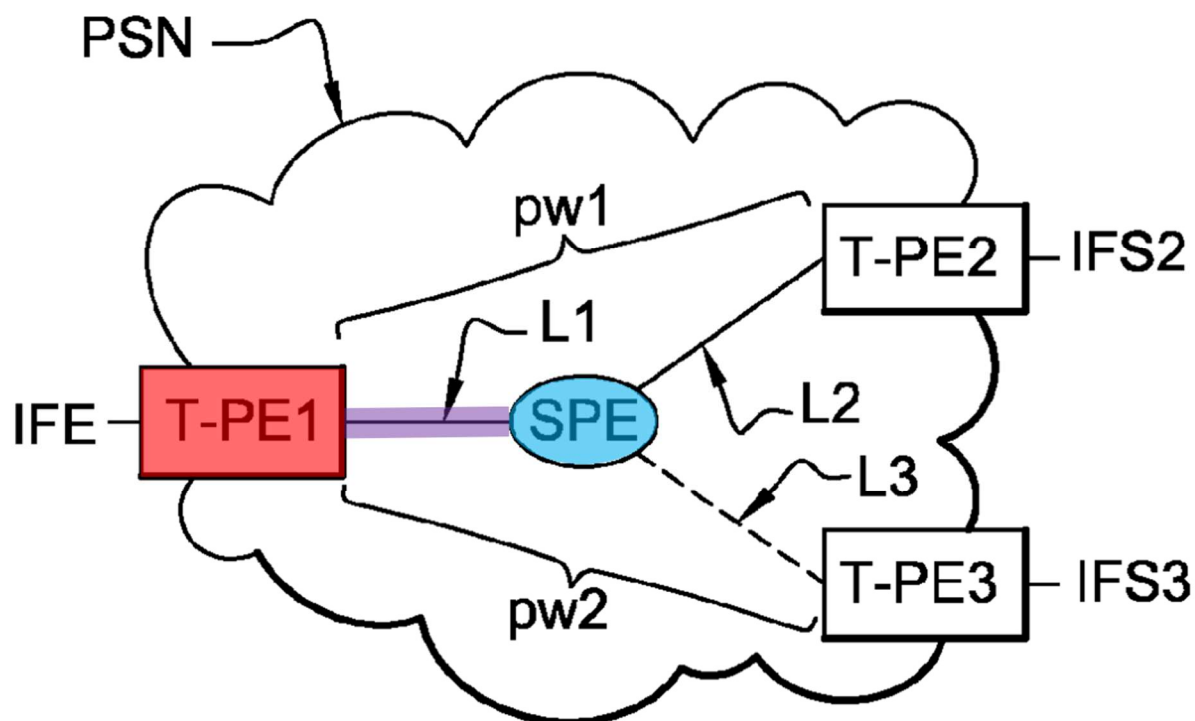
EX1001, Fig. 3 (highlighted). Similarly, Wainner discloses a network configuration that comprises an origination provider edge router (red) and a switching provider edge router (blue):



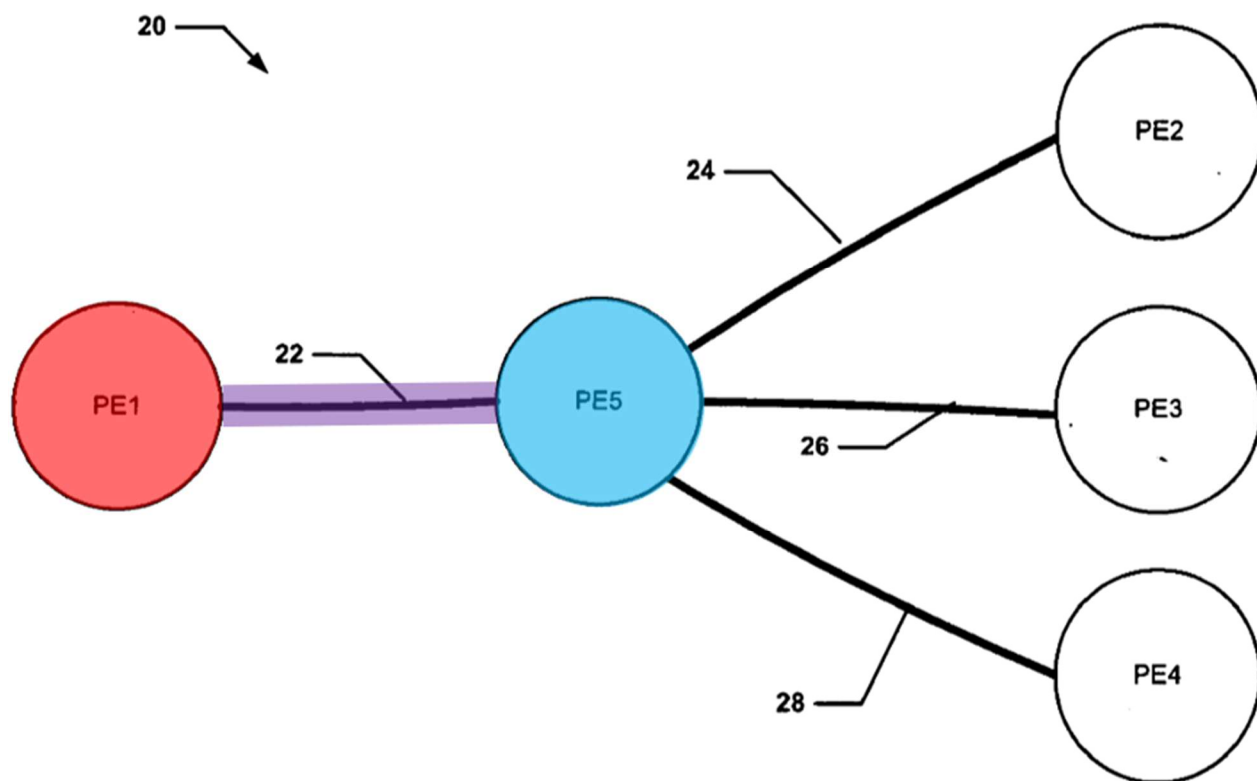
EX1030, Fig. 2 (highlighted). As the coloring in the above figures shows, (1) Wainner's origination provider edge router corresponds to the '775 patent's input router and (2) Wainner's switching provider edge router corresponds to the '775 patent's intermediate router. A POSITA would have known that the routers in Wainner and the routers in the '775 patent are both standard routers used in computer networking.

80. The network in Wainner corresponds to the '775 patent's packet-switched network. In particular, both networks transmit data in the form of packets. *Compare* EX1030, ¶19 ("Packets received by PE1 from another network device (not shown) may be forwarded to one or more of PE2, PE3 and PE4, known as multicasting."), *with* EX1001, 1:30-32 ("In a packet-switched network, data is transmitted in the form of packets processed by routers of the network until they reach their destination.").

81. Further, Wainner's pseudo-wire **22** (purple) corresponds to the '775 patent's "first link" **L1** (purple) that is set up between the input router and intermediate router.



EX1001, Fig. 3 (highlighted).



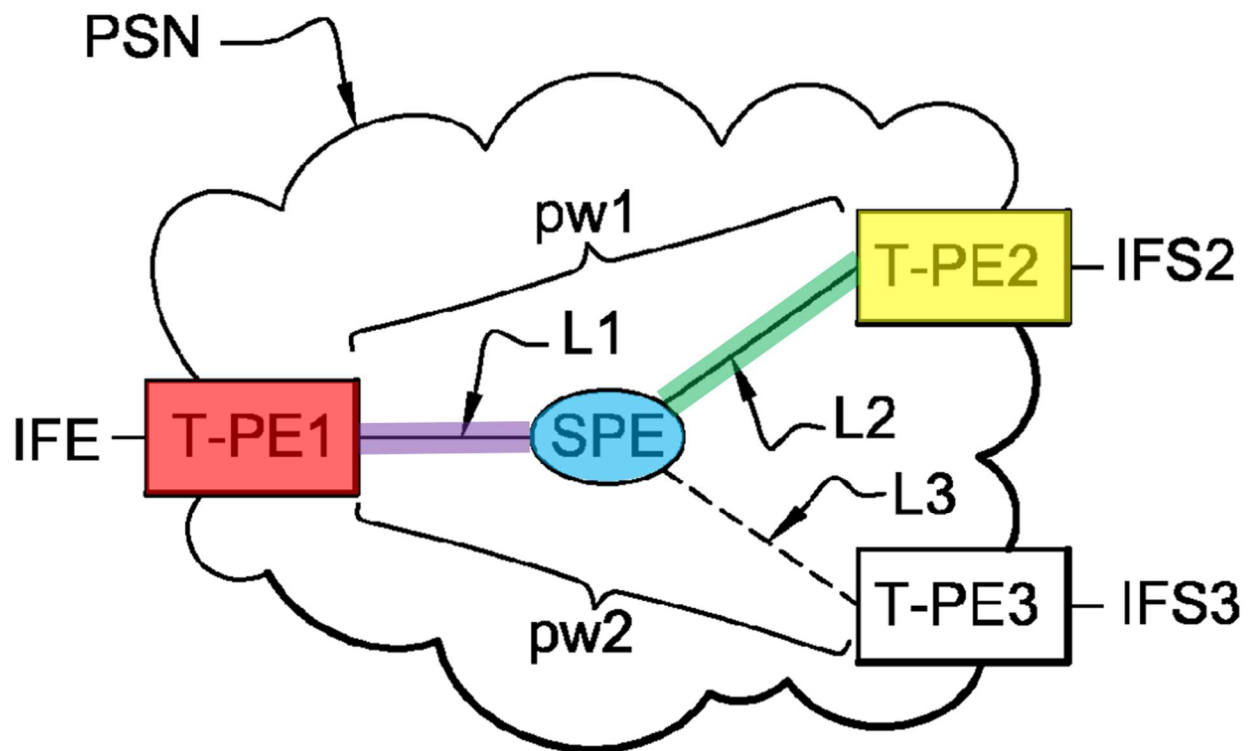
EX1030, Fig. 2 (highlighted).

82. Both pseudo-wire **22** and link **L1** connect the input router to the intermediate router. EX1001, 1:56-58 (“A first link **L1** that is part of the pseudo-wire **pw1** is set up between the first router T-PE**1** and an intermediate router S-PE of the network PSN.”); EX1030, ¶23 (“A PW **22** is signaled between an origination PE (O-PE) (PE**1**) and an S-PE (PE**5**) where the content is sourced at the O-PE.”).

83. As discussed, the Eastern District of Texas court construed “link” to mean a “connection between an interface of a first router and an interface of a second router.” *See* §VI. In my opinion, Wainner’s pseudo-wire **22** satisfies this construction. Wainner explains that its routers are network devices that contain a “communications interface” that “allows the network device **240** to communicate with external devices or systems.” EX1030, ¶34. Further, Wainner explains that pseudo-wire **22** has “a head-end coupled to” the originating provider edge router “and a tail end coupled to” the switching provider edge router. *Id.*, ¶6. A POSITA would have known that this “coupling” occurs at each router’s communications interface, thereby “allow[ing] the network device[s] to communicate with external devices or systems.” *Id.*, ¶34; *see* EX1010, 3 (explaining that pseudo-wires encapsulate data “arriving at the PE-bound port (logical or physical)”; EX1010, 4 (defining “Attachment Circuit” as “[t]he physical or virtual circuit attaching a CE to a PE” and providing examples).

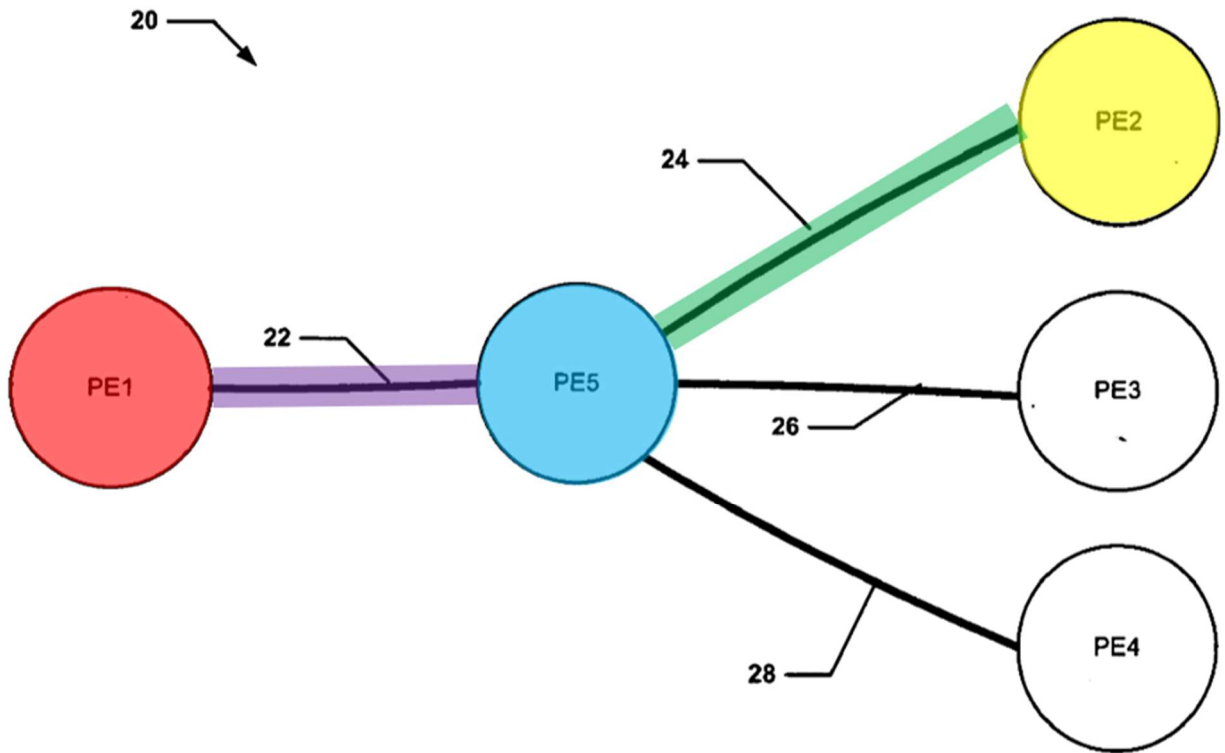
84. Patent Owner advocated for a nearly identical construction during EPR, asserting that “the term ‘link’ should be construed to mean ‘a connection between an interface on a first device and an interface on a second device.’” *See* §VI. In my opinion, Wainner’s pseudo-wire 22 satisfies this construction as well, since its routers are “devices.”

85. *and a second link set up between said intermediate router and a first output router of the packet-switched network.* The ’775 patent describes a second link (green) that connects the intermediate router (blue) to an output router (yellow):

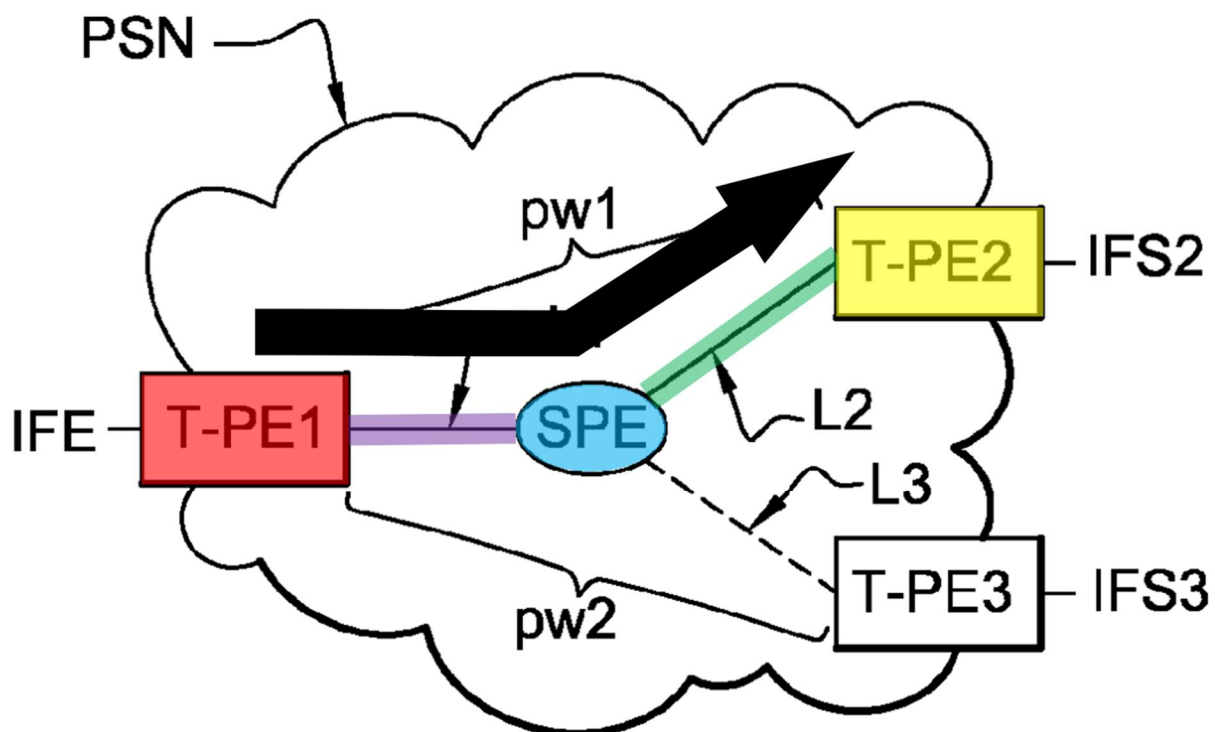


EX1001, Fig. 3 (highlighted). For the same reasons discussed above, (1) Wainner’s receiving provider edge router (*e.g.*, PE2) corresponds to the ’775 patent’s output

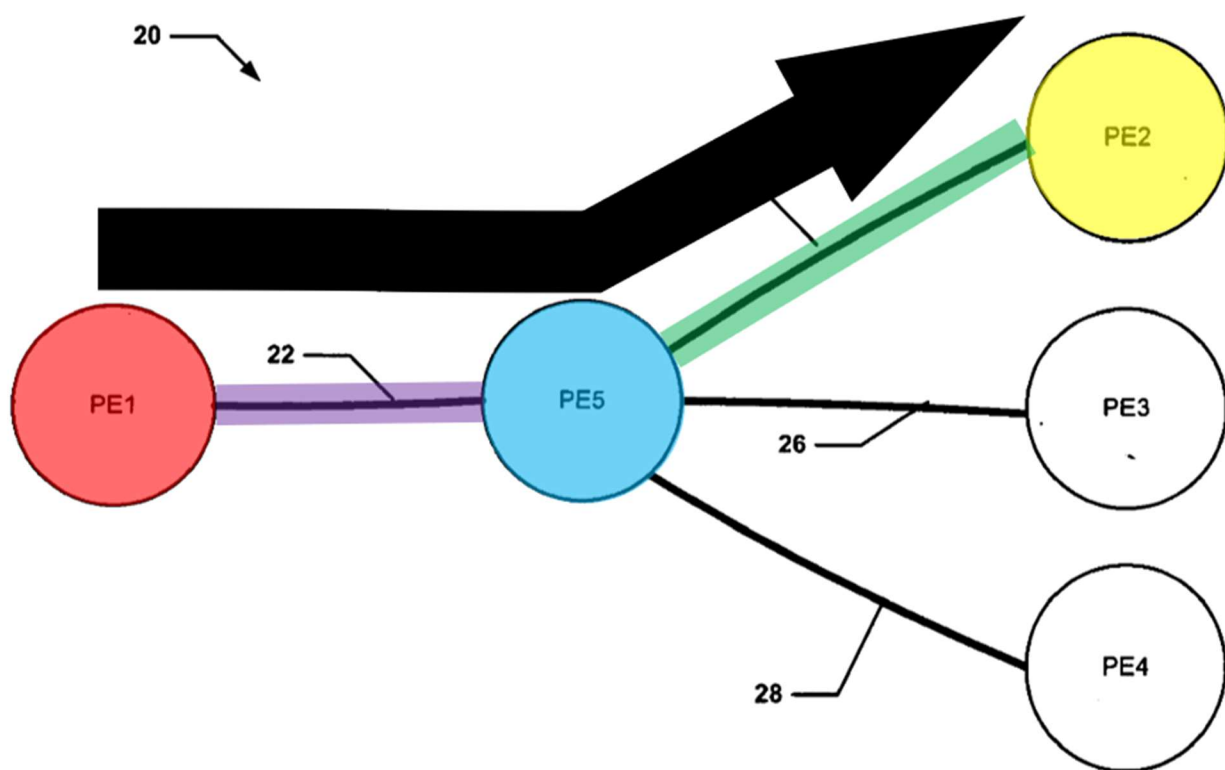
router and (2) Wainner’s pseudo-wire segment (*e.g.*, pseudo-wire **24**) corresponds to a link.



EX1030, Fig. 2 (highlighted). Wainner explains that pseudo-wires **22** and **24** are combined to form a “multi-hop/multi-point pseudowire[.]” EX1030, ¶20 (“This model statically binds an upstream PW—for example, pseudo-wire **22**—“to one or more downstream PW”—for example, pseudo-wire **24**—to form “multi-hop/multi-point pseudowires.”). Together, the components comprise the “first pseudo-wire” in limitation 1[a], depicted with a large arrow in the figures below.



EX1001, Fig. 3 (highlighted and annotated).



EX1030, Fig. 2 (highlighted and annotated).

86. I have been informed that in the past proceeding that Patent Owner brought against Cisco, Patent Owner argued that Wainner does not anticipate the '775 patent because Wainner discloses two distinct pseudo-wires—pseudo-wire **22** and pseudo-wire **24**—that connect the input router to the output router, whereas the '775 patent requires a single, multi-segment pseudo-wire that connects the input router to the output router. I have been informed, for example, Patent Owner's expert testified that "[e]ach black line depicted in Figure 2" of Wainner "represents one single pseudowire" and that "Wainner does not disclose any multi-segment pseudowires." EX1032, 4-6. Patent Owner further argued "that Wainner itself does not mention 'multi-segment pseudowires,' 'MS pseudowires' or any equivalent term" and therefore does not disclose a multi-segment pseudo-wire that teaches the '775 patent's "first pseudo-wire." EX1034, 2-3.

87. I disagree. To start, the '775 patent itself admits that multi-segment pseudo-wires were known in the art, which it depicts in Figure 1. EX1001, 1:53-2:2, 5:40-42 ("FIG. 1 represents a pseudo-wire set up *as in the prior art*" that "is defined in more detail in the document 'An Architecture for *Multi-Segment Pseudo-Wire* Emulation Edge-to-Edge.'" (emphases added)). Further, Wainner explicitly teaches combining pseudo-wires **22** and **24** to form a single "multi-hop/multi-point pseudowire[]" that spans from input router **PE1** to output router **PE2**. EX1030, ¶20

(“This model statically binds an upstream PW”—for example, pseudo-wire **22**—“to one or more downstream PW”—for example, pseudo-wire **24**—to form “multi-hop/multi-point pseudowires.”). A POSITA would have known that a “multi-hop” pseudo-wire is equivalent to a “multi-segment” pseudo-wire. In fact, Bocci explains that “[a] MS-PW is a single PW that for technical or administrative reasons is segmented *into a number of concatenated hops.*” EX1031, 7. Further, Wainner explains that binding pseudo-wire segments results in “a layer 2 connection” between the input and output router. EX1030, ¶24. A POSITA would have known that a pseudo-wire is a layer 2 connection. Therefore, Wainner alone teaches the “first pseudo-wire” limitation of claim 1 for the reasons discussed above.

88. Additionally, Wainner in combination with Bocci would have taught this limitation as well. A POSITA would have found it obvious to combine Wainner and Bocci such that Wainner would operate in its disclosed manner and further implement Bocci’s teaching of combining consecutive pseudo-wires to form a multi-segment pseudo-wire. Bocci explains how to “concatenate PW segments” to form a “multi-segment PW.” EX1031, 4; *see also* EX1031, 6 (A “set of two or more contiguous *PW segments* that behave and function as a single point-to-point PW.” (emphasis added)). For example, Bocci teaches combining pseudo-wire segments to form a multi-segment pseudo-wire in its Figure 1:

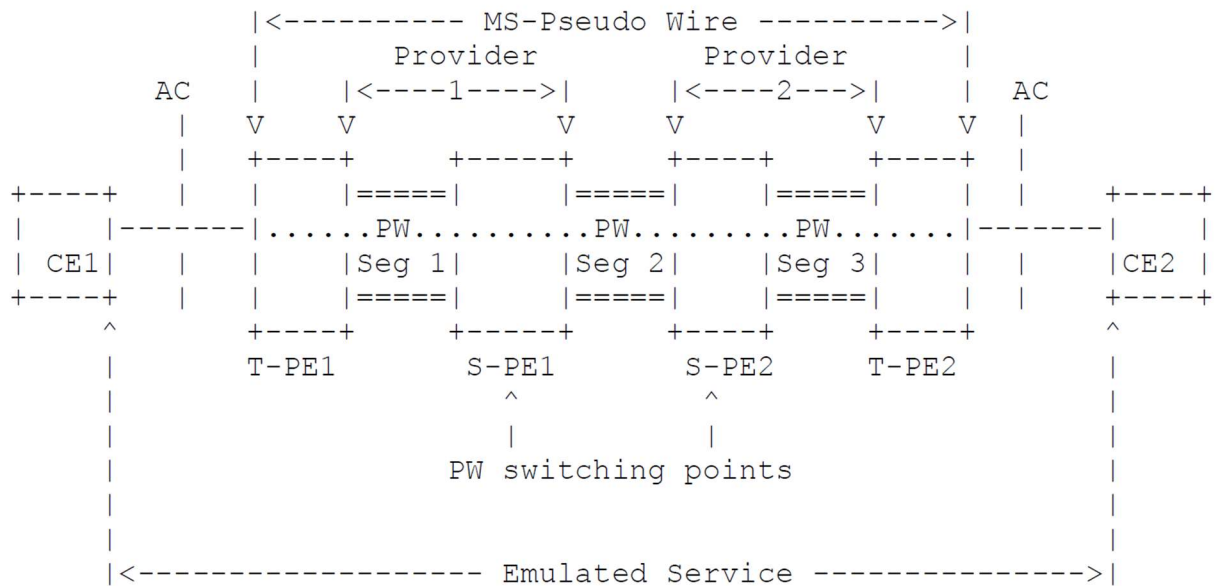
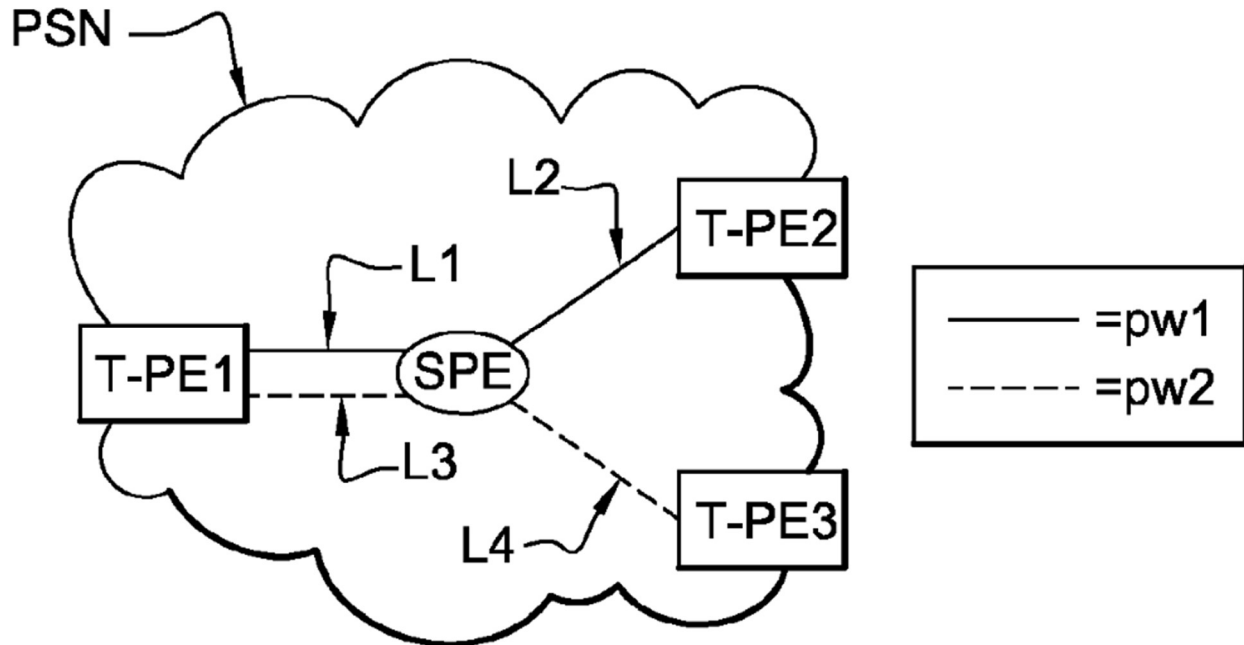


Figure 5 Inter-Provider Reference Model

EX1031, 11. The resulting multi-segment pseudo-wire, Bocci explains, “is a single PW” that “is indistinguishable from a SS-PW,” *i.e.*, a single-segment pseudo-wire. *Id.*, 7. A POSITA would have been motivated to combine the pseudo-wire segments in Wainner to form a multi-segment pseudo-wire according to Bocci’s teachings and would have had a reasonable expectation of success of doing so. *See* §VII.A.4.

89. Further, I note the '775 patent admits that limitation 1[a] was known in the art. *See* §IV.C. For example, the '775 patent explains that “FIG. 2 represents a solution implemented in the prior art to ensure continuity of service in a packet-switched network.” EX1001, 5:43-44. Figure 2 depicts “setting up a first pseudo-wire [*e.g.*, **pw1**] comprising a first link [*e.g.*, **L1**] set up between an input router [*e.g.*, **T-PE1**] of a packet-switched network [*e.g.*, **PSN**] and an intermediate router [*e.g.*,

**SPE]** of the packet-switched network and a second link [*e.g.*, **L2**] set up between said intermediate router [*e.g.*, **SPE**] and a first output router [*e.g.*, **T-PE2**] of the packet-switched network”:



*Id.*, Fig. 2(AA). Thus, limitation 1[a], as the '775 patent admits, was known and implemented in the prior art.

90. Thus, Wainner and Bocci would have rendered obvious limitation 1[a].

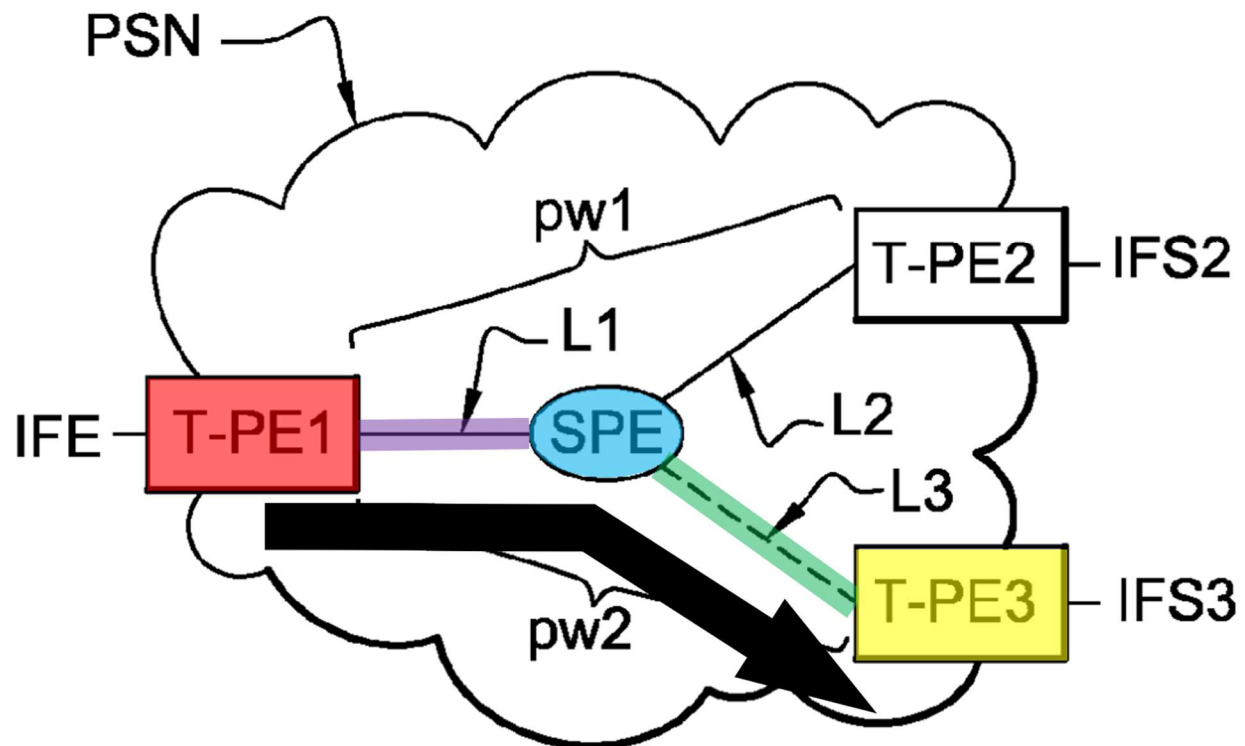
- (c) 1[b]: setting up a second pseudo-wire between said input router and a second output router of the packet-switched network, wherein the second pseudo-wire comprises said first link and a third link set up between said intermediate router and said second output router, said first link being shared by the first and second pseudo-wires.

91. Wainner and Bocci would have rendered obvious limitation 1[b]: “setting up a second pseudo-wire between said input router [*e.g.*, **PE1**] and a second output router [*e.g.*, **PE4**] of the packet-switched network [*e.g.*, **network depicted in**

**Figure 2]**, wherein the second pseudo-wire comprises said first link [*e.g.*, **pseudo-wire 22**] and a third link [*e.g.*, **pseudo-wire 28**] set up between said intermediate router [*e.g.*, **PE5**] and said second output router [*e.g.*, **PE4**], said first link [*e.g.*, **pseudo-wire 22**] being shared by the first and second pseudo-wires.”

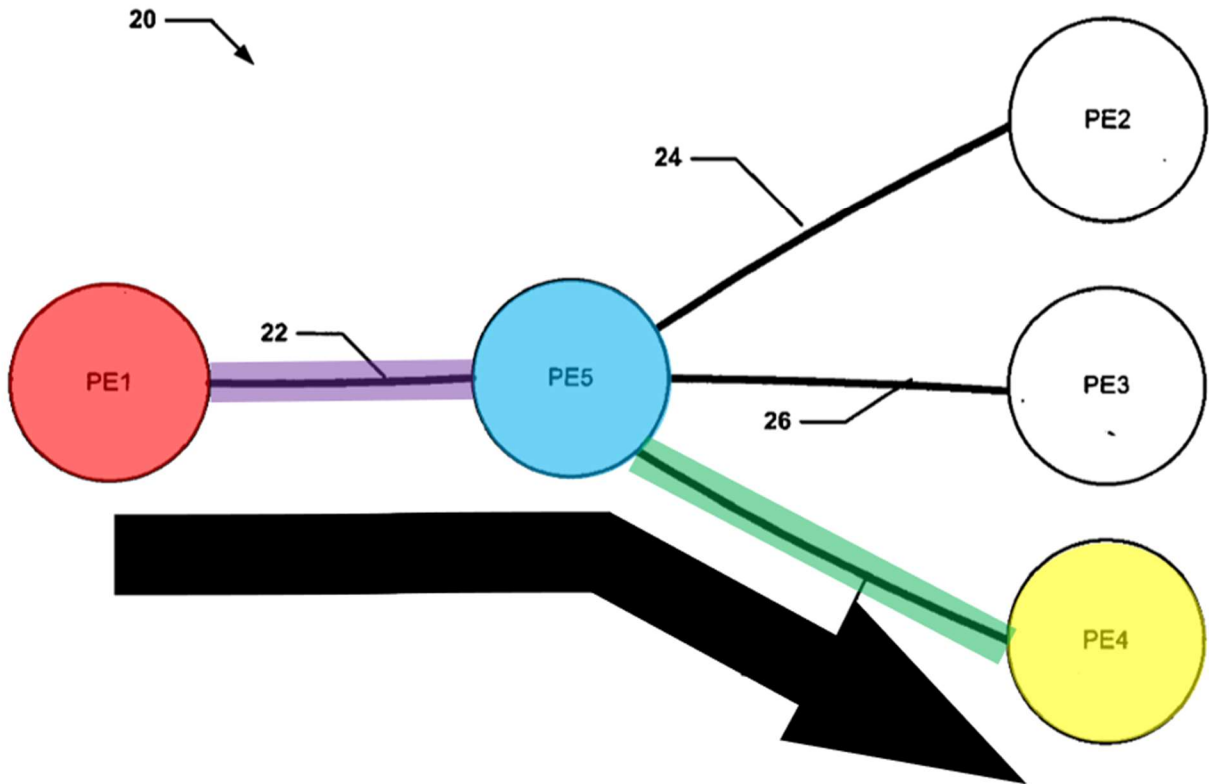
92. Wainner and Bocci disclose this limitation. I break down the elements of this limitation below:

93. *setting up a second pseudo-wire between said input router and a second output router of the packet-switched network.* For the reasons discussed above, Wainner discloses setting up a second pseudo-wire between the input router and a second output router. *See* §VII.A.5(b).



EX1001, Fig. 3 (highlighted and annotated).

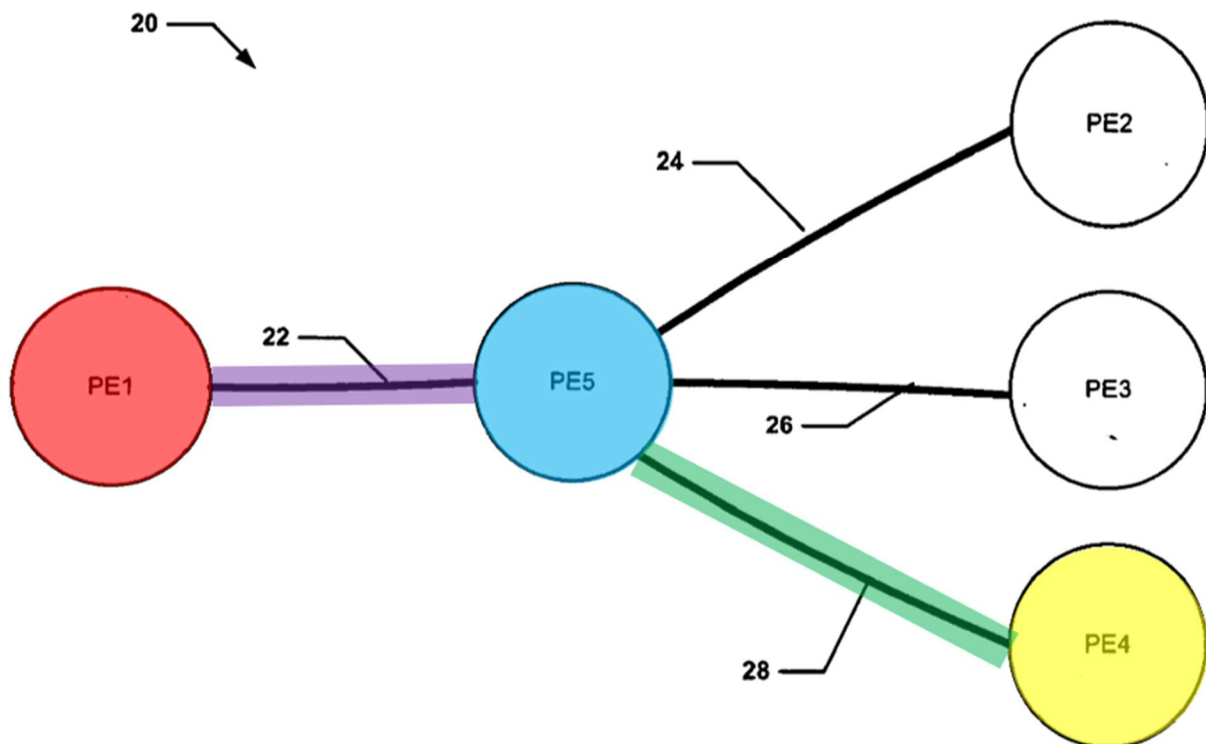
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EX1030, Fig. 2 (highlighted and annotated). In short, and as the figures above and previous analysis show, Wainner’s origination provider edge router **PE1** (red) corresponds to the ’775 patent’s input router **T-PE1**. *See* §VII.A.5(b). Wainner’s switching provider edge router **PE5** (blue) corresponds to the ’775 patent’s second output router **T-PE3**. *Id.* And Wainner explains that pseudo-wires **22** (purple) and **28** (green) combine to form a “multi-hop/multi-point pseudowire[]” that corresponds to the ’775 patent’s second pseudo-wire. *Id.*; *see also* EX1030, ¶20 (“This model statically binds an upstream PW—for example, pseudo-wire **22**—“to one or more

downstream PW”—for example, pseudo-wire **28**—to form “multi-hop/multi-point pseudowires.”).

94. *wherein the second pseudo-wire comprises said first link and a third link set up between said intermediate router and said second output router.* As shown above, Wainner’s second pseudo-wire comprises the first link **22** (purple) and a third link **28** (green) that is set up between the intermediate router **PE5** (blue) and the second output router **PE4** (yellow).

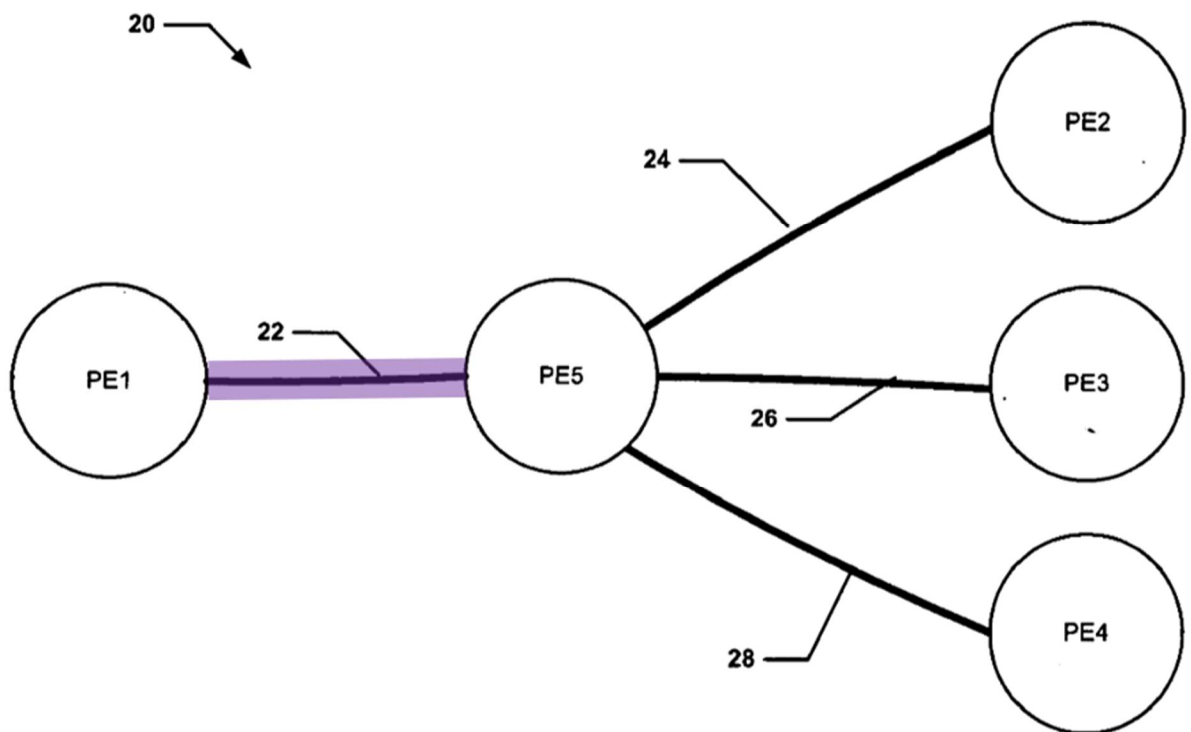


EX1030, Fig. 2 (highlighted). As discussed, pseudo-wires **22** and **28** are “links” both under the construction adopted by the Eastern District of Texas court and the construction advocated by Patent Owner during EPR. See §VII.A.5(b). Also discussed above, Wainner—and at the very least Wainner in combination with

Bocci—teach combining Wainner’s pseudo-wires **22** and **28** into a multi-segment pseudo-wire that spans from the input router **PE1** to the output router **PE4**. See §VII.A.5(b).

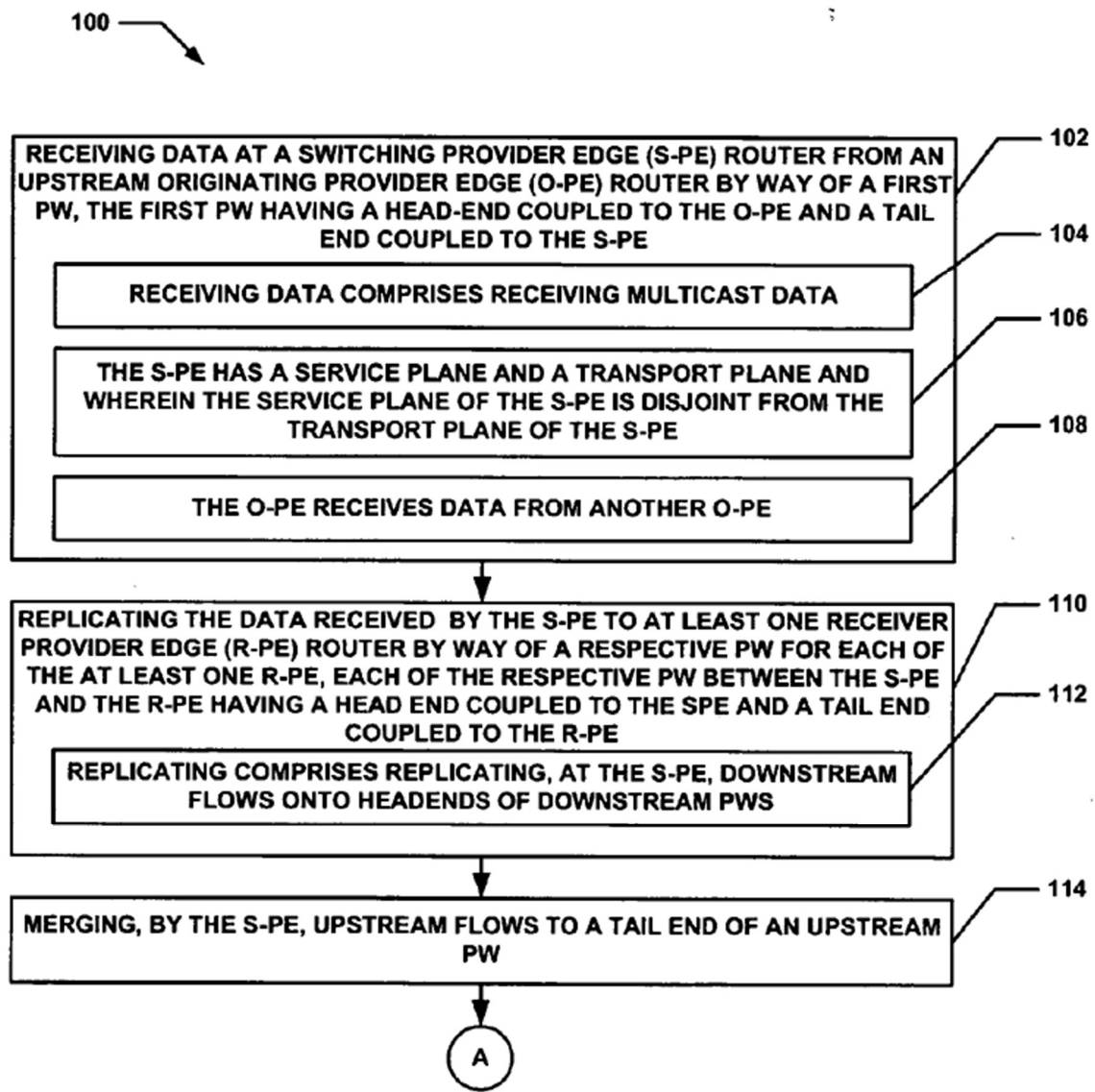
95. *said first link being shared by the first and second pseudo-wires.*

Wainner explains that the first link (e.g., **pseudo-wire 22**) is shared by the first and second pseudo-wires. To start, Wainner’s Figure 2 shows that this link (purple) is shared among the pseudo-wires:



EX1030, Fig. 2 (highlighted). Additionally, Wainner explains that its “model statically binds an upstream PW”—for example, the shared pseudo-wire **22**—to “*one or more* downstream PW”—for example, pseudo-wires **24** and **28**. EX1030,

¶20 (emphasis added). In other words, the single upstream pseudo-wire **22** is bound to (*i.e.*, shared between) **both** downstream pseudo-wires **24** and **28**. This is confirmed in Figure 6A of Wainner, which “comprises a flow chart of a particular embodiment of a method for performing point-to-multipoint multihop distribution using Pseudowires in accordance with embodiments of the invention.” EX1030, ¶17.

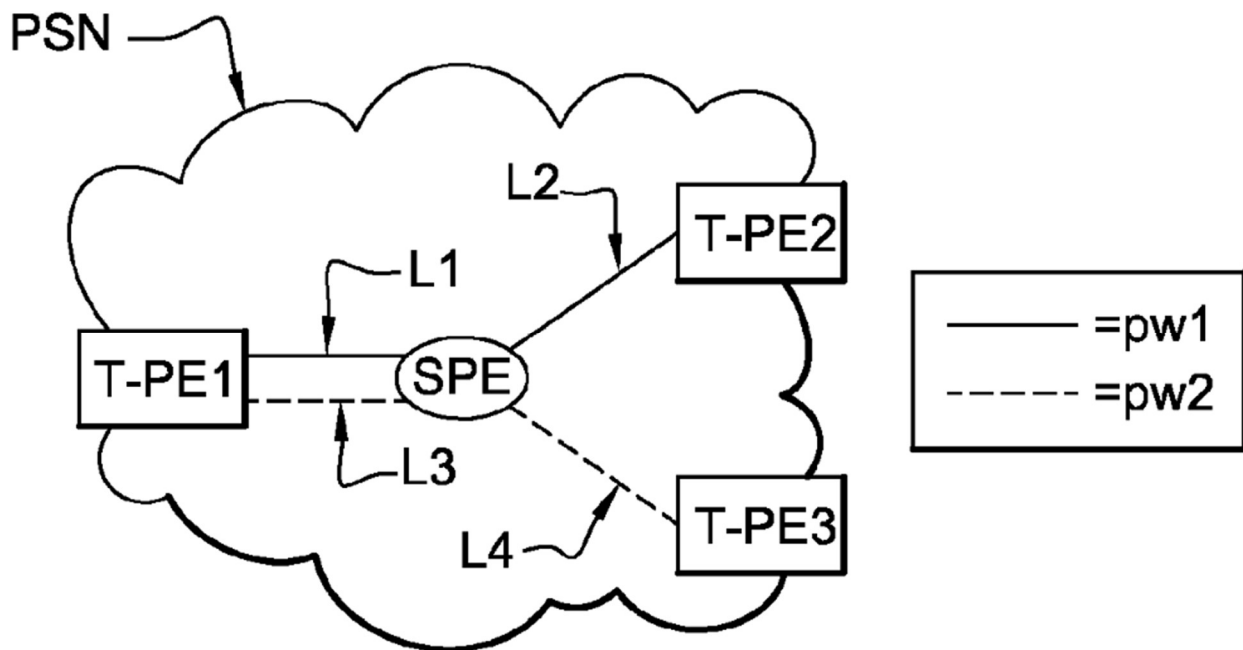


*Id.*, Fig. 6A. Figure 6A explains that, at step **102**, the originating provider edge sends data to the switching provider edge only once. *Id.*, ¶¶29, 31. At step **110**, the switching provider edge then replicates the received data so that it can send multiple copies of that data to different receiver provider edges. *Id.*, ¶¶30-32. Figure 6A confirms that the first link between the originating provider edge and the switching provider edge is “shared” by the first and second pseudo-wires. If the link were not shared, then the both the first and second pseudo-wires would have to send multiple copies of the data from the originating provider edge to the switching provider edge, and the switching provider edge would not need to replicate the received data. By sharing the first link, the originating provider edge only needs to send the data once, thereby accomplishing the ’775 patent’s goal of “optimiz[ing] the use of network resources, for example bandwidth, between the input router and the intermediate router.” EX1001, 3:1-3. Wainner therefore discloses that this “first link” is shared by the first and second pseudo-wires.

96. In the context of Figure 2, Wainner explains that the origination provider edge router **PE1** sends a data packet to the switching provider edge router **PE5** only once. EX1030, ¶¶6, 24. The switching provider edge router **PE5** then duplicates the data packet before sending it to the receiver provider edge routers **PE2**, **PE3**, and **PE4**. *Id.* Accordingly, there is only one link that connects the source

router to the intermediate router in Wainner's network—pseudo-wire **22**. Therefore, Wainner teaches sharing the first link **22**.

97. Further, I note the '775 patent admits that the majority of limitation 1[b] was known in the art. See §IV.C. For example, the '775 patent explains that “FIG. 2 represents a solution implemented in the prior art to ensure continuity of service in a packet-switched network.” EX1001, 5:43-44. Figure 2 depicts “setting up a second pseudo-wire [e.g., **pw2**] between said input router [e.g., **T-PE1**] and a second output router [e.g., **T-PE3**] of the packet-switched network [e.g., **PSN**], wherein the second pseudo-wire comprises said first link [missing from Figure 2 of the '775 patent] and a third link [e.g., **L4**] set up between said intermediate router [e.g., **SPE**] and said second output router [e.g., **T-PE3**], said first link being shared by the first and second pseudo-wires [missing from Figure 2 of the '775 patent]”:



*Id.*, Fig. 2(AA). Thus, the majority of limitation 1[b], as the '775 patent admits, was known and implemented in the prior art. The only element supposedly missing from the prior art—according to the '775 patent—is sharing the first link (*e.g.*, **L1**) between the first pseudo-wire (*e.g.*, **pw1**) and the second pseudo-wire (*e.g.*, **pw2**), which Wainner and Bocci teach.

98. Thus, Wainner and Bocci would have rendered obvious limitation 1[b] and the entire claim 1.

## **6. Claim 6**

99. Claim 6 is substantively the same as claim 1 except written in terms of a “computer program stored on non-transitory computer-readable medium.” Claim 6 therefore would have been obvious for the same reasons explained above with respect to claim 1. I nevertheless provide a limitation-by-limitation analysis below.

- (a) 6[pre]: A computer program product stored on a non-transitory computer-readable medium and comprising program code instructions for implementing a method of setting up at least two pseudo-wires able to broadcast a data stream when said program is executed by a computer, the program code instructions comprising instructions for:

100. To the extent the preamble is limiting, Wainner and Bocci would have rendered obvious limitation 6[pre]: “A computer program product stored on a non-transitory computer-readable medium and comprising program code instructions for implementing a method of setting up at least two pseudo-wires [*e.g.*, in **Figure 2**, a

**first pseudo-wire comprising links 22 and 24<sup>5</sup> and a second pseudo-wire comprising links 22 and 28]** able to broadcast a data stream, when said program is executed by a computer, the program code instructions comprising instructions for:”.

101. As discussed, Wainner discloses “a method of setting up at least two pseudo-wires able to broadcast a data stream.” *See* §VII.A.5(a).

102. Wainner further discloses “computer program product stored on a non-transitory computer-readable medium and comprising program code instructions for implementing” this method “when said program is executed by a computer, the program code instructions comprising instructions for” the method. EX1030, ¶7 (“Other embodiments include a computer readable medium having computer readable code thereon for providing a point-to-multipoint multihop distribution using Pseudowires (PWs).”), ¶9 (“More particularly, a computer program product is one embodiment that has a computer-readable medium including computer program logic encoded thereon that when performed in a computerized device provides associated operations providing point-to-multipoint multihop distribution using Pseudowires as explained herein.”), ¶¶35-38 (describing a device that implements

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<sup>5</sup> Again, Wainner refers to each segment as a pseudo-wire—for example, pseudo-wires 22 and 26—and a POSITA would have known that these pseudo-wires are pseudo-wire segments that form a multi-hop pseudo-wire.

Wainner's disclosures). Thus, Wainner and Bocci would have rendered obvious limitation 6

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- (b) 6[a]: setting up a first pseudo-wire comprising a first link set up between an input router of a packet-switched network and an intermediate router of the packet-switched network and a second link set up between said intermediate router and a first output router of the packet-switched network; and

103. As discussed, Wainner and Bocci would have rendered obvious limitation 6[a]: “setting up a first pseudo-wire comprising a first link [*e.g.*, **pseudo-wire 22**] set up between an input router [*e.g.*, **PE1**] of a packet-switched network [*e.g.*, **network depicted in Figure 2**] and an intermediate router [*e.g.*, **PE5**] of the packet-switched network and a second link [*e.g.*, **pseudo-wire 24**] set up between said intermediate router [*e.g.*, **PE5**] and a first output router [*e.g.*, **PE2**] of the packet-switched network.” *See* §VII.A.5(b).

- (c) 6[b]: setting up a second pseudo-wire between said input router and a second output router of the packet-switched network, wherein the second pseudo-wire comprises said first link and a third link set up between said intermediate router and said second output router, said first link being shared by the first and second pseudo-wires.

104. As discussed, Wainner and Bocci would have rendered obvious limitation 6[b]: “setting up a second pseudo-wire between said input router [*e.g.*, **PE1**] and a second output router [*e.g.*, **PE4**] of the packet-switched network [*e.g.*, **network depicted in Figure 2**], wherein the second pseudo-wire comprises said

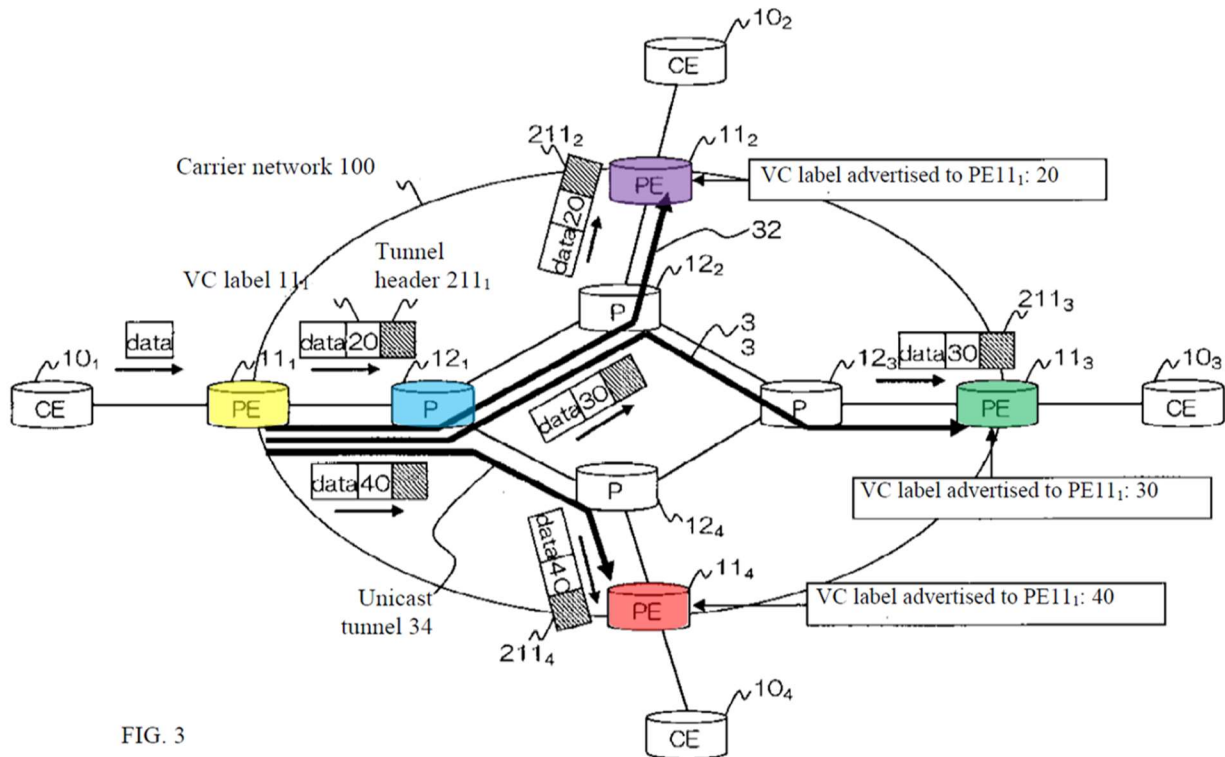
first link [*e.g.*, **pseudo-wire 22**] and a third link [*e.g.*, **pseudo-wire 28**] set up between said intermediate router [*e.g.*, **PE5**] and said second output router [*e.g.*, **PE4**], said first link [*e.g.*, **pseudo-wire 22**] being shared by the first and second pseudo-wires.” *See* §VII.A.5(c). Thus, Wainner and Bocci would have rendered obvious claim 6.

**B. Ground 2: Claims 1 and 6 Would Have Been Obvious in View of Kamite and Bocci**

**1. Kamite (EX1041)**

105. Kamite is a Japanese patent application—JP Patent Application No. 2006-129359 (EX1036). A certified English translation of Kamite (EX1041) is cited throughout my analysis.

106. Kamite discloses implementing pseudo-wires on a multicast network. EX1041, 5-6. Conventionally, pseudo-wires are “based on point-to-point connection.” *Id.*, 6. “[M]ulticast tunnel technology,” on the other hand, transfers data “in multiple directions” as in a point-to-multipoint network. *Id.*, 5-6. Unlike multicast tunnels, conventional pseudo-wires must “establish[] a separate unicast tunnel with each of the multiple downstream PEs,” “even when multicast data is sent.” EX1041, 6. For example, Figure 3 of Kamite depicts a network that uses “pseudo wire technology”:



EX1041, Fig. 3 (highlighted), 13. “[A]s shown in FIG. 3, PE11<sub>1</sub> [yellow] establishes separate unicast tunnels with PE11<sub>2</sub> [purple], PE11<sub>3</sub> [green], **and** PE11<sub>4</sub> [red], copies the data that was sent from CE10<sub>1</sub>, and transmits that data after assigning the advertised VC label **for each** downstream PE.” *Id.*, 6 (emphases added). Thus, Figure 3 depicts how to implement three separate pseudo-wires that share a first link—*i.e.*, the singular connection between PE11<sub>1</sub> and P12<sub>1</sub>. Additionally, Kamite explains that “even though the actual data to be transmitted... is the same, there are three instances of traffic between PE11<sub>1</sub> [yellow] and P12<sub>1</sub> [blue],” as indicated by the three arrows in the figure. EX1041, 6. “In other words, if a multicast tunnel could be utilized..., the traffic between PE11<sub>1</sub> and P12<sub>1</sub> could be reduced to 1/3 of the conventional volume.” *Id.*

107. Kamite discloses how to do exactly that, and depicts its invention in the pseudo-wire network of Figure 10:

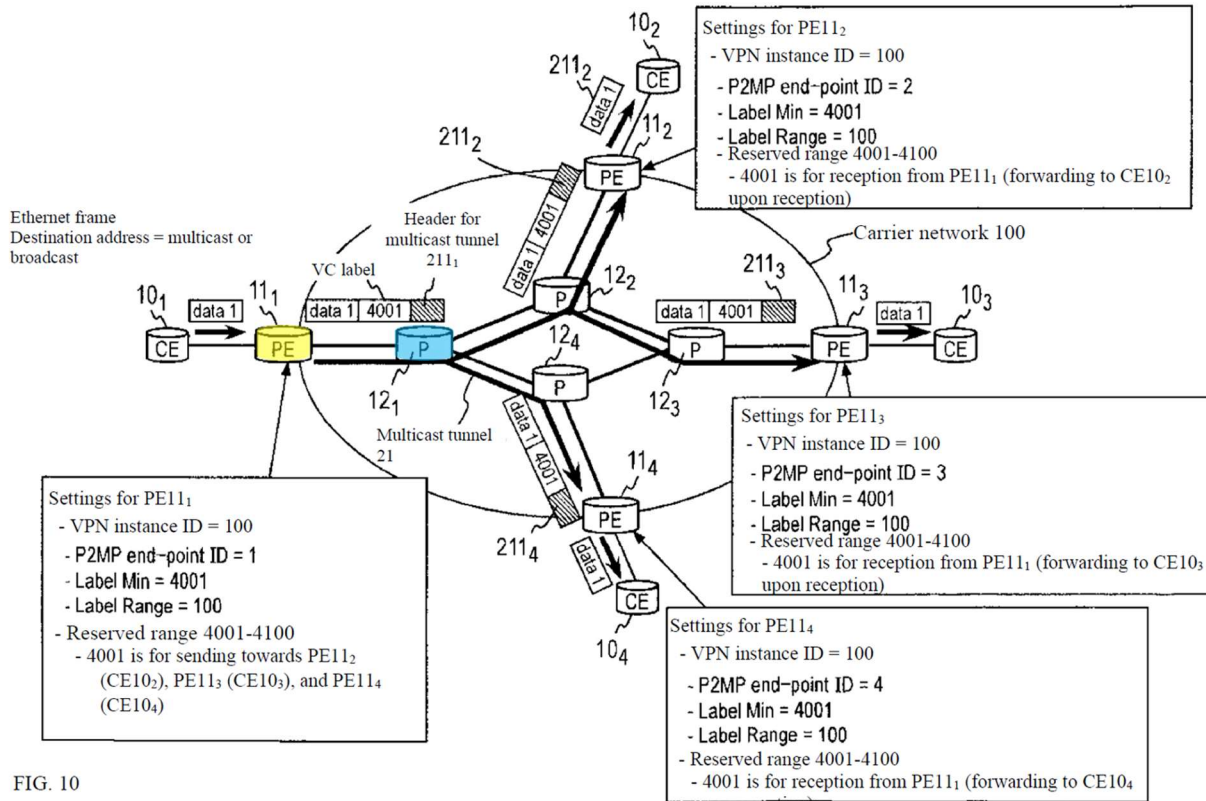


FIG. 10

*Id.*, Fig. 10 (highlighted), 9. In sum, Kamite discloses how to establish a “point-to-multipoint pseudo wire” such that there is only a single connection, or link, between PE11<sub>1</sub> (yellow) and P12<sub>1</sub> (blue), which is shared between the multiple pseudo-wires. *Id.*, 9.

## 2. The Kamite-Bocci Combination

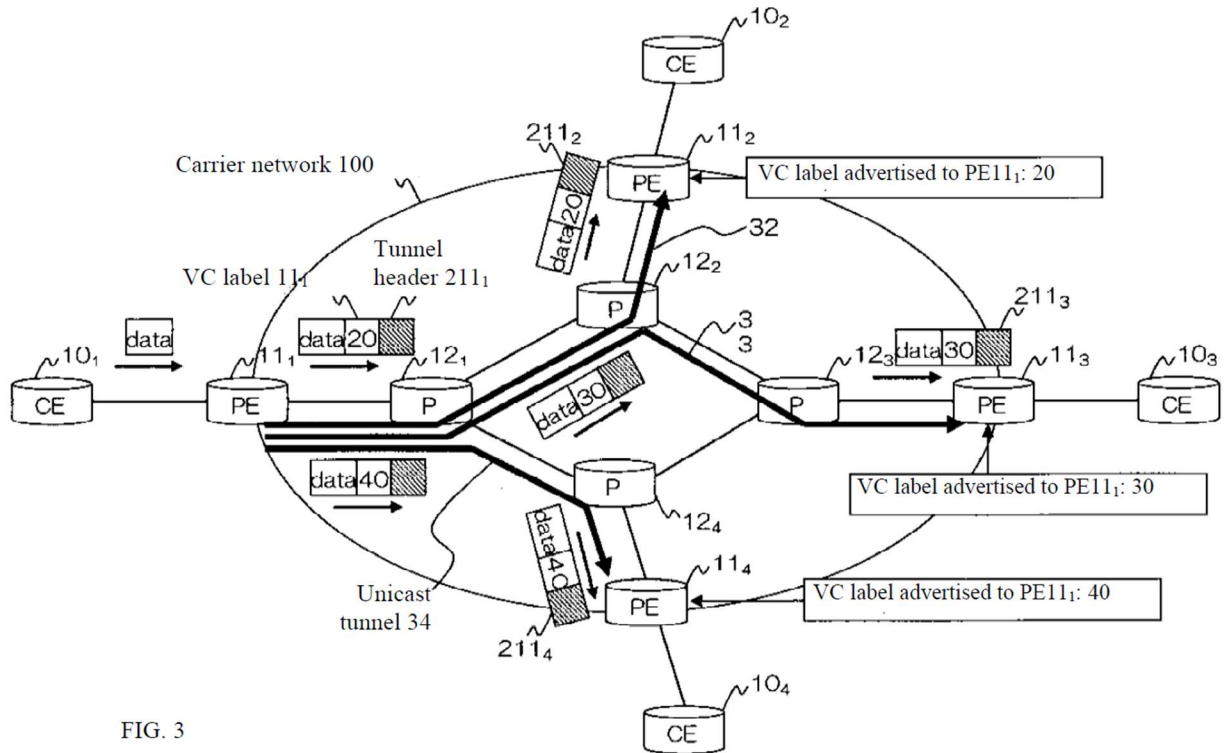
108. In the Kamite-Bocci combination, Kamite discloses the entirety of claims 1 and 6—in particular, setting up two pseudo-wires that share a first link. For the same reasons discussed above for the Wainner-Bocci combination, to the extent

Patent Owner argues that Kamite does not disclose multi-segment pseudo-wires and accordingly does not disclose “two pseudo-wires traversing” the first link, (*see* §VII.A.3), Kamite does disclose these elements, as shown in my analysis below. Additionally, Bocci would have supplemented Kamite’s disclosures and further taught combining consecutive segments into a multi-segment pseudo-wire. Thus, in the Kamite-Bocci combination, Kamite would operate in its disclosed manner and, to the extent necessary, implement Bocci’s teaching of combining consecutive pseudo-wires to form a multi-segment pseudo-wire.

### **3. Motivations to Combine Kamite and Bocci**

109. A POSITA would have been motivated to combine the teachings of Kamite and Bocci and would have had a reasonable expectation of success of doing so.

110. *First*, the prior art contained teachings, suggestions, and motivations that would have led a POSITA to combine Kamite and Bocci. Kamite depicts a network that contains pseudo-wires between each provider edge (“PE”) router. EX1041, 5 (“[A] method called PWE3 (Pseudo Wire Emulation Edge-to-Edge) is commonly used to establish a pseudo wire (virtual circuit) between PEs (Provider Edge routers) and provide connectivity between remote subscriber lines over the carrier network.”). The depicted pseudo-wires comprise multiple segments—for example from a PE to a provider (“P”) router, from a P to a P, or from a P to a PE:



*Id.*, Fig. 3. A POSITA would have therefore been motivated to search for references, like Bocci, that describe the technical process of combining consecutive segments to form a multi-segment pseudo-wire in order to implement Kamite’s teachings. Bocci explains that implementing multi-segment pseudo-wires provides scalability benefits. *See* EX1031, 3-4. Bocci’s teachings are applicable to a variety of network configurations. *See id.*, 8-11 (describing how to implement multi-segment pseudo-wires on both inter-network and intra-network architectures), 3 (identifying “[h]ow to provide PWE3 across multiple PSN routing domains or areas in the same provider” as a motivation). Thus, both Kamite and Bocci contain teachings, suggestions, and motivations to combine the references together. A POSITA would have had a reasonable expectation of success in combining Kamite and Bocci

because Bocci extensively describes the process and technical details of how to combine consecutive pseudo-wires to form a multi-segment pseudo-wire. *See generally* EX1031.

111. ***Second***, the Kamite-Bocci combination would have involved merely combining prior art elements according to known methods to yield predictable results. As shown in the analysis below, Kamite and Bocci include each element in claims 1 and 6. As I show below, Kamite teaches all elements of claims 1 and 6. To the extent the Board finds otherwise, then the only difference between the combination of Kamite and Bocci and the '775 claims is the lack of actual combination of the elements in a single prior art reference. A POSITA could have combined the elements as claimed by known methods. In fact, Bocci describes in detail how to combine consecutive pseudo-wires to form a multi-segment pseudo-wire, and explains that its teachings are applicable to a variety of network configurations. *E.g.*, EX1031, 8-11. Thus, the combination merely would have involved applying the teachings of Bocci to the particular network configuration described in Kamite. In this combination, each element merely performs the same function as it does separately—Kamite's network operates in its disclosed manner and Bocci would have supplemented Kamite's teachings by disclosing combining consecutive segments to form multi-segment pseudo-wires. A POSITA would have recognized that the results of the combination were predictable, especially because

Bocci extensively describes the process and technical details of how to implement its teachings on networks that implement pseudo-wires.

112. **Third**, the combination would have involved the use of a known technique to improve similar devices in the same way. Kamite contains a base device—*i.e.*, the network described in Kamite and depicted in Kamite’s Figure 10. As I show below, Kamite teaches all elements of claims 1 and 6. To the extent the Board finds otherwise, the ’775 patent’s disclosure of multi-segment pseudo-wires can be seen as an “improvement” to Kamite. Bocci contains a comparable device—*i.e.*, the networks described throughout Bocci and particularly the network configuration depicted in Bocci’s Figures 3 and 4—that has been improved in the same way as the claimed invention. Specifically, Bocci discloses combining consecutive pseudo-wires into multi-segment pseudo-wires. *See* EX1031, 3-4. A POSITA could have applied the known improvement—*i.e.*, Bocci’s teaching of combining consecutive pseudo-wires to form a multi-segment pseudo-wire—in the same way to the base device—*i.e.*, Kamite’s network configuration. Indeed, Bocci describes in detail how to combine consecutive pseudo-wires to form a multi-segment pseudo-wire, and explains that its teachings are applicable to a variety of network configurations. *E.g.*, EX1031, 8-11. The results would have been predictable to a POSITA, especially because Bocci extensively describes the process

and technical details of how to implement its teachings on networks that implement pseudo-wires.

113. **Fourth**, the combination would have involved applying a known technique to a known device ready for improvement to yield predictable results. Kamite contains a base device—*i.e.*, the network configuration described in Kamite and depicted in Kamite’s Figure 10. As I show below, Kamite teaches all elements of claims 1 and 6. To the extent the Board finds otherwise, the ’775 patent’s disclosure of multi-segment pseudo-wires can be seen as an “improvement” to Kamite. Bocci discloses a known technique that is applicable to the base device. Specifically, Bocci discloses combining consecutive segments into multi-segment pseudo-wires. *See* EX1031, 3-4. A POSITA would have known that Bocci’s teachings are generally applicable to networks that deploy consecutive pseudo-wires. A POSITA would have recognized that applying the known technique—*i.e.*, Bocci’s teaching of combining consecutive pseudo-wires to form a multi-segment pseudo-wire—would have yielded predictable results and resulted in an improved system. Indeed, Bocci extensively describes the process and technical details of how to implement its teachings on networks that implement pseudo-wires.

114. **Finally**, Kamite, Bocci, and the ’775 patent are analogous art because the references are in the same field of endeavor as each other. All references disclose improvements to conventional pseudo-wire technology. Kamite and the ’775 patent,

for example, both disclose improving pseudo-wires by sharing connections among multiple pseudo-wires in a network, thereby saving network resources. EX1001, 3:15-29 (“Because 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.”); EX1041, 6 (“In other words, if a multicast tunnel could be utilized using a common VC label for the downstream PEs, the traffic between PE11<sub>1</sub> and P[]12<sub>1</sub> could be reduced to 1/3 of the conventional volume.”). And Bocci and the ’775 patent, for example, both disclose extending pseudo-wires across multiple network segments by combining segments together into one multi-segment pseudo-wire—in fact, the ’775 patent explicitly references Bocci’s disclosures as relevant to the patent. EX1001, at Other Publications (citing Bocci); EX1001, at 1:53-2:2 (explaining that multi-segment pseudo-wires are “defined in more detail in [Bocci]”); EX1031, 2 (Bocci “presents an architectural framework for such multi-segment pseudo wires.”).

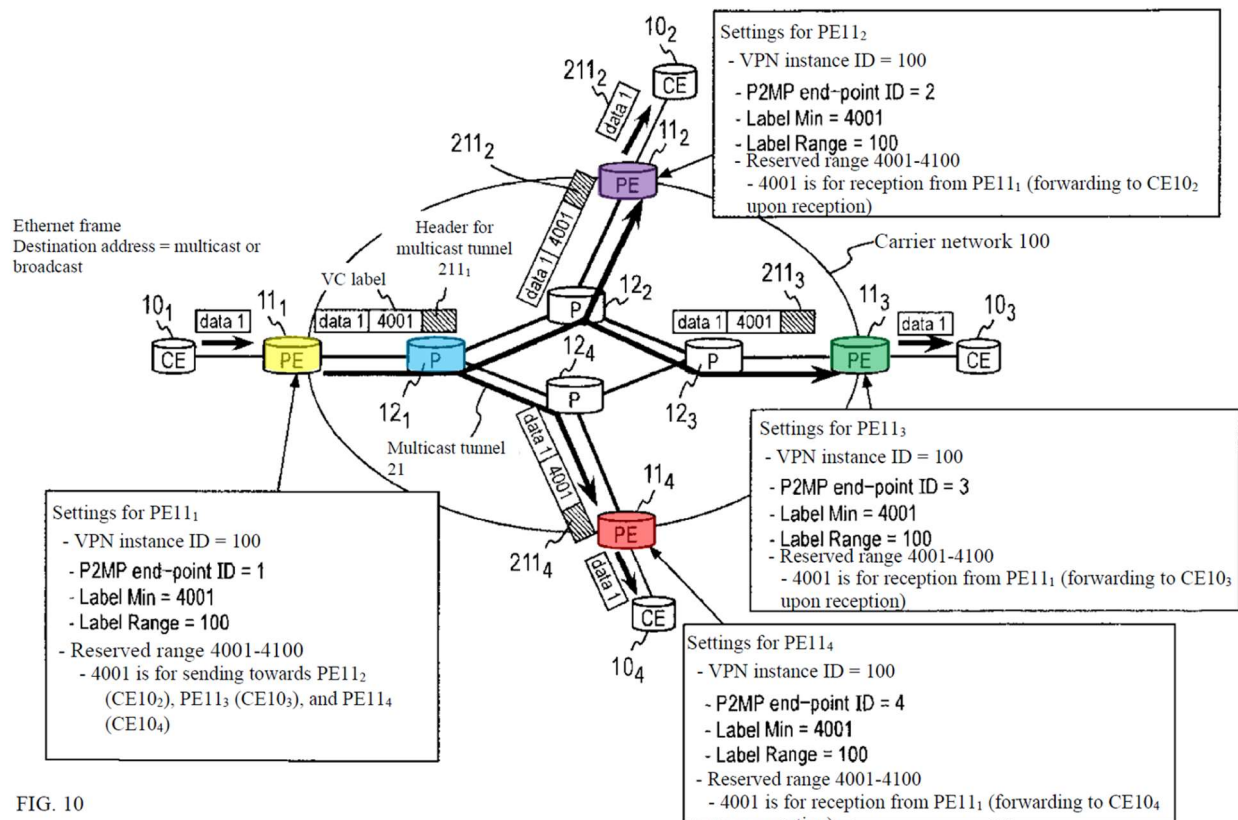
#### **4. Claim 1**

- (a) 1[pre]: A method of setting up at least two pseudo-wires able to broadcast a data stream, comprising:

115. To the extent the preamble is limiting, Kamite and Bocci would have rendered obvious limitation 1[pre]: “A method of setting up at least two pseudo-

116. Kamite discloses this limitation. Kamite teaches establishing multiple pseudo-wires that propagate throughout a network. EX1041, 6, 8-9. For example, in Figure 10 below, a first pseudo-wire starts at PE11<sub>1</sub> (yellow) and ends at PE11<sub>2</sub> (purple), and a second pseudo-wire starts at PE11<sub>1</sub> (yellow) and ends at PE11<sub>4</sub> (red):

116. Kamite discloses this limitation. Kamite teaches establishing multiple pseudo-wires that propagate throughout a network. EX1041, 6, 8-9. For example, in Figure 10 below, a first pseudo-wire starts at PE11<sub>1</sub> (yellow) and ends at PE11<sub>2</sub> (purple), and a second pseudo-wire starts at PE11<sub>1</sub> (yellow) and ends at PE11<sub>4</sub> (red):

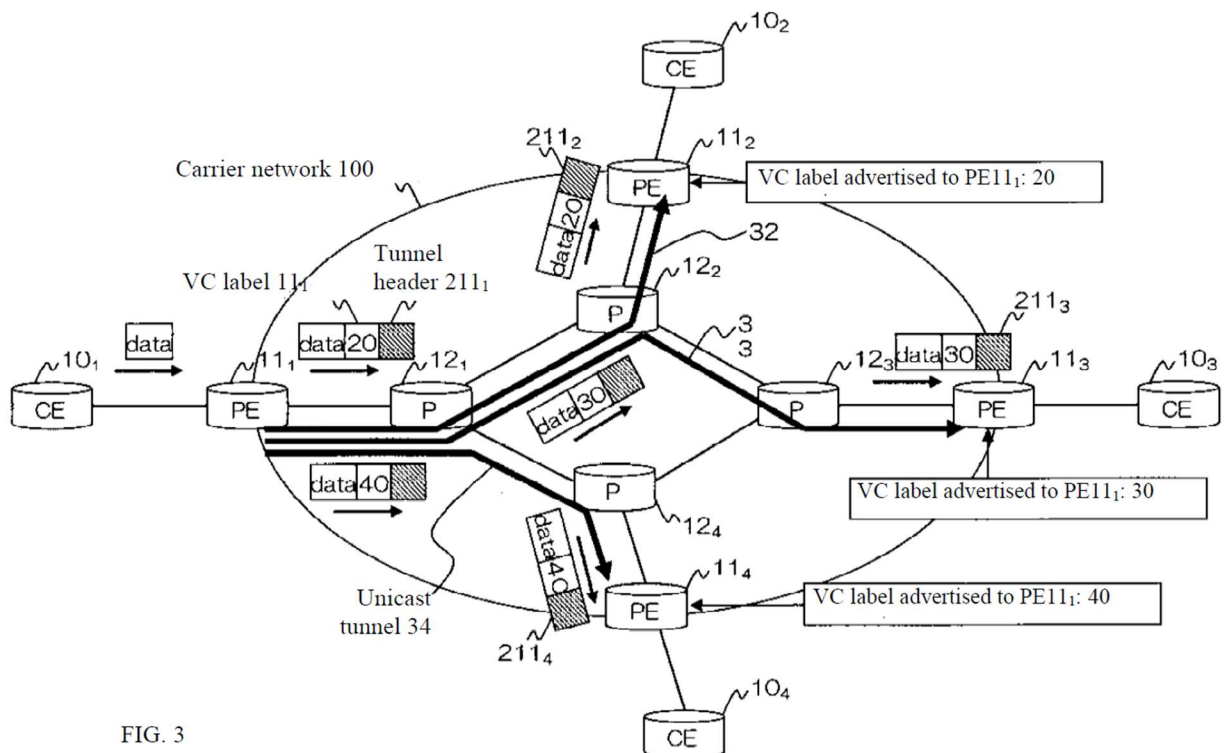


*Id.*, Fig. 10 (highlighted). These pseudo-wires broadcast data. EX1041, 6 (“If a PE (the upstream PE) receives multicast data from a CE, the upstream PE assigns a VC label and sends the data to the PEs (downstream PEs).”). The data in Kamite corresponds to the ’775 patent’s data stream. The ’775 patent explains that a data

stream is merely “the packets for transmission.” EX1001, 1:30-33. Similarly, Kamite discloses transmitting data packets. *See, e.g.*, EX1041, 6.

117. For the same reasons discussed above with respect to Wainner, to the extent Patent Owner argues that Kamite discloses one point-to-multipoint pseudo-wire rather than multiple point-to-point pseudo-wires that share a first link, (*see* §VII.A.5(a)), I disagree.

118. First, Kamite discloses two point-to-point pseudo-wires that share the first link. In Kamite’s Figure 3, “PE11<sub>1</sub> establishes separate unicast tunnels with PE11<sub>2</sub>, PE11<sub>3</sub>, and PE11<sub>4</sub>.” EX1041, 6.



*Id.*, Fig. 3. Figure 3 depicts implementing three separate pseudo-wires that share a first link—*i.e.*, the singular connection between PE11<sub>1</sub> and P12<sub>1</sub> that is depicted in

Figure 3. Additionally, Kamite describes modifying this pseudo-wire implementation to more efficiently share the first link between the multiple point-to-point pseudo-wires. EX1041, 6.

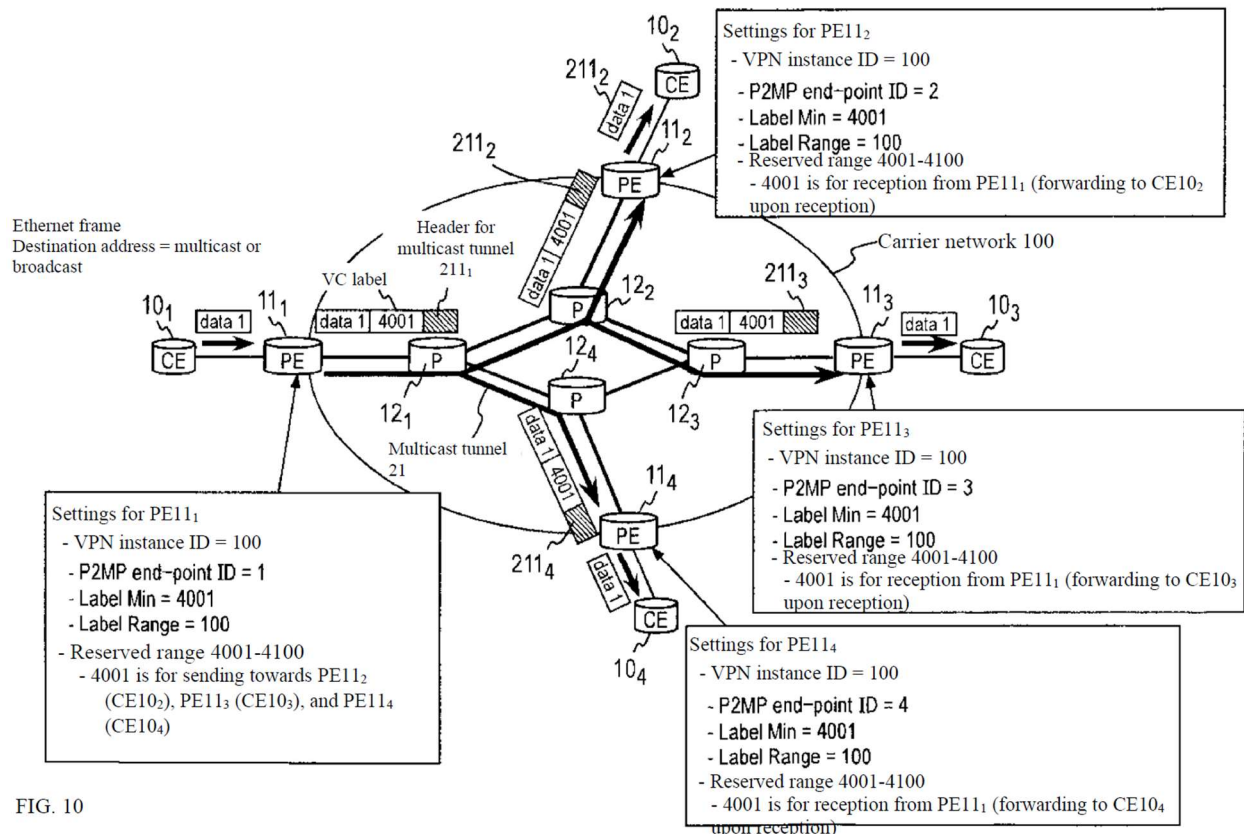


FIG. 10

*Id.*, Fig. 10. Thus—as discussed further below with respect to the appropriate limitations—the resulting pseudo-wire from PE11<sub>1</sub> to PE11<sub>2</sub> corresponds to the '775 patent's “first pseudo-wire” in limitation 1[a] and the resulting pseudo-wire from PE11<sub>1</sub> to PE11<sub>4</sub> corresponds to the '775 patent's “second pseudo-wire” in limitation 1[b].

119. Second, at the very least Kamite in combination with Bocci would have rendered obvious two point-to-point pseudo-wires that share a first link. In this

combination, Kamite's Figure 10 depicts multiple segments, the first of which—between PE11<sub>1</sub> and P12<sub>1</sub>—is shared between the others—like the segments from P12<sub>1</sub> to PE11<sub>2</sub> and from P12<sub>1</sub> to PE11<sub>4</sub>. EX1041, 6; *see* EX1041, Fig. 10. As discussed in further detail below, Bocci teaches combining consecutive segments to form a multi-segment point-to-point pseudo-wire. *E.g.*, EX1031, 4 (“This requires a capability in PE2 that can concatenate PW segments PE1-PE2 to PW segments PE2-PE3. The end-to-end PW is known as a multi-segment PW.”). A POSITA would have found it obvious to use Bocci's teachings to combine Kamite's first segment from PE11<sub>1</sub> and P12<sub>1</sub> and second segment from P12<sub>1</sub> to PE11<sub>2</sub> to form the '775 patent's “first pseudo-wire” in limitation 1[a] and further combine Kamite's first segment from PE11<sub>1</sub> and P12<sub>1</sub> and third segment from P12<sub>1</sub> to PE11<sub>4</sub> to form the '775 patent's “second pseudo-wire” in limitation 1[b].

120. Third, Patent Owner itself has asserted that the '775 patent encompasses point-to-multipoint pseudo-wires. In Patent Owner's previous litigation with Cisco, Patent Owner accused Cisco of infringing the '775 patent because the accused product “implements Label Switched *Multicast* with *point-to-multipoint* traffic engineering (P2MP-TE) for delivering broadcast, *multicast* and certain unicast streams to a VPLS domain using pseudo-wires.” EX1033, ¶123 (emphasis added). Patent Owner again insisted that the Cisco product infringed because it “provides *point to multipoint* (P2MP) communication over IP or MPLS

networks . . . by connecting nodes through P2MP Pseudo-wires.” *Id.*, ¶127 (emphasis added). Similarly, Kamite discloses that “a ***multicast*** tunnel could be utilized using a common VC label for the downstream PEs” such that “the traffic between PE11<sub>1</sub> and P12<sub>1</sub> could be reduced to 1/3 of the conventional volume.” EX1041, 6 (emphasis added). In other words, “[t]his method allows pseudo wire traffic to be forwarded using ***a multicast*** tunnel.” *Id.*, 7 (emphasis added). In doing so, the disclosed invention can “forward[] ***point-to-multipoint*** traffic.” *Id.*, 8 (emphasis added).

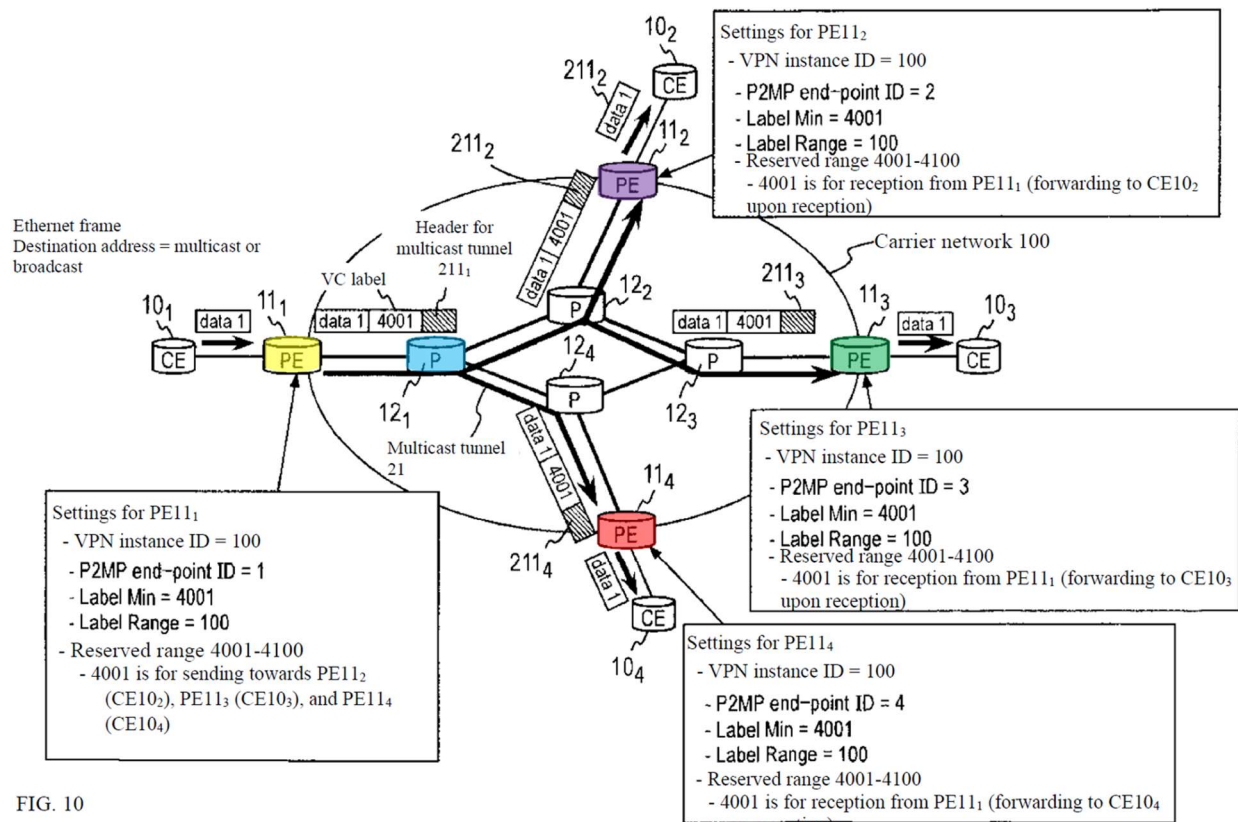
121. Thus, Kamite and Bocci would have rendered obvious limitation 1[pre].

- (b) 1[a]: setting up a first pseudo-wire comprising a first link set up between an input router of a packet-switched network and an intermediate router of the packet-switched network and a second link set up between said intermediate router and a first output router of the packet-switched network; and

122. Kamite and Bocci would have rendered obvious limitation 1[a]: “setting up a first pseudo-wire comprising a first link [e.g., **link between PE11<sub>1</sub> and P12<sub>1</sub>**] set up between an input router [e.g., **PE11<sub>1</sub>**] of a packet-switched network [e.g., **network depicted in Figure 10**] and an intermediate router [e.g., **P12<sub>1</sub>**] of the packet-switched network and a second link [e.g., **link between P12<sub>1</sub> and PE11<sub>2</sub>**] set up between said intermediate router [e.g., **P12<sub>1</sub>**] and a first output router [e.g., **PE11<sub>2</sub>**] of the packet-switched network.”

123. Kamite discloses this limitation. The elements of this limitation are broken down below:

124. *setting up a first pseudo-wire comprising a first link set up between an input router of a packet-switched network and an intermediate router of the packet-switched network.* Kamite depicts the following network configuration in Figure 10<sup>6</sup>:



<sup>6</sup> Kamite's disclosure in Figure 3 is also sufficient to meet this limitation because Figure 3 depicts three separate pseudo-wires that share a first link—*i.e.*, the singular connection between PE11<sub>1</sub> and P12<sub>1</sub>. See §VII.B.1

EX1041, Fig. 10 (highlighted). PE11<sub>1</sub> (yellow) corresponds to the '775 patent's input router. As Kamite explains, PE11<sub>1</sub> is a "provider edge router" that sits on the edge of the carrier network **100**. EX1041, 6, Fig. 10. Similarly, the input router in the '775 patent is "at the edge of a packet-switched network PSN." EX1001, 1:53-56. P12<sub>1</sub> (blue) corresponds to the '775 patent's intermediate router. As Kamite explains, P12<sub>1</sub> is a "provider router" similar to the intermediate router in the '775 patent. EX1041, 6.

125. The network in Figure 10 corresponds to the '775 patent's packet-switched network. In particular, both networks transmit data in the form of packets. *Compare* EX1041, 6 ("In conventional pseudo wire technology based on point-to-point connection, VC labels are assigned for VC-LSP traffic forwarding to the packets to be carried.") *and* EX1041, Fig. 10 (depicting packets routed across the network), *with* EX1001, 1:30-32 ("In a packet-switched network, data is transmitted in the form of packets processed by routers of the network until they reach their destination.").

126. The connection between PE11<sub>1</sub> and P12<sub>1</sub> corresponds to the '775 patent's "first link." As discussed, the Eastern District of Texas court construed "link" to mean a "connection between an interface of a first router and an interface of a second router." *See* §VI. Kamite's connection satisfies this construction. Kamite sets up its pseudo-wires according to a type-length variable ("TLV"), which

“is a unit of information storage.” EX1041, 8. The TLV contains an “Interface Parameter” that is “used in the conventional point-to-point pseudo wire specification” and “[i]n the present invention, this parameter is used as-is.” *Id.* A POSITA would have known that the Interface Parameter specifies how the pseudo-wire connects to a particular interface; for example, verifying that the “ingress and egress ports at the edges of the circuit have the necessary capabilities to interoperate with each other.” EX1037, 14; *see also see* EX1010, 3 (explaining that pseudo-wires encapsulate data “arriving at the PE-bound port (logical or physical)”); EX1010, 4 (defining “Attachment Circuit” as “[t]he physical or virtual circuit attaching a CE to a PE” and providing examples). Further, a POSITA would have known that each link in a conventional pseudo-wire connects from an interface of a first router to an interface of a second router. Thus, the connections between routers in Kamite corresponds to the ’775 patent’s “links.”

127. Patent Owner advocated for a nearly identical construction during EPR, asserting that “the term ‘link’ should be construed to mean ‘a connection between an interface on a first device and an interface on a second device.’” *See* §VI. Kamite’s connection between PE11<sub>1</sub> and P12<sub>1</sub> satisfies this construction as well, since its routers are “devices.”

128. *and a second link set up between said intermediate router and a first output router of the packet-switched network.* Kamite’s PE11<sub>2</sub> (purple)

corresponds to the '775 patent's output router. As Kamite explains, PE11<sub>2</sub> is a "provider edge router" that sits on the edge of the carrier network **100**. EX1041, 6, Fig. 10. Similarly, the output router in the '775 patent is "at the edge of a packet-switched network PSN." EX1001, 1:53-56. The fact that there is an additional intermediate router P12<sub>2</sub> (not highlighted) in between Kamite's intermediate router P12<sub>1</sub> (blue) and the output router PE11<sub>2</sub> (purple) is inconsequential. Indeed, the '775 patent explains that "[i]n this kind of embodiment, the first, second, and third links *are not necessarily direct links* between routers. For example, the second link set up between the intermediate router and the first output router can comprise *one or more hops and possibly pass through one or more other intermediate routers* before reaching the output router." EX1001, 3:30-38 (emphases added).

129. And for the same reasons discussed above, the connection between P12<sub>1</sub> and PE11<sub>2</sub> corresponds to the '775 patent's "second link." Altogether, these components form a first pseudo-wire, represented by the arrow from PE11<sub>1</sub> to PE11<sub>2</sub> in Figure 10.

130. For the same reason discussed above with respect to Wainner, to the extent Patent Owner argues that Kamite does not anticipate the '775 patent because Kamite does not disclose multi-segment pseudo-wires that connects the input router to the output routers, (*see* §VII.A.5(b)), I disagree. To start, the '775 patent itself admits that multi-segment pseudo-wires were known in the art, which it depicts in

Figure 1. EX1001, 1:53-2:2, 5:40-42 (“FIG. 1 represents a pseudo-wire set up *as in the prior art*” that “is defined in more detail in the document ‘An Architecture for *Multi-Segment Pseudo-Wire* Emulation Edge-to-Edge.’” (emphases added)). Further, the pseudo-wires depicted in Kamite comprise multiple segments. See EX1041, Figs. 3 & 10. Steps 2 and 3 of Kamite’s invention describe setting up pseudo-wires between each PE—for example, from PE11<sub>1</sub> to PE11<sub>2</sub>. *Id.*, 8-9. Therefore, Kamite alone teaches the “first pseudo-wire” limitation of claim 1 for the reasons discussed above.

131. Additionally, Kamite in combination with Bocci would have taught this limitation as well. A POSITA would have found it obvious to combine Kamite and Bocci such that Kamite would operate in its disclosed manner and further implement Bocci’s teaching of combining consecutive pseudo-wires to form a multi-segment pseudo-wire. Bocci explains how to “concatenate PW segments” to form a “multi-segment PW.” EX1031, 4; *see also* EX1031, 6 (A “set of two or more contiguous *PW segments* that behave and function as a single point-to-point PW.” (emphasis added)). For example, Bocci teaches combining pseudo-wire segments to form a multi-segment pseudo-wire in its Figure 1:

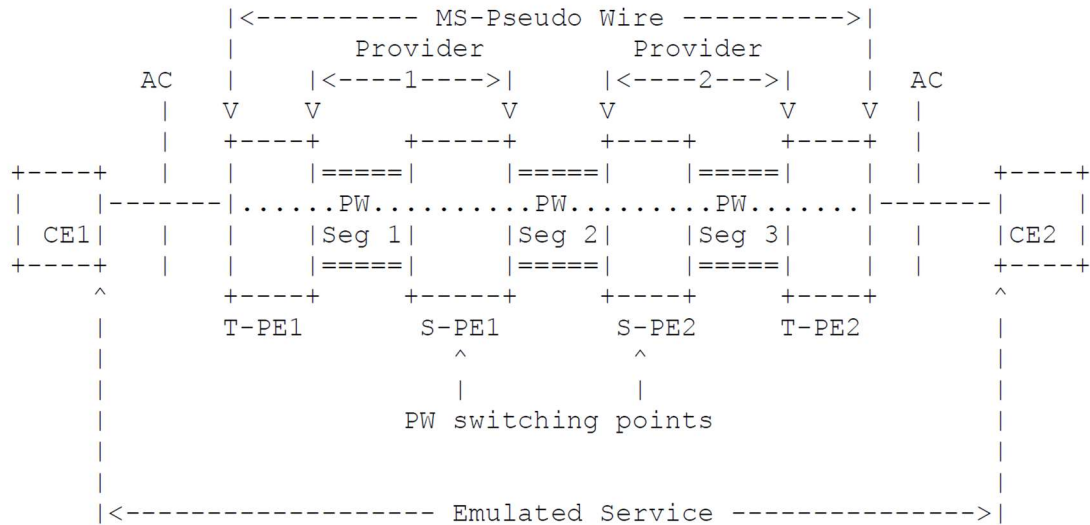
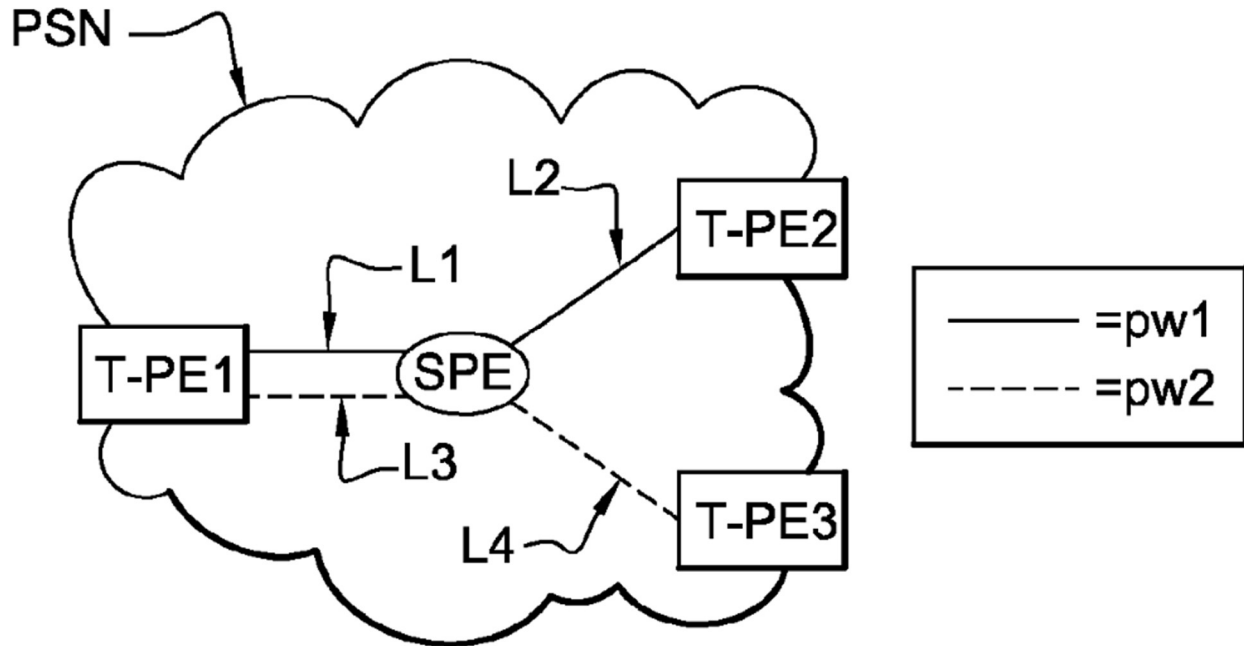


Figure 5 Inter-Provider Reference Model

EX1031, 11. The resulting multi-segment pseudo-wire, Bocci explains, “is a single PW” that “is indistinguishable from a SS-PW,” *i.e.*, a single-segment pseudo-wire. *Id.*, 7. A POSITA would have been motivated to combine the segments in Kamite to form multi-segment pseudo-wires according to Bocci’s teachings and would have had a reasonable expectation of success of doing so. *See* §VII.B.3.

132. Further, I note the ’775 patent admits that limitation 1[a] was known in the art. *See* §IV.C. For example, the ’775 patent explains that “FIG. 2 represents a solution implemented in the prior art to ensure continuity of service in a packet-switched network.” EX1001, 5:43-44. Figure 2 depicts “setting up a first pseudo-wire [*e.g.*, **pw1**] comprising a first link [*e.g.*, **L1**] set up between an input router [*e.g.*, **T-PE1**] of a packet-switched network [*e.g.*, **PSN**] and an intermediate router [*e.g.*, **SPE**] of the packet-switched network and a second link [*e.g.*, **L2**] set up between

said intermediate router [e.g., **SPE**] and a first output router [e.g., **T-PE2**] of the packet-switched network”:



*Id.*, Fig. 2(AA). Thus, limitation 1[a], as the '775 patent admits, was known and implemented in the prior art.

133. Thus, Kamite and Bocci would have rendered obvious limitation 1[a].

- (c) 1[b]: setting up a second pseudo-wire between said input router and a second output router of the packet-switched network, wherein the second pseudo-wire comprises said first link and a third link set up between said intermediate router and said second output router, said first link being shared by the first and second pseudo-wires.

134. Kamite and Bocci would have rendered obvious limitation 1[b]: “setting up a second pseudo-wire between said input router [e.g., **PE11<sub>1</sub>**] and a second output router [e.g., **PE11<sub>4</sub>**] of the packet-switched network [e.g., **network depicted in Figure 10**], wherein the second pseudo-wire comprises said first link

[e.g., link between PE11<sub>1</sub> and P12<sub>1</sub>] and a third link [e.g., link between P12<sub>1</sub> and PE11<sub>4</sub>] set up between said intermediate router [e.g., P12<sub>1</sub>] and said second output router [e.g., PE11<sub>4</sub>], said first link [e.g., link between PE11<sub>1</sub> and P12<sub>1</sub>] being shared by the first and second pseudo-wires.”

135. Kamite and Bocci disclose the entire limitation. The elements of this limitation are broken down below:

136. *setting up a second pseudo-wire between said input router and a second output router of the packet-switched network.* For the reasons discussed above, Kamite discloses setting up a second pseudo-wire between the input router and a second output router. See §VII.B.4(b).

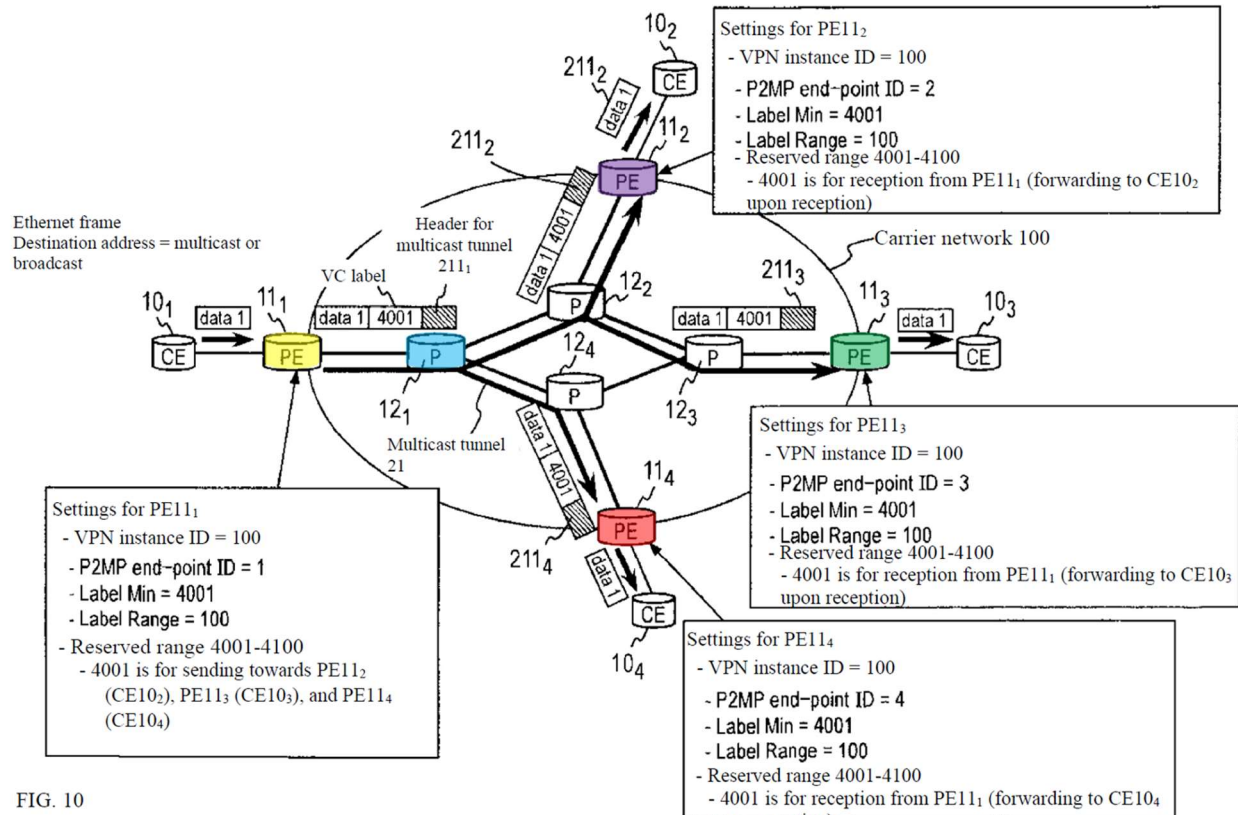


FIG. 10

EX1041, Fig. 10 (highlighted). As the figure above<sup>7</sup> and previous analysis show, Kamite's PE11<sub>1</sub> (yellow) corresponds to the '775 patent's input router **T-PE1**. See §VII.B.4(b). Similarly, Kamite's PE11<sub>4</sub> (red) corresponds to the '775 patent's second output router **T-PE3**. *Id.* And the arrow from PE11<sub>1</sub> to PE11<sub>4</sub> corresponds to the '775 patent's "second pseudo-wire." *Id.*

137. *wherein the second pseudo-wire comprises said first link and a third link set up between said intermediate router and said second output router.* As shown above, Kamite's second pseudo-wire comprises the first link from input router PE11<sub>1</sub> (yellow) to intermediate router P12<sub>1</sub> (blue) and a third link from the intermediate router P12<sub>1</sub> (blue) to the second output router PE11<sub>4</sub> (red). The fact that there is an additional intermediate router P12<sub>4</sub> (not highlighted) in between Kamite's intermediate router P12<sub>1</sub> (blue) and the output router PE11<sub>4</sub> (red) is inconsequential. Indeed, the '775 patent explains that "[i]n this kind of embodiment, the first, second, and third links are not necessarily direct links between routers. For example, the second link set up between the intermediate router and the first output router can comprise one or more hops and possibly pass through one or more other

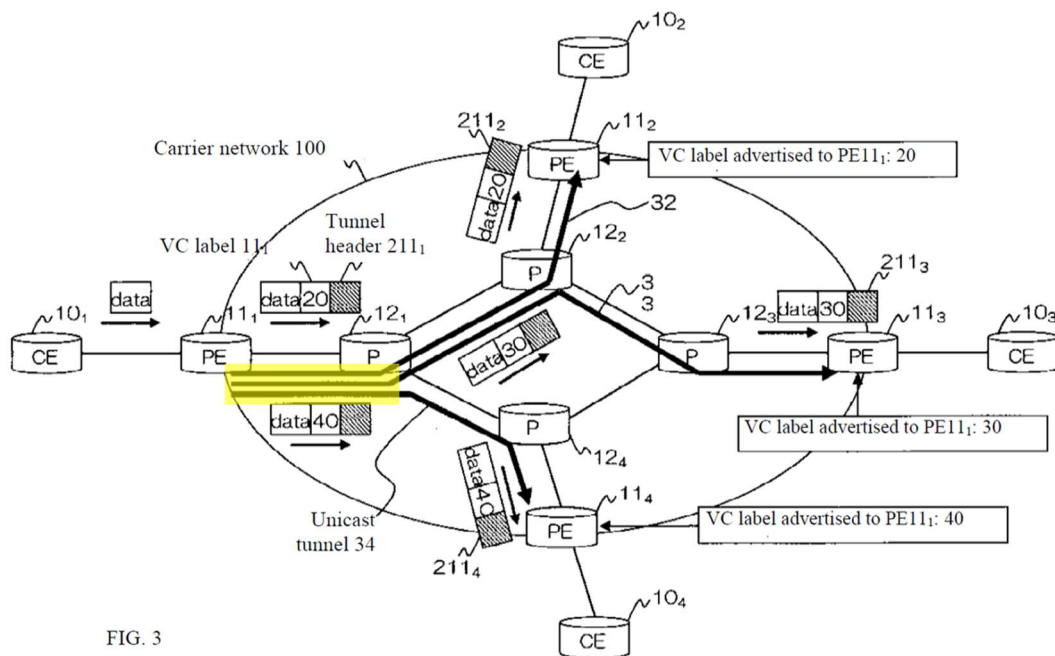
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<sup>7</sup> Kamite's disclosure in Figure 3 is also sufficient to meet this limitation because Figure 3 depicts three separate pseudo-wires that share a first link—*i.e.*, the singular connection between PE11<sub>1</sub> and P12<sub>1</sub>. See §VII.B.1

intermediate routers before reaching the output router.” EX1001, 3:30-38 (emphases added).

138. As discussed, the connection between intermediate router P12<sub>1</sub> (blue) and the output router PE11<sub>4</sub> (red) is a “link” both under the construction adopted by the Eastern District of Texas court and the construction advocated by Patent Owner during EPR. *See* §VII.B.4(b). Also discussed above, Kamite—and at the very least Kamite in combination with Bocci—teach combining Kamite’s segments into a multi-segment pseudo-wire that spans from the input router PE11<sub>1</sub> to the output router PE11<sub>4</sub>. *See* §VII.B.4(b).

139. *said first link being shared by the first and second pseudo-wires.* Kamite explains that the first link (*e.g.*, **the link between PE11<sub>1</sub> and P12<sub>1</sub>**) is shared by the first and second pseudo-wires. This is shown in both Figures 3 and 10:



EX1041, Fig. 3 (highlighted). In Figure 3, three pseudo-wires (highlighted in yellow) traverse a single link between PE11<sub>1</sub> and P12<sub>1</sub>.

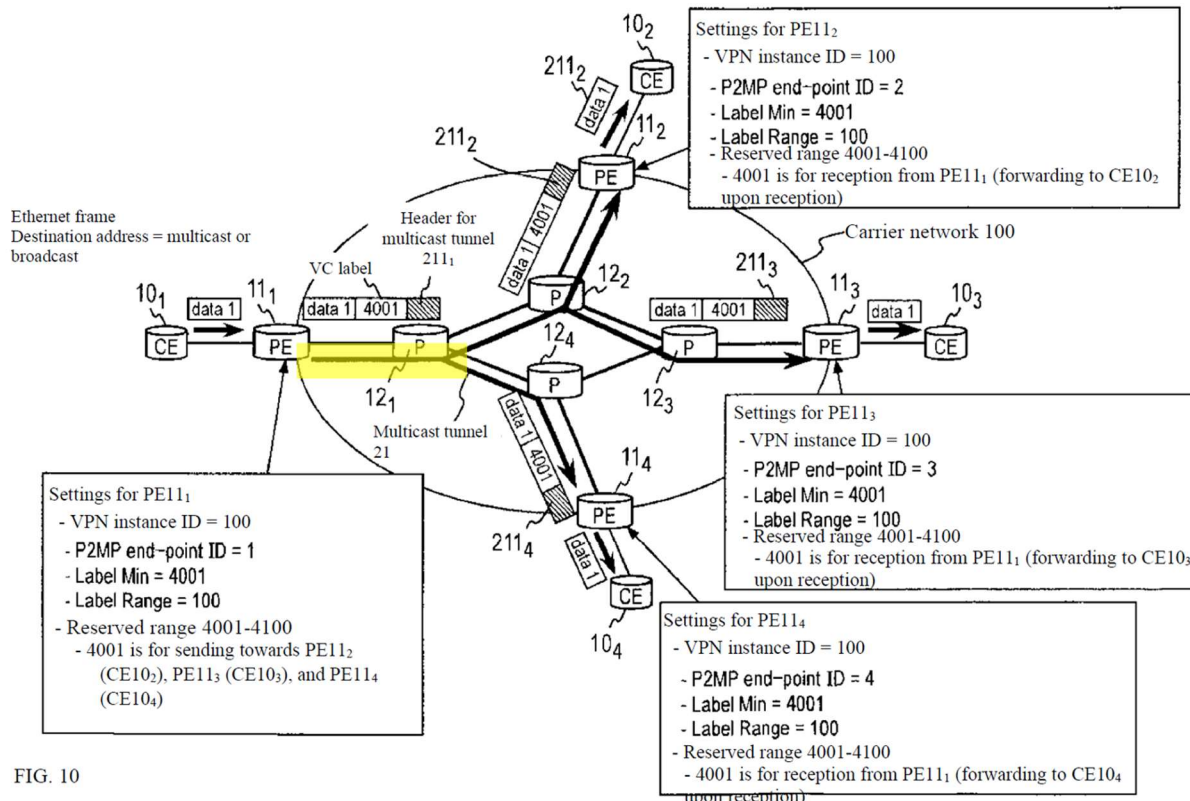
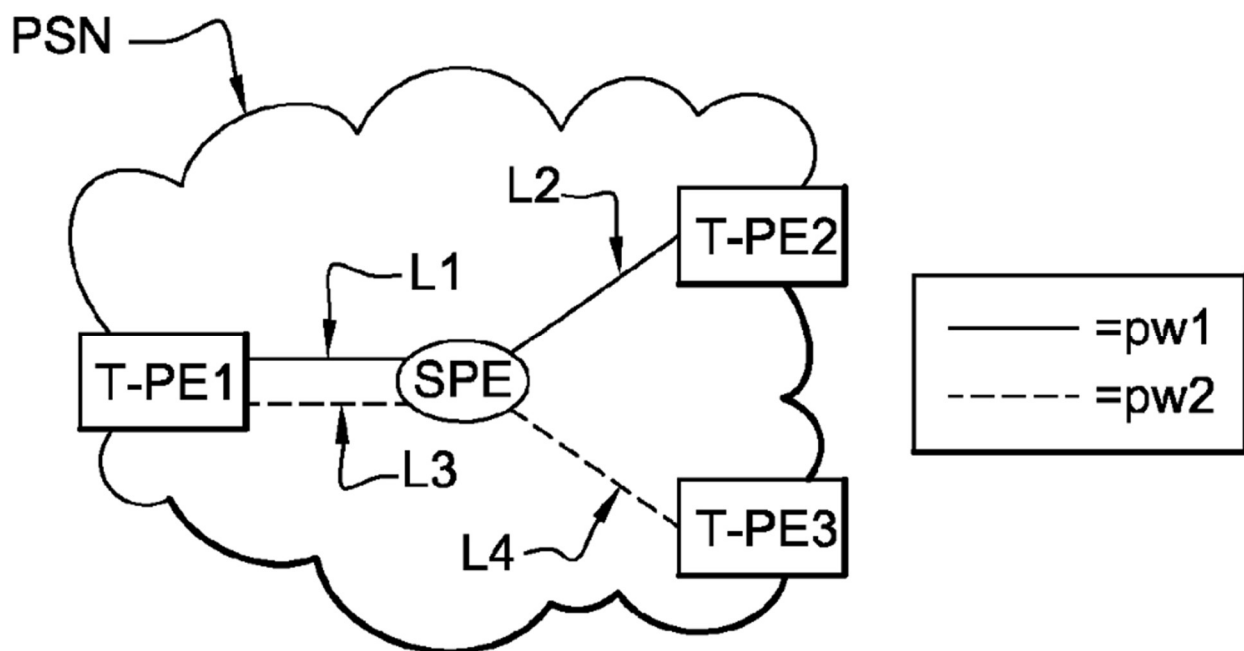


FIG. 10

*Id.*, Fig. 10 (highlighted). Figure 10 shares this link even more efficiently by sending data across the shared link only once, when possible. *Id.*, Fig. 10; *e.g.*, *id.* 7-9. By doing so, “the traffic between PE11<sub>1</sub> and P12<sub>1</sub> could be reduced by 1/3 of the conventional volume.” *Id.*, 6. Kamite therefore discloses that this “first link” is shared by the first and second pseudo-wires in both Figures 3 and 10.

140. Further, I note the '775 patent admits that the majority of limitation 1[b] was known in the art. *See* §IV.C. For example, the '775 patent explains that “FIG. 2 represents a solution implemented in the prior art to ensure continuity of service

in a packet-switched network.” EX1001, 5:43-44. Figure 2 depicts “setting up a second pseudo-wire [e.g., **pw2**] between said input router [e.g., **T-PE1**] and a second output router [e.g., **T-PE3**] of the packet-switched network [e.g., **PSN**], wherein the second pseudo-wire comprises said first link [missing from Figure 2 of the ’775 patent] and a third link [e.g., **L4**] set up between said intermediate router [e.g., **SPE**] and said second output router [e.g., **T-PE3**], said first link being shared by the first and second pseudo-wires [missing from Figure 2 of the ’775 patent]”:



*Id.*, Fig. 2(AA). Thus, the majority of limitation 1[b], as the ’775 patent admits, was known and implemented in the prior art. The only element supposedly missing from the prior art—according to the ’775 patent—is sharing the first link (e.g., **L1**) between the first pseudo-wire (e.g., **pw1**) and the second pseudo-wire (e.g., **pw2**), which is disclosed by Kamite and Bocci.

141. Thus, Kamite and Bocci would have rendered obvious limitation 1[b] and the entire claim 1.

## 5. Claim 6

142. Claim 6 is substantively the same as claim 1 except written in terms of a “computer program stored on non-transitory computer-readable medium.” Claim 6 therefore would have been obvious for the same reasons explained above with respect to claim 1. I nevertheless provide a limitation-by-limitation analysis below.

- (a) 6[pre]: A computer program product stored on a non-transitory computer-readable medium and comprising program code instructions for implementing a method of setting up at least two pseudo-wires able to broadcast a data stream when said program is executed by a computer, the program code instructions comprising instructions for:

143. To the extent the preamble is limiting, Kamite and Bocci would have rendered obvious limitation 6[pre]: “A computer program product stored on a non-transitory computer-readable medium and comprising program code instructions for implementing a method of setting up at least two pseudo-wires [*e.g.*, **in Figure 10, a first pseudo-wire from PE11<sub>1</sub> to PE11<sub>2</sub> and a second pseudo-wire from PE11<sub>1</sub> to PE11<sub>4</sub>**] able to broadcast a data stream, when said program is executed by a computer, the program code instructions comprising instructions for:”.

144. As discussed, Kamite discloses “a method of setting up at least two pseudo-wires able to broadcast a data stream.” *See* §VII.B.4(a).

145. Kamite further discloses “computer program product stored on a non-transitory computer-readable medium and comprising program code instructions for implementing” this method “when said program is executed by a computer, the program code instructions comprising instructions for” the method. EX1041, claim 17 (claiming “[a] communication program that causes a computer to run the system or device” described in the claims). Indeed, a POSITA would have known that Kamite’s routers could execute the method using program code stored on a non-transitory computer-readable medium. Thus, Kamite and Bocci would have rendered obvious limitation 6[pre].

- (b) 6[a]: setting up a first pseudo-wire comprising a first link set up between an input router of a packet-switched network and an intermediate router of the packet-switched network and a second link set up between said intermediate router and a first output router of the packet-switched network; and

146. As discussed, Kamite and Bocci would have rendered obvious limitation 6[a]: “setting up a first pseudo-wire comprising a first link [*e.g.*, **link between PE11<sub>1</sub> and P12<sub>1</sub>**] set up between an input router [*e.g.*, **PE11<sub>1</sub>**] of a packet-switched network [*e.g.*, **network depicted in Figure 10**] and an intermediate router [*e.g.*, **P12<sub>1</sub>**] of the packet-switched network and a second link [*e.g.*, **link between P12<sub>1</sub> and PE11<sub>2</sub>**] set up between said intermediate router [*e.g.*, **P12<sub>1</sub>**] and a first output router [*e.g.*, **PE11<sub>2</sub>**] of the packet-switched network.” See §VII.B.4(b).

- (c) 6[b]: setting up a second pseudo-wire between said input router and a second output router of the packet-switched network, wherein the second pseudo-wire comprises said first link and a third link set up between said intermediate router and said second output router, said first link being shared by the first and second pseudo-wires.

147. As discussed, Kamite and Bocci would have rendered obvious limitation 6[b]: “setting up a second pseudo-wire between said input router [*e.g.*, **PE11<sub>1</sub>**] and a second output router [*e.g.*, **PE11<sub>4</sub>**] of the packet-switched network [*e.g.*, **network depicted in Figure 10**], wherein the second pseudo-wire comprises said first link [*e.g.*, **link between PE11<sub>1</sub> and P12<sub>1</sub>**] and a third link [*e.g.*, **link between P12<sub>1</sub> and PE11<sub>4</sub>**] set up between said intermediate router [*e.g.*, **P12<sub>1</sub>**] and said second output router [*e.g.*, **PE11<sub>4</sub>**], said first link [*e.g.*, **link between PE11<sub>1</sub> and P12<sub>1</sub>**] being shared by the first and second pseudo-wires.” *See* §VII.B.4(c). Thus, Kamite and Bocci would have rendered obvious claim 6.

## VIII. CONCLUSION

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

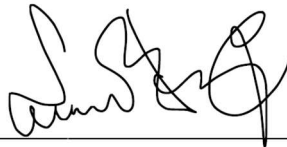
149. In signing this declaration, I recognize that the declaration will be filed as evidence in a contested case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I also recognize that I may be subject to cross-examination in the case and that cross-examination will take place within

the United States. If cross-examination is required of me, I will appear for cross-examination within the United States during the time allotted for cross-examination.

\* \* \*

I hereby declare that all statements 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: February 15, 2024

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Samrat Bhattacharjee, Ph.D