

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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CISCO SYSTEMS, INC.,

Petitioner,

v.

NETSOCKET, INC.,

Patent Owner.

Patent No. 7,190,698

Filing Date: December 20, 2001

Issue Date: November 10, 2009

Inventors: Emil Svanberg, Joachim Johansson, Anders Torger,  
Joakim Norrgard, and Anders Larsson

Title: NETWORK OPTIMISATION METHOD

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**DECLARATION OF DR. PAUL CONGDON**

Case No. IPR2023-00607

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I, Paul Congdon, declare as follows:

## **I. BACKGROUND AND QUALIFICATIONS**

1. The details of my education, work experience, and research are summarized in my curriculum vitae (“CV”) which is attached to this Report as **Exhibit A**. I have summarized some of the relevant information about my experience and qualifications below.

2. I have over 25 years of experience working with the IEEE 802, IETF and other standards efforts involved in the creation of the Ethernet LAN and a wide range of network devices and technologies, including routers, Layer 2/3/4 switches, iSCSI storage devices, FDDI, Ethernet, wireless LANs, virtual LANs, link aggregation, LLDP, Virtual Edge Port Aggregators (VEPA) for data centers and access security protocols, including IEEE 802.1X.

3. At the outset of my career, I obtained a Bachelor of Science in Computer Science from California State University, Chico when I graduated Magna Cum Laude in 1985. During the course of my career, I also earned my Ph.D. in Computer Science at the University of California, Davis in 2012 and a Master of Science degrees from California State University, Chico in 1997.

4. My professional career began at Hewlett-Packard in 1985, where I started in the Information Network Division. Over the next two and a half decades at Hewlett-Packard, I worked in various divisions and ultimately ended up as a

Fellow. During this time, I was responsible for leading wireless and Software Defined Networking research within HPLabs and holding positions as CTO for HP's ProCurve Business Unit, Vice Chair of the IEEE 802.1 committee, Technical Advisor for the IETF RADIUS Extensions Working Group and Chair of the Wireless and Mobile Working Group in the Open Networking Foundation.

5. I was recently the Chair of the IEEE 802.1 Maintenance Task Group and am currently an Architect and Technical Editor for the Ultra Ethernet Consortium of the Linux Foundation.

6. In 2013, I co-founded Tallac Networks, Inc. and serve as its Chief Technology Officer. At Tallac Networks, I am responsible for innovation, technical direction and the implementation of the company's contributions in remote site automation, wireless, switching and Software Defined Networking.

7. I am the owner and founder of Congdon Consulting, LLC and. As owner of Congdon Consulting, I provide consulting services for the computer networking and associated industries.

8. In my 36 years in the networking industry, I have become widely known as an inventor, developer, spokesperson and leader in driving the networking industry.

9. In addition to my professional experience. I am the co-inventor of the commonly used TCP checksum offload, a hardware approach for accelerating the

networking performance of TCP/IP within servers.

10. Additionally, I am familiar with and can read the following computer coding languages: C, C++, C#, Java, Java Script, Ruby, Verilog, VHDL. I read and have written code in these languages for the last 35 years.

11. I am a named inventor on 27 patents in the fields of Computer Networking.

12. I have prepared this Declaration as an expert witness retained by NetSocket, Inc. In this Declaration, I provide my opinions as to whether the Challenged Claims of U.S. Patent No. 7,190,698 (the “’698 Patent”) are valid. I provide technical bases for these opinions as appropriate.

13. This Declaration contains statements of my opinions formed to date and the bases and reasons for those opinions. I may offer additional opinions based on further review of the materials in this proceeding, including opinions and/or testimony of other expert witnesses.

## **II. MATERIALS CONSIDERED**

14. The materials I considered include the ’698 patent and the prosecution history for the ’698 Patent. I also considered the materials that I refer to and that I cite in this declaration.

15. I also considered all papers and exhibits filed in IPR2023-00607 including the petition (“Pet.”) and the declaration of Dr. Henry H. Houh.

16. I have also considered the Board's Decision on Institution (IPR2023-00607, Paper 11) ("Inst.") in this proceeding.

17. I have also considered any exhibits attached to the Patent Owner's Response in this proceeding, including the deposition transcript of Dr. Henry H. Houh.

18. In addition, I have drawn on my experience and knowledge, as discussed above and described more fully in my CV.

### **III. LEGAL PRINCIPLES**

19. I understand that a patent claim is unpatentable as "obvious" if the subject matter of the claim as a whole would have been obvious to a person of ordinary skill in the art as of the time of the invention at issue.

20. I understand that the use of the "person of ordinary skill" rubric is to prevent one from improperly, in the present day, using hindsight to decide whether a claim is obvious.

21. I understand that the following factors must be 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 the scope of the patent claim and the scope of the prior art; and (3) the level of ordinary skill in the art at the time of the invention.

22. I understand that, unlike anticipation, which allows consideration of

only one item of prior art, obviousness may be shown by considering more than one item of prior art. I understand that, when considering a combination of prior art references as part of an obviousness analysis, it can be important to ascertain if the references are from the same field of endeavor and also to ascertain whether there is any reason that would have prompted a person of ordinary skill in the relevant art to combine the elements in the way the claim does. In other words, a claim generally cannot be rendered obvious by combining (i) art from across different fields, including outside the field of the claimed invention, or (ii) art that itself teaches away from combination with other art that would otherwise provide its missing limitations, or (iii) art for which there is not at least an articulable, common sense reason to bridge the gap between its disclosure and the claim at issue.

23. Moreover, I understand that so-called “objective indicia of nonobviousness,” also known as “secondary considerations,” are also to be considered when assessing obviousness. I understand that this objective evidence includes at least: the commercial success of the invention; the long felt but unresolved need to develop the invention; any praise of the invention in the market; and copying by others. I also understand that evidence of objective indicia of non-obviousness must be commensurate in scope with the claimed subject matter; *i.e.*, that there must be a nexus or connection between the criteria and the claim itself.

24. I understand that the disclosure of an asserted prior art reference must

provide an enabling disclosure of the desired subject matter and that mere naming or description of the subject matter is insufficient; to be enabling, I understand that it must be able to be produced without undue experimentation.

25. I understand that I must construe a claim in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and consistent with the prosecution history pertaining to the patent.

#### **IV. LEVEL OF ORDINARY SKILL IN THE ART**

26. I understand that I should perform my analysis from the viewpoint of a person of ordinary skill in the art. I understand that this hypothetical person of ordinary skill in the art is considered to have the normal skills of a person in a certain technical field. I understand that factors that may be considered in determining the level of ordinary skill in the art include: (1) the education level of the inventor; (2) the types of problems encountered in the art; (3) the prior art solutions to those problems; (4) rapidity with which innovations are made; (5) the sophistication of the technology; and (6) the education level of active workers in the field.

27. I understand that, in its Preliminary Response, Patent Owner utilized Petitioner's proposed level of skill in the art— a person of ordinary skill in the art ("POSITA") would have had "a bachelor's degree in computer science, computer engineering, electrical engineering, or an equivalent, and two years of experience working in the field of network communications" and that "[a]dditional work

experience can substitute for specific educational background, and vice versa.” Pet. at 10.

28. My qualifications and experience exceed those of a person of ordinary skill in the art. Nonetheless, my analysis and opinions herein regarding the ’698 patent are given from the perspective of a person of ordinary skill in the art.

## **V. CLAIM CONSTRUCTION**

29. I have been informed by Counsel that, for purposes of my analysis in this *inter partes* review proceeding, claim terms should be given their ordinary and customary meaning within the context of the patent in which the terms are used, *i.e.*, the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention in light of what the patent teaches, unless it appears that the inventors were using them to mean something else. Additionally, the specification and prosecution history must be consulted to confirm whether the patentee has acted as his/her own lexicographer (*i.e.*, provided special meaning to any disputed terms), or intentionally disclaimed, disavowed, or surrendered any claim scope).

30. I have further been informed by Counsel that a person of ordinary skill in the art is deemed to read a claim term not only in the context of the particular claim in which the disputed term appears, but also in the context of the entire patent, including the specification and the prosecution history. The prosecution file history

provides evidence of how both the Patent Office and the inventors understood the terms of the patent, particularly in light of what was known in the prior art. Further, where the specification describes a claim term broadly, arguments and amendments made during prosecution may require a more narrow interpretation. For these reasons, the words of the claim must be interpreted in view of, and be consistent with, the entire specification. The specification is the primary basis for construing the claims and provides a safeguard such that correct constructions closely align with the specification. Ultimately, the interpretation to be given a term can only be determined and confirmed with a full understanding of what the inventors actually invented and intended to envelop with the claim as set forth in the patent itself.

31. I have further been informed by Counsel that, to determine how a person of ordinary skill would understand a claim term, one should look to those sources available that show what a person of skill in the art would have understood disputed claim language to mean. Such sources include the words of the claims themselves, the remainder of the patent's specification, the prosecution history of the patent (all considered "intrinsic" evidence), and "extrinsic" evidence concerning relevant scientific principles, the meaning of technical terms, and the state of the art. I understand that one looks primarily to the intrinsic patent evidence, but extrinsic evidence may also be useful in interpreting patent claims when the intrinsic evidence itself is insufficient. Additionally, the context in which a term is used in the Asserted

Claims can be highly instructive. Likewise, other claims of the patent in question, both asserted and not asserted, can inform the meaning of a claim term. For example, because claim terms are normally used consistently throughout the patent, the usage of a term in one claim can often illuminate the meaning of the same term in other claims. Differences among claims can also be a useful guide in understanding the meaning of particular claim terms.

32. I have further been informed by Counsel that, while intrinsic evidence is of primary importance, extrinsic evidence, *e.g.*, all evidence external to the patent and prosecution history, including expert and inventor testimony, dictionaries, and learned treatises, can also be considered. For example, technical dictionaries may help one better understand the underlying technology and the way in which one of skill in the art might use the claim terms. Extrinsic evidence should not be considered, however, divorced from the context of the intrinsic evidence. Evidence beyond the patent specification, prosecution history, and other claims in the patent should not be relied upon unless the claim language is ambiguous in light of these intrinsic sources. Furthermore, while extrinsic evidence can shed useful light on the relevant art, it is less significant than the intrinsic record in determining the legally operative meaning of claim language.

33. I have been asked to provide my opinion on whether the preamble of Claim 1 of the '698 Patent should be construed as limiting and whether a person of

ordinary skill in the art would have found Petitioner's proposed construction of "bandwidth broker" necessary and/or accurate.

34. In my opinion, a person of ordinary skill in the art would have found that several terms in the preamble of Claim 1 are essential to understanding those limitations within Claim 1 and its dependent claims. As an example, Claim 1's preamble recites "wherein at least one domain is a Multiprotocol Label Switching MPLS domain," while Claim 2 adds "if said domains comprise at least one Differentiated Services, DiffServ, domain" in addition to the MPLS domain of Claim 1. Similarly, Claim 3 also recites "said domains comprise at least one Differentiated Services, DiffServ, domain and one Multiprotocol Label Switching, MPLS, domain." Each of Claim 2 and Claim 3 are dependent on Claim 1 precisely because they describe multi-domain systems adding a method with a DiffServ domain to Claim 1's method that already includes an MPLS domain. Additionally, Claim 1 recites that a "bandwidth broker (BB) is associated to each network domain." In my opinion, a person of ordinary skill in the art would find this limitation in the preamble essential to understanding Claim 1's subsequent limitations that "BB<sub>A</sub> establishes the different domains involved to reach the destination network (DST)," "BB<sub>A</sub> directly or indirectly passes requests to all Bandwidth Brokers (BB) of the involved domains regarding a VLL of the predefined QoS from ingress to egress of each domain," and "each involved bandwidth broker

(BB) performs admission control in its domain” because each of these limitations refers to the preamble’s statement that there is a bandwidth broker associated with each of the network domains involved in the path from source to destination networks.

35. In view of the several examples where Claim 1 itself and its dependent claims rely on phrases within the preamble that are essential for understanding those subsequent limitations in Claim 1 and its dependent claims, in my opinion, a person of ordinary skill in the art would understand the preamble of Claim 1 to be limiting.

36. I note that the Board held that Petitioner’s construction for “bandwidth broker” was not necessary. Inst. at 12-13. A person of ordinary skill in the art would have understood that the claim language sufficiently renders redundant Petitioner’s construction that the “bandwidth broker” “is an entity in a network domain” that “manages policies for bandwidth resources,” “maintain[s] resource information, provid[es] admission control, configur[es] the network, or communicat[es] with neighboring bandwidth brokers to allocate resources across multiple domains.” Pet. at 11. For example, Claim 1 already recites that “the bandwidth broker (BB) is associated to each network domain” “the bandwidth broker (BB) is configured to control a hierarchical routing domain,” “each involved bandwidth broker (BB) performs admission control in its domain,” and “each involved bandwidth broker (BB) returns a result of the admission control.” ’698 Patent, Claim 1.

## **VI. ANY COMBINATION OF XIAO, SCHELEN-1, GIBSON, AND SCHELEN-2 DOES NOT RENDER CLAIMS 1-8 OBVIOUS**

### **A. Ground 1: The Combination of Xiao, Schelen-1, and Gibson Does Not Render Claims 1-5 and 7-8 Obvious**

#### **1. The Combination of Xiao, Schelen-1, and Gibson Does Not Render Obvious “*Method in a packet based communication network including network domains, wherein at least one domain is a Multiprotocol Label Switching MPLS domain, to establish a virtual leased line, VLL, between a source (SRC) and a destination (DST) in different domains in order to achieve packet transfer between the source (SRC) and the destination (DST),*” as Required by Claim 1**

37. As described above, the preamble should be construed as limiting. Therefore, I understand that Claim 1 requires “wherein at least one domain is a Multiprotocol Label Switching MPLS domain.” Section V.

38. I note that Petitioner relies on only Xiao to disclose the limitation of “a packet based communication network including network domains, wherein at least one domain is a Multiprotocol Label Switching MPLS domain, to establish a virtual leased line, VLL, between a source (SRC) and a destination (DST) in different domains in order to achieve packet transfer between the source (SRC) and the destination (DST).” Pet. at 19-28. However, in my opinion, Petitioner’s basis for Xiao disclosing this limitation is entirely misleading because it relies on simply labeling a modified version of Fig. 4 with “MPLS domain” (Pet. at 23, 27) despite the fact that Fig. 4 is obviously under Xiao’s heading of “Differentiated Services,”

also known as DiffServ. Ex. 1005, at 10-13. I note that Petitioner's expert acknowledges that Fig. 4 is directed to a DiffServ system rather than an MPLS system:

Q. Could you turn to PDF page 3 of Xiao? Let me know when you're there.

A. Page 3, yes.

Q. Do you see the heading Differentiated Services?

A. Yes.

Q. And under that heading do you see that Xiao abbreviates Differentiated Services as DS?

A. Yes.

Q. Differentiated Services is also referred to as DiffServ, correct?

A. Yes.

Q. Figures 2 to 4 are described under this heading of Differentiated Services, correct?

A. That does appear to be the case in this discussion of -- in that section in Xiao.

Q. Is it your understanding that Figures 2 to 4 describe examples of DiffServ-based architecture?

...

A. Well, I think those figures do appear in the section with the heading, you know, in the section Differentiated Services.

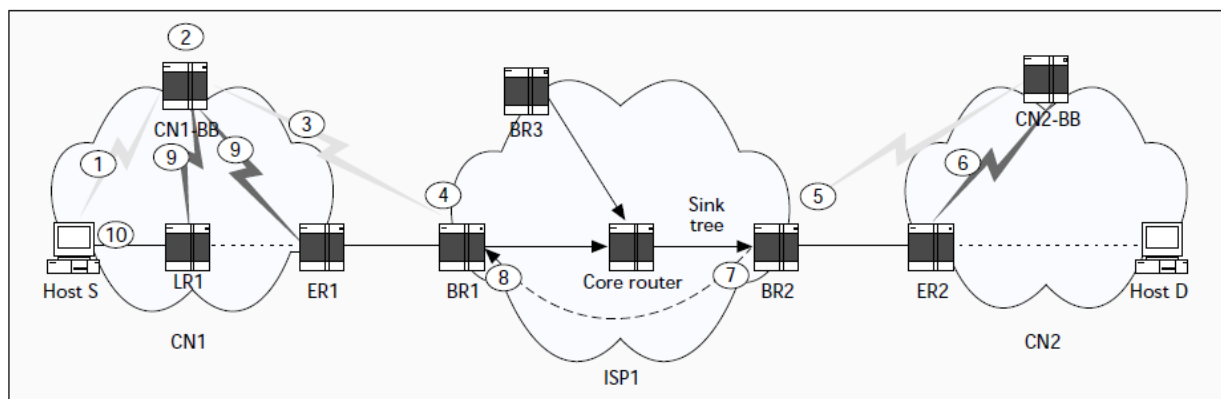
Q. Therefore, is it your understanding that Figures 2 to 4 describe examples of DiffServ-based architecture since they appear in this section with the heading Differentiated Services?

A. I mean, while they're discussing some processes, generally, and I think they are in the context of the section with the main -- with a higher level heading Differentiated

Services, and they're giving examples of certain things that happen.

Ex. 2003, 38:6-40:2.

39. In my opinion, a person of ordinary skill in the art would therefore not look to Fig. 4 to disclose an MPLS system, particularly when there is a separate section in Xiao titled MPLS, which has a sole graphical representation marked Fig. 5 that is captioned “The signaling process of dynamic premium service *in an MPLS architecture.*” Ex. 1005, at 13-14.



■ Figure 5. The signaling process of dynamic premium service in an MPLS-based architecture.

Ex. 1005, Fig. 5.

40. I note that Petitioner’s expert also acknowledges that Fig. 5 is explicitly an MPLS-based architecture:

Q. And Figure 5 of Xiao shows a MPLS-based architecture, correct?

A. Well, the discussion doesn't include the discussion of label switch paths, the discussion of Figure 5.

Q. Do you see the label underneath Figure 5 that says, "The signalling process of dynamic premium service in a MPLS-based architecture"?

A. Yes.

Q. So Figure 5 shows a MPLS-based architecture, right?

A. This is an example of one, one such MPLS-based architecture that's being discussed in the paper.

Ex. 2003, 37:15-38:5. As noted below, Fig. 5 does not show bandwidth brokers in each network domain of Fig. 5 in contravention of Claim 1. Section VI.A.2.

41. Because a person of ordinary skill in the art would not look to Xiao's Fig. 4 or be motivated to manufacture Petitioner's arbitrary edits to Xiao's Fig. 4, in my opinion, the combination of Xiao, Schelen-1, and Gibson cannot render Claim 1 obvious.

**2. The Combination of Xiao, Schelen-1, and Gibson Does Not Render Obvious “*wherein the bandwidth broker (BB) is associated to each network domain and the bandwidth broker (BB) is configured to control a hierarchical routing domain,*” as Required by Claim 1**

42. As described above in Section V, the preamble should be construed as limiting, which I understand to mean that Claim 1 requires “wherein the<sup>1</sup> bandwidth broker (BB) is associated to each network domain.” Coupled with the rest of Claim 1's preamble, “wherein at least one domain is a Multiprotocol Label Switching MPLS domain,” a person of ordinary skill in the art would understand that Claim 1 requires that a bandwidth broker is associated to each network domain and at least

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<sup>1</sup> Petitioner correctly notes that this language should be addressed as “a bandwidth broker.” Pet. at 28, n. 3.

one of those network domains is an MPLS domain that also has a bandwidth broker associated to it.

43. As noted above, Fig. 5 is the only graphic representation of MPLS in Xiao. Section VI.A.1. Moreover, a person of ordinary skill in the art would understand that Xiao does not disclose a bandwidth broker associated each domain in an MPLS architecture, as confirmed by Petitioner's expert:

Q. So the example shown in Figure 5 does not show a bandwidth broker in Internet Service Provider 1, correct?

A. That's what *the discussion of Figure 5 is -- is saying. This is the case where there is not a bandwidth broker in the ISP* but there are clearly examples earlier where there are bandwidth brokers in the ISP in Xiao.

Ex. 2003, 37:6-14. I note that Petitioner's expert mentions that only the "examples earlier" related to DiffServ architectures disclose bandwidth brokers in each network domain. Ex. 2003, 37:6-14. In fact, a person of ordinary skill in the art would understand that Xiao teaches away from this claim limitation. A person of ordinary skill in the art would further understand that Xiao describes that the major difference between MPLS-based architectures and DiffServ-based architectures to be that "the MPLS effect is confined within the ISPs that use MPLS." Ex. 1005, at 14. Xiao further describes this difference in ISPs has consequences as to whether bandwidth brokers are required in Xiao's ISPs that use MPLS:

[S]ince LSPs are configured within the ISPs, resource requests can easily be hidden from the core routers by tunneling them from the ingress routers to the egress

routers. Therefore, BBs may not be needed in MPLS-based ISP networks. Admission control is done in a distributed fashion by the ingress and egress routers.

Without BBs in the ISP networks, the signaling process for dynamic SLAs is slightly different from the one described earlier. It is depicted in Fig. 5 and described below.

Ex. 1005, at 14. I note that Petitioner's only rebuttal to the explicit statement that "BBs may not be needed in MPLS-based ISP networks," is to cite to inapposite statements made in the DiffServ section of Xiao, which confirms that Fig. 4 was referring to a DiffServ architecture, where bandwidth brokers in each network domain are encouraged. Pet. at 28-29. In my opinion, Xiao's mention of an ISP1-BB does not negate the fact that Xiao chose exemplary Fig. 5 of an MPLS-based architecture to have no bandwidth broker in the ISP and therefore expressed a preference for such an embodiment with no bandwidth broker. Provided with such a preference, it is my opinion that a person of skill in the art at the time of the invention of the '698 Patent would not have opted to add a bandwidth broker as an unnecessary component in an ISP network domain.

44. In my opinion, Petitioner's cites to Schelen-1 and Gibson are inapposite. A person of ordinary skill in the art would have understood that Schelen-1 does not even mention an MPLS-based architecture while Gibson does not disclose any relationship between its "admission managers" and their associations with network domains. Ex. 1032 and Ex. 1006. As a result, it is my opinion that there

would be no motivation to combine Xiao with either Schelen-1 or Gibson to obviate this claim limitation.

45. For the reasons noted above, it is my opinion that the combination of Xiao, Schelen-1, and Gibson cannot render Claim 1 obvious.

**3. The Combination of Xiao, Schelen-1, and Gibson Does Not Render Obvious “ii) *BB<sub>A</sub> establishes the different domains involved to reach the destination network (DST)*,” as Required by Claim 1**

46. Since Petitioner fails to show how the combination of Xiao, Schelen-1, and Gibson discloses, teaches, or suggests “wherein the bandwidth broker (BB) is associated to each network domain,” it is my opinion that it therefore cannot disclose, teach, or suggest “BB<sub>A</sub> establishes the different domains involved to reach the destination network (DST).” Sections VI.A.1 and VI.A.2.

47. In my opinion, Schelen-1 does not remedy the deficiencies of Xiao. As a preliminary matter, a person of ordinary skill in the art would understand that Schelen-1 does not describe that one bandwidth broker, BB<sub>A</sub> “establishes the different domains involved to reach the destination network (DST)” but that every reservation agent in Schelen-1 must work **together**:

“Such reservation agents advertize [sic] themselves periodically on a well known multicast address, giving their identity and which routing domain (AS) they are responsible for. By listening to this well known multicast address, each top level agent will know the existence of all other top level agents.”

Ex. 1032, at 452.

48. Additionally, a person of ordinary skill in the art would understand that Schelen-1's disclosure of the knowledge of other bandwidth brokers' existence does not mean any bandwidth broker "establishes the different domains involved to reach the destination network (DST)":

Q. Is it your understanding that the process of discovery of other top level agents is different than the process of determining the domains involved for a request to reach a destination network?

...

A. Well, I think by definition your description of the processes are different. And, you know, in your question you describe different -- two different things. And *Schelen is describing, you know, one, the ability for the reservation agents or bandwidth brokers to know and find out about all the other domains and the bandwidth brokers. That's -- that is different than actually passing a request to bandwidth brokers of the involved domains regarding, you know, any sort of setup request*, because you would need the information, you know, of all the other domains in order to pass the request to the appropriate domains.

Ex. 2003, 51:18-52:15.

49. Therefore, in my opinion, Claim 1 is not rendered obvious by the combination of Xiao, Schelen-1, and Gibson.

**4. The Combination of Xiao, Schelen-1, and Gibson Does Not Render Obvious "iii) *BB<sub>A</sub> directly or indirectly passes requests to all Bandwidth Brokers (BB) of the involved domains regarding a VLL of the predefined QoS from ingress to egress of each domain,*" as Required by Claim 1**

50. Since Petitioner fails to show how the combination of Xiao, Schelen-1, and Gibson discloses, teaches, or suggests “wherein the bandwidth broker (BB) is associated to each network domain,” it is my opinion that it therefore cannot disclose, teach, or suggest “BB<sub>A</sub> directly or indirectly passes requests to *all Bandwidth Brokers* (BB) of the involved domains.” Section VI.A.2.

51. Therefore, it is my opinion that Claim 1 is not rendered obvious by the combination of Xiao, Schelen-1, and Gibson.

**5. The Combination of Xiao, Schelen-1, and Gibson  
Does Not Render Obvious “iv) each involved  
bandwidth broker (BB) performs admission control in  
its domain,” as Required by Claim 1**

52. Since Petitioner fails to show how the combination of Xiao, Schelen-1, and Gibson discloses, teaches, or suggests “wherein the bandwidth broker (BB) is associated to each network domain,” it is my opinion that it therefore cannot disclose, teach, or suggest “iv) each involved bandwidth broker (BB) performs admission control in its domain.” Section VI.A.2.

53. Particularly, Xiao teaches that, for its MPLS-based architecture, its bandwidth brokers are differentiated from its ingress and egress routers,<sup>2</sup> because it

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<sup>2</sup> While a person of ordinary skill in the art would have understood that a bandwidth broker can be structured as a router or software implemented within a router (including within an ingress or egress router), a person of ordinary skill in the art would also have understood that the MPLS-architecture system of Xiao precludes such options in view of its clear distinction between routers and bandwidth brokers in its disclosed system and Fig. 5. Ex. 1005, at 14.

simultaneously discloses that “[a]dmission control is done in a distributed fashion by the ingress and egress routers” and that “BBs may not be needed.” Ex. 1005, at 14. Therefore, a person of ordinary skill in the art would have understood that Xiao does not disclose “each involved bandwidth broker (BB)” performing admission control.

54. For these reasons, Claim 1 is not rendered obvious by the combination of Xiao, Schelen-1, and Gibson.

**6. The Combination of Xiao, Schelen-1, and Gibson Does Not Render Obvious “v) *each involved bandwidth broker (BB) returns a result of the admission control to BB<sub>A</sub> that passes it back to the requesting entity and if the request was admitted along all domains between the source (SRC) and the destination (DST) a VLL of the predefined QoS is granted,*” as Required by Claim 1**

55. I note that Petitioner only relies on Xiao to obviate this claim limitation. Pet. at 51-53.

56. Since Petitioner fails to show how the combination of Xiao, Schelen-1, and Gibson discloses, teaches, or suggests “wherein the bandwidth broker (BB) is associated to each network domain,” or “iv) each involved bandwidth broker (BB) performs admission control in its domain” it is my opinion that it therefore cannot disclose, teach, or suggest “*each involved bandwidth broker (BB) returns a result of the admission control* to BB<sub>A</sub> that passes it back to the requesting entity and *if the request was admitted along all domains* between the source (SRC) and the

destination (DST) a VLL of the predefined QoS is granted.” Sections VI.A.2 and Section VI.A.5.

57. Therefore, it is my opinion that Claim 1 is not rendered obvious by the combination of Xiao, Schelen-1, and Gibson.

**7. The Combination of Xiao, Schelen-1, and Gibson Does Not Render Obvious “*characterized in that step iv) comprises the following step: performing [LSP] Label Switched Path, LSP setup*” as Required by Claim 1.**

58. Since Petitioner fails to show how the combination of Xiao, Schelen-1, and Gibson discloses, teaches, or suggests either “*iv) each involved **bandwidth broker (BB) performs admission control** in its domain,*” it is my opinion that it therefore cannot disclose, teach, or suggest “characterized in that *step iv) comprises the following step: performing [LSP] Label Switched Path, LSP setup.*” Sections VI.A.5.

59. In addition to its reliance on Xiao, I note that Petitioner also incorrectly asserts that Gibson’s “admission manager corresponds to a ‘bandwidth broker.’” Pet. at 54. However, a person of ordinary skill in the art would not have understood admission managers to correspond to bandwidth brokers because they do not perform any of the exemplary activities of a bandwidth broker described in the ’698 Patent, such as “configuring the network to meet [] granted policies.” ’698 Patent, 2:48-54.

60. Further, a person of ordinary skill in the art would have understood that Gibson's admission manager does not perform LSP setup or requests LSPs across the MPLS network. In my opinion, Gibson is clear that its Administrative Server has an interface that is used to request new high capacity LSPs:

The Administrative Server 35 has a COPS interface to all the admission managers at the edge of the network. ***This interface is used*** by those admission managers ***to request new high capacity label Switch paths across the MPLS network***, or to request a change in the capacity of an existing LSP.

Ex. 1006, 8:49-54.

FIG.2 shows the process of requesting a new LSP. Either an Endpoint 10 or an Admission Manager 35 issues a request for a new route between two Abstract Nodes 12, 13 in the MPLS network. This is responded to by the Administrative Server, with the acceptance situation being illustrated in FIG. 2. ***The Administrative Server now signals to one of the specified abstract nodes AN1, 12 that it should set-up a path*** to the other abstract node AN2, 13. In the case that the abstract nodes represent a group of label switch routers, the administrative server specifies a particular label switch router within each abstract node.

Ex. 1006, 8:55-65. I note that Petitioner's expert confirms that either an endpoint or Gibson's admission server issues a request for a new route between abstract nodes but Gibson's administrative server responds to set up paths:

Q. So this section in Figure 2 show an admission manager requests LSPs from an administrative server, correct?

A. Well, it says ***either an endpoint or admission manager issues a request***, and that -- that in this example this is

*responded to by the administrative server*, but it does so by further signalling other devices.

Ex. 2003, 62:5-13. As a result, assuming that Petitioner was correct that Gibson's admission managers corresponded to the claimed bandwidth brokers (they do not), in my opinion, Gibson contradicts the claim limitation since its "bandwidth brokers" do not perform LSP setup or setup any paths.

61. In my opinion, a person of ordinary skill in the art would also not be motivated to combine Gibson with any other reference to reach this claim limitation of Claim 1 of the '698 Patent because Gibson's description of pre-determined high capacity paths contradicts the LSP path set up of the '698 Patent:

The communications network has an overlay network of high capacity paths established on it. By arranging for communication sessions to preferably be established using these *pre-determined high capacity paths* the complexity of the topology information required is reduced.

Ex. 1006, Abstract.

62. A person of ordinary skill in the art would have understood that Gibson's "pre-determined high capacity paths" are inconsistent with claim language in claim 1 requiring "Label Switch Path, LSP, *Setup*." In contrast to Gibson, a person of ordinary skill in the art would have understood that the '698 patent's objective is to achieve dynamic allocation of the best path within the MPLS domain at runtime using communication:

Simultaneously BB performs path sensitive admission control according to layer 3 routing from the SRC ingress router to the domain B egress router. This is achieved by ***looking up the path through domain A and evaluating the resource availability on each link in the path.***

'698 Patent, 7:45-50. A person of ordinary skill in the art would have further understood that Claim 1's LSP setup is performed by a bandwidth broker evaluating resource availability on each link in the path instead of Gibson's communication through "pre-determined high capacity paths." A person of ordinary skill in the art would have also understood that pre-defined path does not require path setup by a bandwidth broker.

63. Therefore, it is my opinion that Claim 1 is not rendered obvious by the combination of Xiao, Schelen-1, and Gibson.

**8. The Combination of Xiao, Schelen-1, and Gibson Does Not Render Obvious "*passing resource requests from the Bandwidth Broker (BB) to at least one intra-domain (IDB), wherein each intra-domain broker (IDB) is responsible for admission control and the Label Switched Path, LSP, setup,*" as Required by Claim 1.**

64. I note that Petitioner relies only on Gibson to obviate this claim limitation. Pet. at 56-70.

65. Petitioner fails to show how the combination of Xiao, Schelen-1, and Gibson discloses, teaches, or suggests either "*iv) each involved bandwidth broker (BB) performs admission control* in its domain," or "performing [LSP] Label

Switched Path, LSP setup,” it is my opinion that it therefore cannot disclose, teach, or suggest “characterized in that *step iv*) comprises the following step:...” or “*wherein each intra-domain broker (IDB) is responsible for admission control and the Label Switched Path, LSP, setup.*” Sections VI.A.5 and VI.A.7.

66. I note that Petitioner incorrectly alleges that “[t]he administrative server together with one or more connection manager, corresponds to “*at least one intra-domain (IDB).*” Pet. at 57. However, a person of ordinary skill in the art would have understood that Gibson’s administrative server cannot be an intra-domain broker since “[t]he Administrative Server 35 has a COPS interface to all the admission managers at the edge of the network.” Ex. 1006, 8:49-50. A person of ordinary skill in the art would understand Gibson’s administrative server to correspond to multiple domains. However, a person of ordinary skill in the art would also understand that the claimed “intra-domain” to “be understood in the plain and ordinary meaning of that term, where “intra” refers to within.” Ex. 2003, 65:2-8. Therefore, in my opinion, Gibson’s administrative server cannot be an intra-domain broker since it corresponds to multiple domains.

67. Therefore, in my opinion, Claim 1 is not rendered obvious by the combination of Xiao, Schelen-1, and Gibson.

#### **9. The Combination of Xiao, Schelen-1, and Gibson Does Not Render Obvious Claims 2-5 and 7-8**

68. Claims 2-5 and 7-8 depend upon Claim 1, and for at least the same

reasons as Claim 1, in my opinion, any combination of Xiao, Schelen-1, and Gibson fails to obviate Claims 2-5 and 7-8.

**B. Ground 2: The Combination of Xiao, Schelen-1, Gibson, and Schelen-2 Does Not Render Claims 4-8 Obvious**

**1. The Combination of Xiao, Schelen-1, Gibson, and Schelen-2 Does Not Render Obvious Claims 4-8**

69. I note that Petitioner's Ground 2 relies exclusively on the combination of Schelen-2 with "Xiao's bandwidth broker" that Petitioner had described already in Ground 1. Pet. at 76-82. Therefore for at least the same reasons as described in Ground 1 with respect to Xiao, in my opinion, any combination of Xiao and Schelen-2 fails to obviate Claims 4-8.

**2. The Combination of Xiao, Schelen-1, Gibson, and Schelen-2 Does Not Render Obvious "*Method according to claim 4, characterized in that the bandwidth broker (BB) comprises a data structure which keeps resource usage information over time for each link in the topology which enables ability to plan ahead of time,*" as Required by Claim 6**

70. I note that Petitioner only relies on Schelen-2 to obviate this limitation. Pet. at 78-79.

71. Specifically, I note that Petitioner incorrectly asserts that Schelen-2's description of "maintain[ing] information about reserved resources on each link in its domain" obviates the claimed limitation. Pet. at 78-79. However, a person of ordinary skill in the art would understand that Schelen-2's "maintain[ed] information about *reserved* resources" does not imply or correlate to "resource *usage*

information” or “*used* resource information”:

Q. Based on your understanding of Schelen-2, does a reserved resource necessarily imply that a resource is used?

A. ... I think what [Schelen-2 is] generally saying is that, you know -- like, if I make a reservation at a restaurant, I might not show up, or I might make a reservation for 12 but 11 people show up, and so I'm not using the full reservation. I don't think -- I don't think Schelen is implying that -- that every request generates the full reservation, the full requested data for the entire time of any request. I don't -- I don't think -- I haven't seen in Schelen-2 where it's saying that.

Ex. 2003, 74:9-75:25. A person of ordinary skill in the art would understand that prior usage information can be used as an indicator of future usage and enable the ability to reserve or “plan” resources accordingly “ahead of time.” In my opinion, a person of ordinary skill in the art would understand that maintaining only information about reserved resources removes that ability.

72. Moreover, I note that Petitioner cites to nothing in Schelen-2 that would indicate a data structure that maintains information about *used* resources over time but only reserved resources at a given time. Ex. 1007, 215 (“[W]e focus on agent-based admission control where the objective is to administer resources exactly, i.e., admission control in an agent maintains information about reserved resources on each link in its domain). A person of ordinary skill in the art would have understood that the only data structures disclosed in Schelen-2 are “data structures that manage

reservations efficiently and allow quick admission control,” “[a] data structure keeps exact starting times and finishing times for each admission request,” and “[a] data structure has fixed size and depends only on the maximum bookahead time allowed and the slot length.” Ex. 1007, 221. A person of ordinary skill in the art would further understand that none of these disclosed data structures in Schelen-2 store resource usage information over a period of time for each link in the topology, as Claim 6 requires.

73. Therefore, in my opinion, Claim 6 is not rendered obvious by the combination of Xiao, Schelen-1, Gibson, and Schelen-2.

## **VII. SUMMARY OF OPINIONS**

74. It is my opinion that the Board should confirm the validity of the challenged claims. I reserve the right to supplement my opinions in response to any additional contentions by Petitioner or opinions by Dr. Henry H. Houh, and as the Board permits.

75. I 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; and further that these statements were made with knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Executed on January 10th, 2024 in College Park, Maryland.

A handwritten signature in black ink, reading "Paul Congdon". The signature is written in a cursive style with a large initial "P".

---

Dr. Paul Congdon

# EXHIBIT A

# Paul Congdon

[paul.congdon@outlook.com](mailto:paul.congdon@outlook.com)

## Work Experience

### **Congdon Consulting, LLC, Granite Bay, CA**

**10/20 – present**

*Owner - Principal Consultant*

Provide consulting services for computer networking and associated industries. Primary services include leading industry standards development activities and organizations, corporate technical strategy creation and evaluation, advisory board participation, intellectual property assessment, technical training delivery, public speaking, and analyst relations. Recently consulted with a large international networking vendor to lead data center networking initiatives as editor of IEEE P802.1Qcz (Congestion Isolation) and Maintenance Task Group Chair of the IEEE 802.1 Working Group. Currently providing subject matter expert services, intellectual property analysis and editor/architect services for the Technical Advisory Committee of the Ultra Ethernet Consortium hosted by the Linux Foundation.

### **Tallac Networks, Rocklin, CA**

**3/13 –present**

*Co-Founder – Chief Technology Officer*

Responsible for the technical strategy, vision and creation of a start-up company defining the Software Defined Local Area Network (SD-LAN) and Software Defined Branch (SD-Branch) movements. Engaged a network of resources and industry contacts to build a boot-strap business that blends revenue from products, cloud-based services, consulting, technical training, and the development of intellectual property. Created a strategy and solution for Software Defined Mobility that enables managed service providers to offer multi-tenant WiFi services. Designing, developing, and implementing key components of the Software Defined LAN solution incorporating software on IEEE 802.11ac enterprise class access points, gigabit Ethernet switches, gateways/routers and cloud-based management systems. Individually developed complete cloud-based captive portal web-service based on Ruby on Rails and a portable embedded software agent currently supporting over 1 million captive portal sessions. Previously led industry activities as Chair of the Open Networking Forum Wireless and Mobility Working.

### **HPLabs Network Communications Lab**

#### **Hewlett Packard, Palo Alto, CA**

**3/11 –2/13**

*HP Fellow - Research Manager*

Responsible for the vision, creation and execution of HP's research agenda around Wireless, Mobility and Software Defined Networking. Hired and built a team of world-class researchers responsible for key innovative technologies that transfer into HP's client devices, networking products and enterprise services. Researched and delivered technology involving small cell in-building localization, HotSpot 2.0, mobile virtualization and mobile cloud. In the first year, the world wide team published 10 top tier conference and journal papers and filed 22 US patents. Supported 8 university and government collaborations involving Mobility and participated on numerous conference TPCs and workshop panels.

### **ProCurve Networking Business**

#### **Hewlett Packard, Roseville, CA**

**2/02 – 3/11**

*ProCurve Chief Technologist – HP Fellow*

Provided technical leadership, spokesman-ship, vision and innovation in Hewlett Packard's ProCurve Networking Business. As a member of the executive management team, drove the business into the number two market position for L2-L7 Ethernet networking. Responsible for all aspects of the security business within ProCurve. Evaluated and execute new business opportunities for mobility, security and convergence solutions. Delivered technical guidance to a team of 34 cross discipline architects and over 250 development engineers. Worked as Vice Chair for the IEEE 802.1 standards body. Directed the development of the IEEE 802.1AB standard for Link Layer Connectivity Discovery and improvements to IEEE 802.1X Port Based Access Control.

### **Network Infrastructure Solutions, Network Storage Organization**

#### **Hewlett Packard, Roseville, CA**

**2/00 – 1/02**

*Chief Architect*

Defined the architecture and technical requirements for Hewlett Packard's Storage over Ethernet solution. Led a worldwide development team in the creation of a Linux based iSCSI gateway and iSCSI interfaces for HP storage arrays and tape libraries. Participated in the development of the IETF standard for iSCSI. Worked across all

Hewlett Packard storage and research organizations to architect future converged storage controller incorporating InfiniBand, iSCSI/TCP/IP acceleration engines, RAID processors, storage applications and NAS engines.

**Workgroup Networks Division**

**Hewlett Packard, Roseville, CA**

**2/96 – 1/00**

*Chief Architect - 64TC*

Responsible for setting the technical direction of HP's ProCurve Ethernet LAN business. Led the investigation and definition of ProCurve L2/L3/L4 Ethernet switch architecture. Worked with product marketing to define and communicate key features of new architectures. Provided leadership and coordination to a team of 12 cross discipline architects. Communicated technical vision and direction to valued customers through the support of *big deals* and public speaking opportunities. Represented Hewlett Packard and established an influential position within the IEEE 802.1 standards committee. Brought forth and evaluated new business opportunities with industry partners and other HP entities.

**Roseville Networks Division - Interconnected Workgroups**

**Hewlett Packard, Roseville, CA**

**8/93 - 2/96**

*Platform Architect - 62TC*

Responsible for the investigation, architecture and system design of Hewlett Packard Routers and Switches. Worked with Hewlett Packard Laboratories and the University Research Grants Program to bring in and evaluate new product opportunities. Monitored and participated in IEEE, IETF and ATM Forum standards activities.

**Roseville Networks Division - Internet Section**

**Hewlett Packard, Roseville, CA**

**12/92 - 8/93**

*Lead Engineer*

Led a team of software and firmware engineers on the design and implementation of the Hewlett Packard AdvanceStack Router 650. Migrated the software design from a single Motorola 68K-based platform to a multiprocessor Intel i960 system. Implemented low level operating system code and module hot swap capability.

**Roseville Networks Division - Mobile Communications**

**Hewlett Packard, Roseville, CA**

**3/92 - 12/92**

*Lead Engineer*

Led the investigation of wireless LAN and remote access products. Participated in the IEEE 802.11 standards activity to define a wireless Media Access Control. Acted as technical contact for various 3rd party relationships.

**California Personal Computer Division - Advanced Development Group**

**Hewlett Packard, Sunnyvale, CA**

**9/91 - 3/92**

*Network Specialist*

Consulted with PC architects to help define the networking requirements for a new class of computing device; the Personal Server and Mobile Client. Delivered technical content to the division of PC focused specialists.

**Network Architecture Lab - High Speed Initiative**

**Hewlett Packard, Roseville, CA**

**8/89 - 8/91**

*Project Engineer*

Investigated, designed and prototyped an architecture for supporting 100 Mbps networking in the Hewlett Packard Series 800 Systems. Developed firmware and UNIX drivers for an advanced FDDI interface. Invented hardware assist mechanisms to offload the TCP/IP protocol stack. Worked with product divisions to integrate results.

**Grenoble Networks Division - X.25 Communications**

**Hewlett Packard, Grenoble, France**

**9/87 - 8/89**

*Foreign Service Engineer*

Developed LAPB and X.25 embedded firmware for Hewlett Packard Series 800 systems.

**Information Networks Division - IBM Communications Lab**

**Hewlett Packard, Cupertino, CA**

**8/85 - 9/87**

*Member Technical Staff*

Developed SDLC, embedded firmware and UNIX drivers for Hewlett Packard Series 800 systems.

## Education

|                       |                                    |      |
|-----------------------|------------------------------------|------|
| PhD, Computer Science | University of California, Davis    | 6/12 |
| MS, Computer Science  | California State University, Chico | 5/97 |
| BS, Computer Science  | California State University, Chico | 5/85 |

## Professional Positions

|                                                                         |                 |
|-------------------------------------------------------------------------|-----------------|
| Owner, Congdon Consulting, LLC                                          | 10/20 – present |
| Editor/Architect Ultra Ethernet Consortium Technical Advisory Committee | 9/23 – present  |
| Secretary/Treasurer, Sierra Oaks Homeowners Association                 | 4/20 – present  |
| Advisory Board, Department of Computer Science, CSU Chico               | 4/14 – present  |
| Board Member, Tallac Networks, Inc.                                     | 3/13 – present  |
| Editor, P802.1Qcz Congestion Isolation                                  | 7/19 – 8/23     |
| Chair, IEEE 802.1 Maintenance Task Group                                | 7/18 – 5/23     |
| Vice Chair, Open Networking Forum Wireless and Mobility Working Group   | 6/14 – 3/15     |
| Technical Advisor Board, Elliptic Technologies Inc.                     | 1/14 – 6/15     |
| Vice Chair, IEEE 802.1 Working Group                                    | 3/06 – 3/12     |

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11. K. Kim, S.J. Lee, and P. Congdon, "On Cloud-Centric Network Architecture for Multi-Dimensional Mobility," *Best Workshop Paper*, Proceedings of ACM MCC 2012, Helsinki, Finland, August 2012
12. J. Mogul and P. Congdon, "Hey you darn counters, get off my ASIC!", Proceedings of ACM HotSDN 2012, Helsinki, Finland, August 2012
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15. Tech Field Day WiFi Mobility Symposium, "Industry Panel", San Jose, CA, January 2012, <http://techfieldday.com/2012/wifi-mobility-symposium/>
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## Industry Standards

|                                                                                                            |                          |
|------------------------------------------------------------------------------------------------------------|--------------------------|
| <b>RFC 3580</b><br><i>IEEE 802.1X Remote Authentication Dial In User Service (RADIUS) Usage Guidelines</i> | <b>September 2003</b>    |
| <b>RFC 4675</b><br><i>RADIUS Attributes for Virtual LAN and Priority Support</i>                           | <b>September 2006</b>    |
| <b>RFC 4849</b><br><i>RADIUS Filter Rule Attribute</i>                                                     | <b>April 2007</b>        |
| <b>RFC 7268</b><br><i>RADIUS Attributes for IEEE 802 Networks</i>                                          | <b>July 2014</b>         |
| <b>IEEE Std 802.3ad™-2000</b><br><i>Aggregation of Multiple Link Segments</i>                              | <b>March 30, 2000</b>    |
| <b>IEEE Std 802.11i™-2004</b><br><i>Wireless LAN Media Access Control (MAC) Security Enhancements</i>      | <b>July 23, 2004</b>     |
| <b>IEEE Std 802.1Q™-2005</b><br><i>Virtual Bridged Local Area Networks</i>                                 | <b>May 19, 2006</b>      |
| <b>IEEE Std 802.1AE™-2006</b><br><i>Media Access Control (MAC) Security</i>                                | <b>August 18, 2006</b>   |
| <b>IEEE Std 802.1AR™-2009</b><br><i>Secure Device Identity</i>                                             | <b>December 22, 2009</b> |
| <b>IEEE Std 802.1AB™- 2009</b><br><i>Station and Media Access Control Connectivity Discovery</i>           | <b>May 6, 2005</b>       |
| <b>IEEE Std 802.1X™-2010</b><br><i>Port-Based Network Access Control</i>                                   | <b>February 5, 2010</b>  |
| <b>IEEE Std 802.1Qbg™-2012</b><br><i>Edge Virtual Bridging</i>                                             | <b>July 5, 2012</b>      |
| <b>IEEE Std 802.1ABdh™-2021</b><br><i>LLDP Support for Multiframe Protocol Data Units</i>                  | <b>April 19, 2022</b>    |
| <b>IEEE Std 802.1Qcz™-2023</b><br><i>Congestion Isolation</i>                                              | <b>August 5, 2023</b>    |

## Patents

|                                                                                                                                                             |                           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| <b>US Patent 11,165,595</b><br><i>Network and switch providing controllable power through outlets and communication ports</i>                               | <b>November 2, 2021</b>   |
| <b>US Patent 10,257,084</b><br><i>Implementing a software defined network based on event records</i>                                                        | <b>April 9, 2019</b>      |
| <b>US Patent 10,135,673</b><br><i>Communicating data associated with different personas of a user</i>                                                       | <b>November 20, 2018</b>  |
| <b>US Patent 10,057,167</b><br><i>Identifying end-stations on private networks</i>                                                                          | <b>August 21, 2018</b>    |
| <b>US Patent 9,929,953</b><br><i>Making a frame receive decision in a receiver PHY layer</i>                                                                | <b>March 27, 2018</b>     |
| <b>US Patent 9,769,675</b><br><i>Cloud-based connectivity</i>                                                                                               | <b>September 19, 2017</b> |
| <b>US Patent 9,705,756</b><br><i>Network virtualization</i>                                                                                                 | <b>July 11, 2017</b>      |
| <b>US Patent 9,590,909</b><br><i>Reducing TCP timeouts due to incast collapse at a network switch</i>                                                       | <b>March 7, 2017</b>      |
| <b>US Patent 9,559,981</b><br><i>Providing agreement information to allow access by a client device of selected equipment from among multiple equipment</i> | <b>January 31, 2017</b>   |
| <b>US Patent 9,532,286</b><br><i>Controlling communication of data for different user personas</i>                                                          | <b>December 27, 2016</b>  |
| <b>US Patent 9,521,695</b><br><i>Initializing network advertisements from probe requests</i>                                                                | <b>December 13, 2016</b>  |

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|---------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| <b>US Patent 9,325,569</b><br><i>Implementing a Software Defined Network using event records that are transmitted from a network switch</i> | <b>April 26, 2016</b>    |
| <b>US Patent 8,983,938</b><br><i>Selecting a command file</i>                                                                               | <b>March 17, 2015</b>    |
| <b>US Patent 8,826,385</b><br><i>Method and apparatus for access security services</i>                                                      | <b>September 2, 2014</b> |
| <b>US Patent 8,638,799</b><br><i>Establishing network quality of service for a virtual machine</i>                                          | <b>January 28, 2014</b>  |
| <b>US Patent 8,363,654</b><br><i>Predictive packet forwarding for a network switch</i>                                                      | <b>January 29, 2013</b>  |
| <b>US Patent 8,203,970</b><br><i>Method and apparatus for selecting spanning tree root</i>                                                  | <b>June 19, 2012</b>     |
| <b>US Patent 7,873,038</b><br><i>Packet processing</i>                                                                                      | <b>January 18, 2011</b>  |
| <b>US Patent 7,506,065</b><br><i>Remote mirroring using IP encapsulation</i>                                                                | <b>March 17, 2009</b>    |
| <b>US Patent 7,370,346</b><br><i>Method and apparatus for access security services</i>                                                      | <b>May 6, 2008</b>       |
| <b>US Patent 7,292,573</b><br><i>Methods and apparatus for selection of mirrored traffic</i>                                                | <b>November 6, 2007</b>  |
| <b>US Patent 6,804,233</b><br><i>Method and system for link level server/switch trunking</i>                                                | <b>October 12, 2004</b>  |
| <b>US Patent 6,567,403</b><br><i>Virtual-chassis switch network topology</i>                                                                | <b>May 23, 2003</b>      |
| <b>US Patent 6,151,297</b><br><i>Method and system for link level server/switch trunking</i>                                                | <b>November 21, 2000</b> |
| <b>US Patent 6,070,187</b><br><i>Method and apparatus for configuring a network node to be its own gateway</i>                              | <b>May 30, 2000</b>      |
| <b>US Patent 5,522,039</b><br><i>Calculation of Network Data Check Sums by Dedicated Hardware with Software Corrections</i>                 | <b>May 28, 1996</b>      |
| <b>US Patent 5,491,802</b><br><i>Network Adapter for Inserting Pad Bytes into Packet Link Headers for Efficient Memory Transfer</i>         | <b>February 13, 1996</b> |
| <b>US Patent 5,430,842</b><br><i>Insertion of Network Data Checksums by a Network Adapter</i>                                               | <b>July 4, 1995</b>      |

## Patents Applications

|                                                                                                                                                                   |                          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| <b>Pub. App. No. 20200127862</b><br><i>Network Switch Providing Managed Power</i>                                                                                 | <b>April 23, 2020</b>    |
| <b>Pub. App. No. 20190007316</b><br><i>Controller for Software Defined Network</i>                                                                                | <b>January 3, 2019</b>   |
| <b>Pub. App. No. 20170026281</b><br><i>Implementing a Software Defined Network Based on Event Records</i>                                                         | <b>January 26, 2017</b>  |
| <b>Pub. App. No. 20160043949</b><br><i>Making A Frame Receive Decision in a Receiver PHY Layer</i>                                                                | <b>February 11, 2016</b> |
| <b>Pub. App. No. 20160021546</b><br><i>Cloud-based Connectivity</i>                                                                                               | <b>January 21, 2016</b>  |
| <b>Pub. App. No. 20150295885</b><br><i>Identifying End-Stations on Private Networks</i>                                                                           | <b>October 15, 2015</b>  |
| <b>Pub. App. No. 20150134819</b><br><i>Providing Agreement Information to Allow Access by a Client Device of Selected Equipment from Among Multiple Equipment</i> | <b>May 14, 2015</b>      |
| <b>Pub. App. No. 20150127786</b><br><i>Communicating Data Associated with Different Personas of a User</i>                                                        | <b>May 7, 2015</b>       |
| <b>Pub. App. No. 20140355523</b><br><i>Initializing Network Advertisements from Probe Requests</i>                                                                | <b>December 4, 2014</b>  |
| <b>Pub. App. No. 20140247718</b><br><i>Reducing TCP Timeouts due to Incast Collapse at a Network Switch</i>                                                       | <b>September 4, 2014</b> |
| <b>Pub. App. No. 20140105215</b>                                                                                                                                  | <b>April 17, 2014</b>    |

*Converting Addresses for Nodes of a Data Center Network into compact identifiers for determining flow keys for received data packets*

**Pub. App. No. 20140032743**

**January 30, 2014**

*Selecting equipment associated with provider entities for a client request*

**Pub. App. No. 20140003422**

**January 2, 2014**

*Implementing a Software Defined Network using event records that are transmitted from a Network Switch*

**Pub. App. No. 20130346583**

**December 26, 2013**

*Network Virtualization*

**Pub. App. No. 20130336284**

**December 19, 2013**

*Controlling communication of data for different user personas*

**Pub. App. No. 20110125949**

**May 26, 2011**

*Routing packet from first virtual machine to second virtual machine of a computing device*

**Pub. App. No. 20110007746**

**January 13, 2011**

*Establishing Network Quality of Service for a Virtual Machine*

**Pub. App. No. 20100118885**

**May 13, 2010**

*Predictive Packet Forwarding for a Network Switch*

**Pub. App. No. 20080267179**

**October 30, 2008**

*Packet processing*

**Pub. App. No. 20080265915**

**October 30, 2008**

*Method of Detecting a Network Cabling Change*

**Pub. App. No. 20080229393**

**September 18, 2008**

*Method and apparatus for access security services*

**Pub. App. No. 20080089246**

**April 17, 2008**

*Method and apparatus for selecting spanning tree root*

**Pub. App. No. 20050220092**

**October 6, 2005**

*Methods and apparatus for selection of mirrored traffic*

**Pub. App. No. 20050220091**

**October 6, 2005**

*Secure remote mirroring*

**Pub. App. No. 20050114522**

**May 26, 2005**

*Remote mirroring using IP encapsulation*

**Pub. App. No. 20040250117**

**December 9, 2004**

*Method and apparatus for access security services*

## Awards

1. Open Networking Foundation (ONF) – September 2014 - Outstanding Leadership, Wireless & Mobile - <https://opennetworking.org/news-and-events/onf-awards/sep-16-2014/>
2. Institute of Electrical and Electronics Engineers – December 2022 – IEEE SA Standards Medallion - <https://standards.ieee.org/about/awards/med/>

## Memberships & Certifications

California Registered Home Care Aide (ID 4600345009)

4/23 – present

Member Association for Computing Machinery (ID 8188376)

8/12 – present

Senior Member IEEE (ID 40138164)

10/95 – present