

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CISCO SYSTEMS, INC.,

Petitioner,

v.

NETSOCKET, INC.,

Patent Owner.

Patent No. 7,616,601

Filing Date: December 20, 2001

Issue Date: November 10, 2009

Inventors: Joakim Norrgard, Anders Larsson, and Olov Schelen

Title: NETWORK RESOURCE MANAGER IN A
MOBILE TELECOMMUNICATION SYSTEM

DECLARATION OF DR. PAUL CONGDON

Case No. IPR2023-00606

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. 7,616,601 (the “’601 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 ’601 patent and the prosecution history for the ’601 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 IPR2023-00606 including the petition (“Pet.”) and the declaration of Dr. R Michael Buehrer.

16. I have also considered the Board's Decision on Institution (IPR2023-00606, 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. R. Michael Buehrer and the declaration of Dr. Olov Schelen.

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 with wireless communication systems, including cellular networks that

utilize IP-based core networks” and that “[l]ack of work experience can be remedied by additional education, and vice versa.” Pet. at 11.

28. My qualifications and experience exceed those of a person of ordinary skill in the art. Nonetheless, my analysis and opinions herein regarding the '601 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 '601 Patent should be construed as limiting, the construction of “a

Core Network,” and whether “radio resource manager” and “network resource manager” should be construed differently in the context of the ’601 Patent specification and claims.

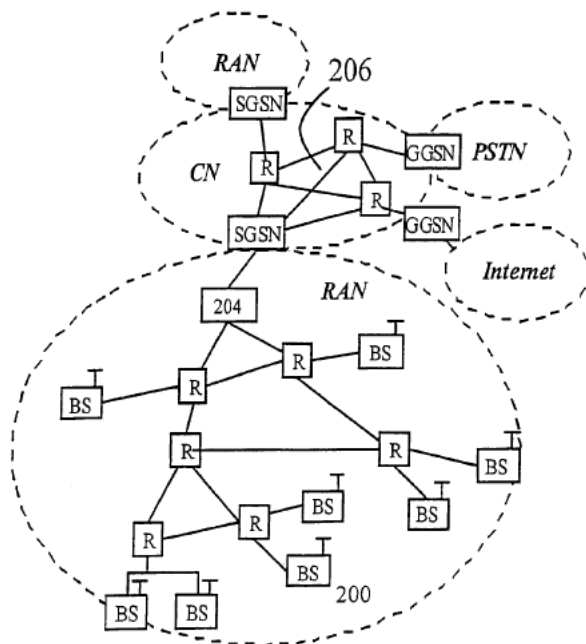
A. Claim 1’s Preamble Should Be Limiting

34. In my opinion, a person of ordinary skill in the art would have construed Claim 1’s preamble to be limiting because several terms in the preamble provide antecedent basis for those same terms within Claim 1 and its dependent claims, and therefore are essential to understanding those limitations within Claim 1 and its dependent claims. As an example, Claim 1’s preamble recites “end-to-end Quality of Service (QoS),” while subsequent limitations in Claim 1 rely on the preamble for antecedent basis by reciting “controlling IP network resources by using a resource map in a Network Resource Manager (NRM) in order to provide *said end-to-end QoS*” and “reserving the IP network resources along the path by the NRM to fulfill *the end-to-end QoS*.” ’601 Patent, Claim 1. As another example, Claim 1’s preamble recites “a Core Network (CN) connected to at least one Radio Access Network (RAN)” while dependent claims rely on the preamble for antecedent basis: Claim 2 recites the “[m]ethod according to claim 1, wherein the NRM is used within *the RAN and the CN*,” Claim 3 recites the “[m]ethod according to claim 1, wherein the NRM is used within *the RAN*,” and Claim 4 recites the “[m]ethod according to claim 1, wherein the NRM is used within *the CN*.” ’601 Patent, Claims 2-4. In view of the

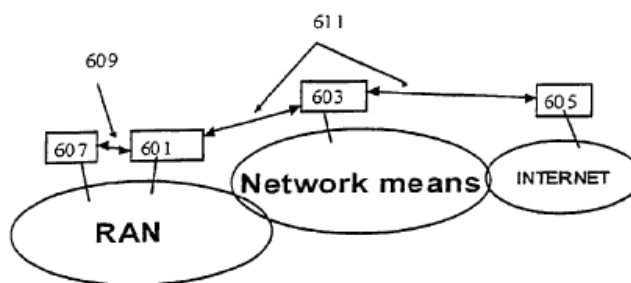
several examples where Claim 1 itself and its dependent claims rely on phrases within the preamble for antecedent basis, a person of ordinary skill in the art would understand the preamble of Claim 1 to be limiting.

B. “a Core Network” Should Be Construed as “one Core Network Preamble”

35. In my opinion, a person of ordinary skill in the art would understand that “a Core Network” ought to be construed as “*one* Core Network.” A person of ordinary skill in the art would have found this understanding to be supported by usage of the term throughout the patent specification. For example, the ’601 Patent describes “[t]he communication system comprises at least one network e.g. a Core Network (CN) and at least one Radio Access Network (RAN).” ’601 Patent, Abstract, 1:20-23 (“a mobile telecommunication system comprising at least one network means e.g. a Core Network (CN) connected to at least one Radio Access Network (RAN)”). In other words, a person of ordinary skill in the art would have understood that an example of one network in “the communication system” is one CN connected to at least one RAN. Figs. 2 and 6 represented below also support the understanding that Claim 1 is reciting only one CN.



'601 Patent, Fig. 2.



'601 Patent, Fig. 6 (referring to a Core Network (CN) as a network means); '601 Patent, 1:21-23 (“at least one network means e.g. a Core Network (CN) connected to at least one Radio Access Network (RAN), using Internet Protocol (IP) based transmission.”).

36. Therefore, in my opinion, a person of ordinary skill in the art would have understood the preamble of Claim 1 to be limiting and, in particular, that “a Core Network” should be construed as “*one* Core Network.”

C. “Radio Resource[s] [Manager]” and “Network Resource[s] [Manager] Should Be Construed to Have Different Meanings

37. In my opinion, a person of ordinary skill in the art would construe “radio resource” and “network resource” differently as explained further in Section VI.A.2 below.

VI. ANY COMBINATION OF PATEL-225, SCHELEN-1999, SCHELEN-1997, PATEL-185, PATEL-764, AND DEGERMARK DOES NOT RENDER CLAIMS 1-9 OBVIOUS

A. Ground 1: The Combination of Patel-225, Schelen-1999, and Schelen-1997 Does Not Render Claims 1 and 4-6 Obvious

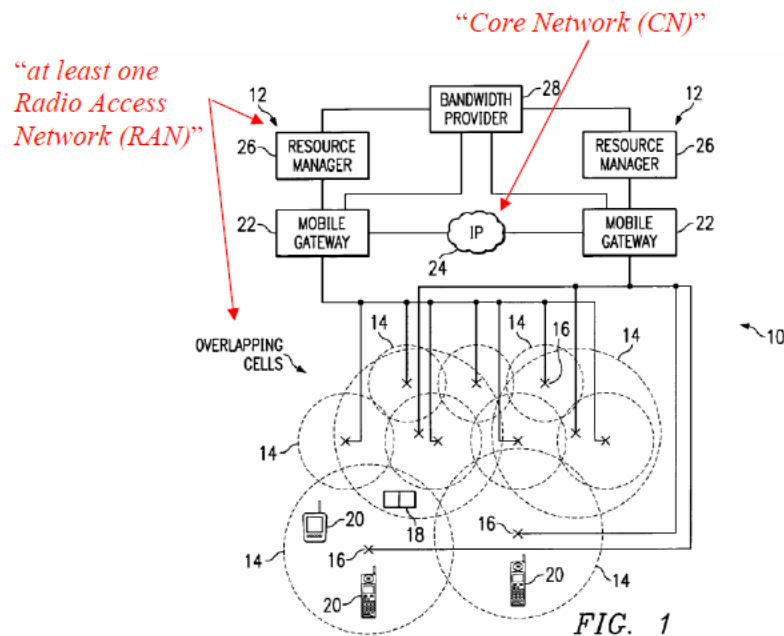
1. The Combination of Patel-225, Schelen-1999, and Schelen-1997 Does Not Render Obvious “*A method for providing end-to-end Quality of Service (QoS) within a mobile telecommunication system comprising a Core Network (CN) connected to at least one Radio Access Network (RAN) using Internet Protocol (IP) based transmission,*” as Required by Claim 1

38. I note that Petitioner only relies on Patel-225 to disclose this limitation of “a mobile telecommunication system comprising a Core Network (CN) connected to at least one Radio Access Network (RAN) using Internet Protocol (IP) based transmission.” Pet. at 31-36.

39. As described above in Section V, the preamble should be construed as limiting, which means that Claim 1 requires “providing end-to-end Quality of Service (QoS) within a mobile telecommunication system” that comprises “one Core Network.”

40. In my opinion, Petitioner incorrectly asserts that “the wireline IP

network 24 renders obvious a Core Network (CN)” and that “one or more of Patel-225’s cellular networks 12 that use RF links to provide radio access render obvious at least one Radio Access Network (RAN)” based on an annotated version of Fig. 1 of Patel-225 represented below:

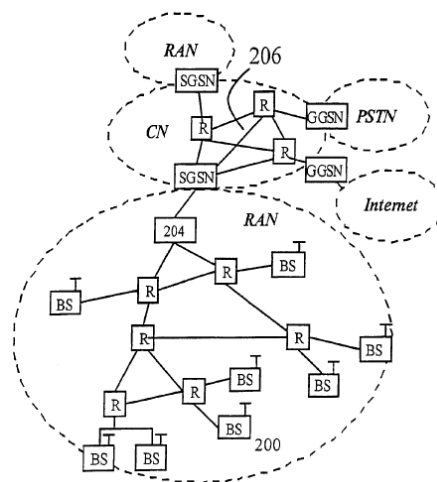


Ex.1005, Fig. 1 (annotated); Ex.1003, ¶151

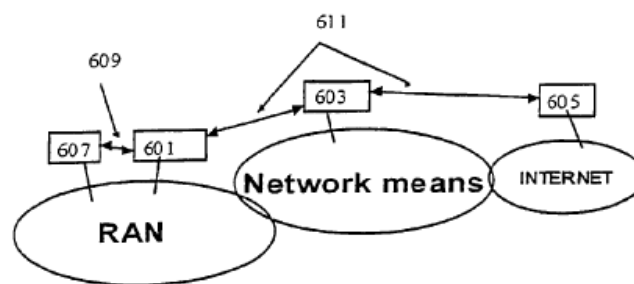
Pet. at 31-33.

41. However, contrary to Petitioner’s assertion, a person of ordinary skill in the art would understand the cloud marked IP 24 in Patel-225 cannot be the recited Core Network. Patel-225 describes that “IP 24” is “*a wireline portion 24 of the wireless network 10*” and that “*wireline portion 24 may be the Internet, intranet, extranet, or other suitable local or wide area network.*” Ex. 1005, 5:6-12. A person of ordinary skill in the art would have understood that Patel-225’s “wireline portion” means a wired *portion* of a network instead of a full network on its own. The ’601

Patent discloses that “[b]oth the RAN and the CN are IP networks where logical functions (e.g. Radio Resource Management (RRM)) are distributed, e.g. in the RNC and in the SGSN.” ’601 Patent, 2:33-35. This understanding of the CN and each RAN as being their own IP networks is confirmed by the ’601 Patent’s representation of a telecommunications system with one CN and at least one RAN in Figs. 2 and 6:



’601 Patent, Fig. 2.



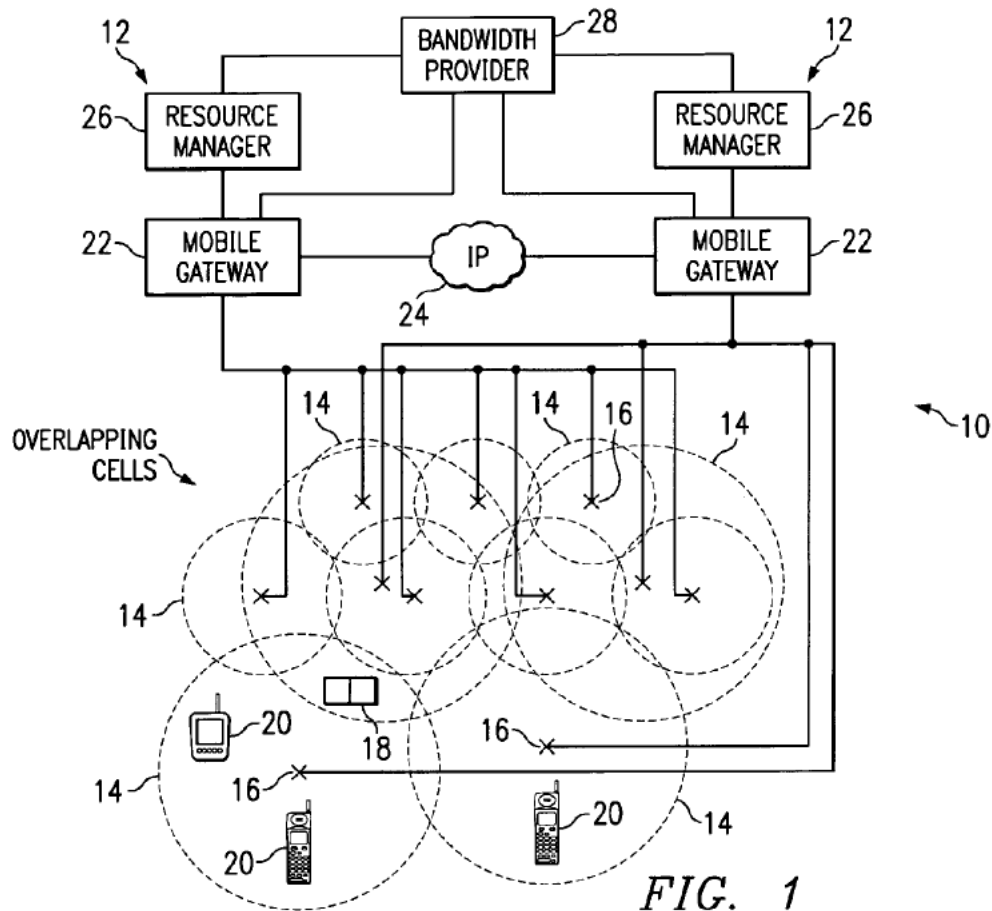
’601 Patent, Fig. 6 (referring to a Core Network (CN) as a network means); ’601 Patent, 1:21-23 (“at least one network means e.g. a Core Network (CN) connected to at least one Radio Access Network (RAN), using Internet Protocol (IP) based

transmission.”). In my opinion, Figs. 2 and 6 above also demonstrate that the CN separate from the Internet unlike Patel-225 which notes that “**wireline portion 24 may be the Internet.**” Ex. 1005, 5:6-12; ’601 Patent, 6:39-43 (distinguishing the CN, RAN, and Internet since “[t]he NRM may thus be distributed to run on multiple nodes (e.g. the RAN, the CN and the Internet) and/or distributed geographically over a network”).

42. Moreover, I note that Petitioner’s argument rests entirely on the misrepresentation that Patel-225 describes a telecommunications system based on CDMA or W-CDMA that inherently discloses the claimed CN or RAN. Pet. at 31-32. However, I also note that Patel-225 only refers to CDMA twice. The first reference does not describe a full telecommunications system based on CDMA or W-CDMA but only notes that the **RF links for mobile devices** (noted as 14 in Patel-225’s Fig. 1 may be based on CDMA or W-CDMA:

Servers 16 provide a radio frequency (RF) link for mobile devices 20 in a corresponding cell 14. The wireless RF link to the mobile devices 20 in the cell 14 may be based on established standards such as IS-54 (TDMA), IS-95 (CDMA), GSM and AMPS, 802.11 based WLAN, or new upcoming standards such as CDMA2000 and W-CDMA or proprietary terrestrial or mobile radio interfaces. The mobile devices 20 may be cell phones, data phones, data devices, portable computers, or any other suitable devices capable of communicating information over a wireless link.

Ex. 1005, 4:19-27.



Ex. 1005, Fig. 1. In my opinion, a person of ordinary skill in the art would have understood that the RF link to the mobile device in a cell 14, as shown in Fig. 2, does not correspond to what Petitioner is alleging is the disclosed CN (IP 24) or RAN (cellular network 12). A person of ordinary skill in the art would have also understood that whether an RF link to a mobile device conforms to a standard does not imply that the entire system or all parts of the system are included as part of the CDMA or W-CDMA standard.

43. The second, and only other, reference to CDMA and W-CDMA in Patel-225 refers generically to bandwidth usage in such a system. Ex. 1005, 4:39-42

(“In the complete spectrum sharing systems such as CDMA and W-CDMA, bandwidth usage in a particular area directly impacts the bandwidth available at different locations in the neighborhood.”). A person of ordinary skill in the art would not imply any statement about a CN or RAN from the aforementioned statements in Patel-225.

44. In my opinion, to the extent that other references describe telecommunications systems involving both one CN and at least one RAN, a person of ordinary skill in the art would therefore not seek to combine Patel-225 with such references to obviate Claim 1 because Patel-225 does not describe a system with a single CN and at least one RAN.

45. I note that Patel-225 is also silent regarding the claimed “end-to-end Quality of Service (QoS).” A person of ordinary skill in the art would understand that Patel-225 only describes QoS in its background section as an example of provisions in tiered service offerings and that an advantage of Patel-225 is that “consumers may specify resource location, price, QoS policy and other parameters to bandwidth providers including service providers, network providers and bandwidth brokers, shop between providers and negotiate service parameters.” Ex. 1005, 1:29-43, 2:43-49. Outside of the background section of Patel-225, I note that there is only one reference to QoS and it too refers to negotiating the terms of a service level agreement (SLA) between a customer and the network provider. Ex.

1005, 6:32-35 (“The service type parameters 35 include different class or quality of service (QoS) types such as gold, silver, bronze, premium, assured, and best efforts.”). A person of ordinary skill would not understand Patel-225 to be related to end-to-end QoS in the absence of any mention of the term. As Petitioner’s expert acknowledges, end-to-end QoS refers to a network architecture that supports “providing a particular Quality of Service” “from the -- one end of the flow of packets to the other end of the flow of packets, so from origin to the destination.” Ex. 2005, 30:19-31:15. Therefore, a person of ordinary skill in the art would not be motivated to combine Patel-225 with any reference that does perform end to end QoS, since these different systems require different network architectures.

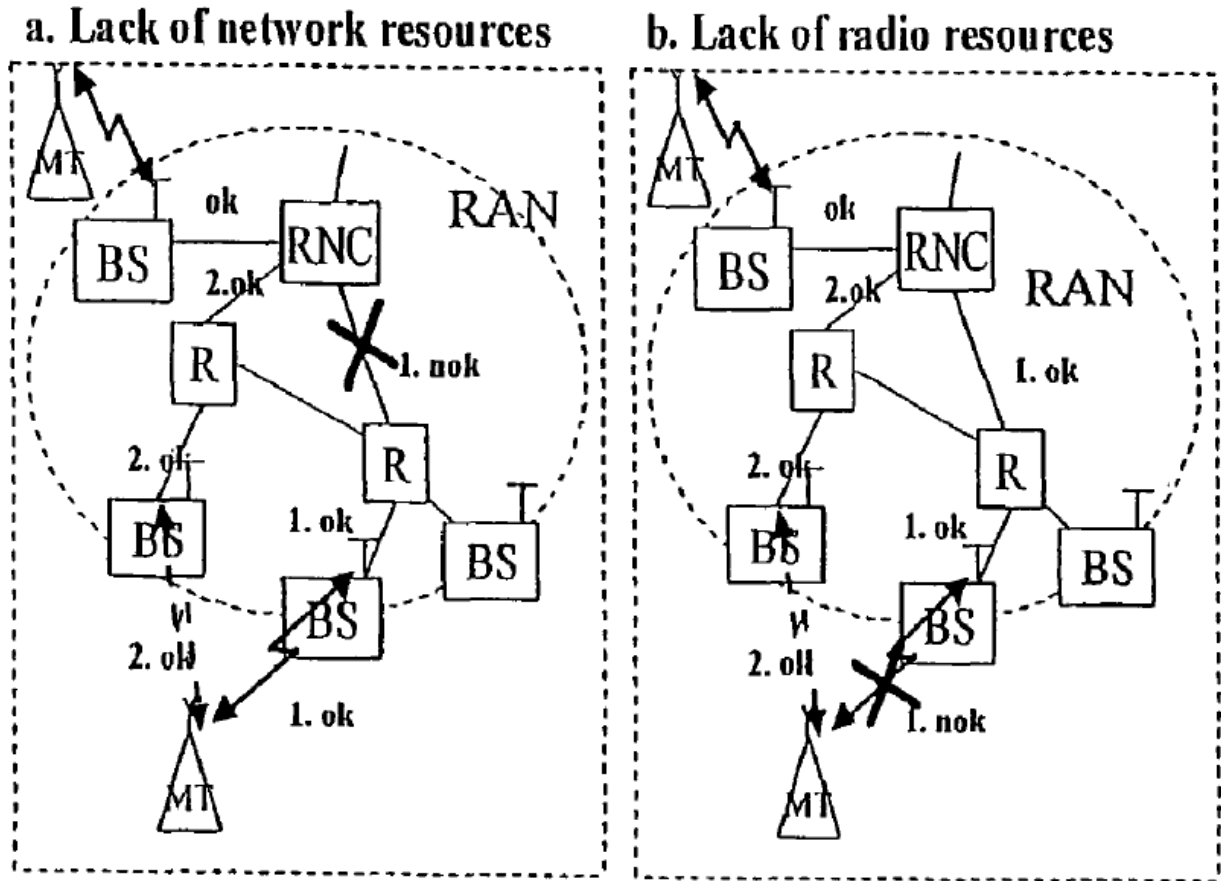
46. In view of Petitioner’s failure to show that the combination of Patel-225, Schelen-1999, and Schelen-1997 discloses, teaches, or motivates the claimed “method for providing end-to-end Quality of Service (QoS) within a mobile telecommunication system comprising a Core Network (CN) connected to at least one Radio Access Network (RAN) using Internet Protocol (IP) based transmission,” in my opinion, the combination of Patel-225, Schelen-1999, and Schelen-1997 cannot render Claim 1 obvious.

2. The Combination of Patel-225, Schelen-1999, and Schelen-1997 Does Not Render Obvious “*handling radio resources within the RAN by using a radio resource manager,*” as Required by Claim 1

47. I note that Petitioner only relies on Patel-225 to disclose this claim

limitation but Patel-225 does not disclose a radio resource manager.

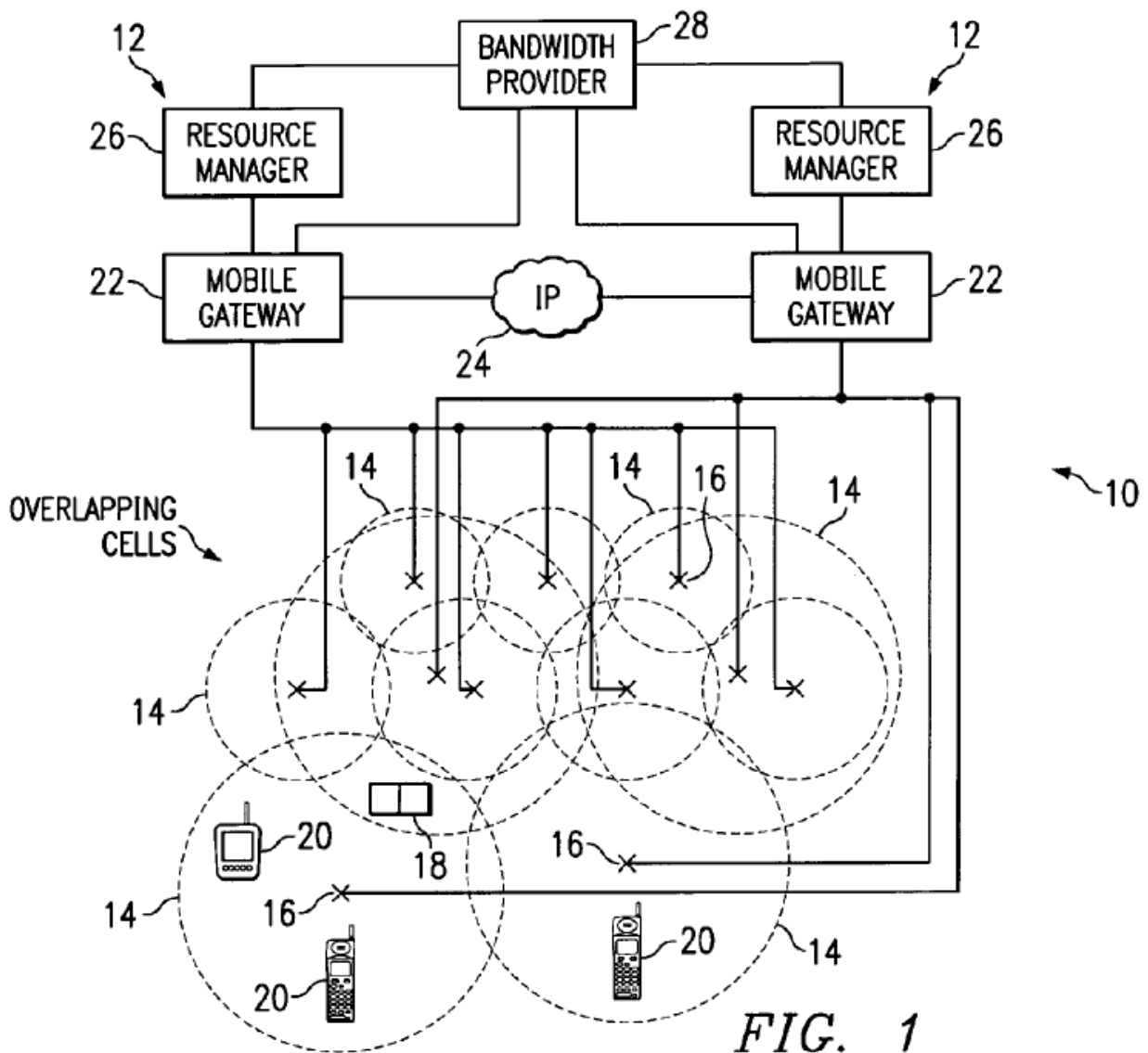
48. The '601 Patent distinguishes between a **radio** resource manager and a **network** resource manager (NRM) throughout its specification. '601 Patent, 5:14-19 (“The NRM monitors and/or manages and/or reserves **resources within the network with IP based transmission within the cellular telecommunication system** and a **bearer service manager, such as a RAB service manager, manages radio resources in the wireless part of the cellular telecommunication network.**”), 9:22-30 (“If bearer service entities that manage the **radio resources** and **network resources** (e.g. the RAB manager and NRMs) are tightly coupled, as described below, they will have complete information about how **radio and IP network resources** are used and where resources are available in the system. This makes it possible to make joint optimisation of **radio and IP network resources** and direct a handover to where resources are available for a session which otherwise would have been denied.”). As demonstrated in Fig. 5b (as distinguished from Fig. 5a that shows a lack of network resources), radio resources refer to the resources exchanged between the base station (BS) and mobile terminal (MT). A person of ordinary skill would understand an example of a mobile terminal to be a mobile device.



'601 Patent, Figs. 5a, 5b; 4:41-43 (“The session can be denied due to lack of network resources as in FIG. 5a, lack of radio resources as in FIG. 5b, or lack of both radio and network resources as in FIG.5c.”).

49. As described above, radio resources are resources in the wireless part of the cellular telecommunication network, *i.e.*, between the base station and mobile device. '601 Patent, 5:14-19, Fig. 5b. Patel-225 does not disclose a manager of radio resources *in the wireless part* of the cellular telecommunication network or resources exchanged between the base station and mobile device despite the fact that Patel-225 describes both a base station and mobile devices. Ex. 1005, 4:3-5 (“Each

cell 14 has a base station, or server, 16 and may be subdivided into a plurality of geolocation areas 18.”). Fig. 1 of Patel-225 and its accompanying description in the specification of Patel-225 shows that the only resource managers in Patel-225 are on the wireline side and not between base stations and mobile devices.



Ex. 1005, Fig. 1.

50. I note that Petitioner’s cited portions of Patel-225 describing Fig. 1’s

resource manager confirm that Patel-225's resource manager manages "suitable *network resources*," "control[s] bandwidth *within a cellular network*," or makes sure "the SLA will be checked and enforced/ensured by the network elements during use of the wireless service" instead of the managing the claimed *radio* resources. Pet. at 35 (citing Ex. 1005, 5:311-39, 6:42-48). A person of skill in the art would understand that a radio resource manager handles strategies and algorithms for controlling parameters such as transmit power, user allocation, beamforming, data rates, handover criteria, modulation scheme, and/or error coding schemes.

51. Therefore, it is my opinion that Claim 1 is not rendered obvious by the combination of Patel-225, Schelen-1999, and Schelen-1997.

3. The Combination of Patel-225, Schelen-1999, and Schelen-1997 Does Not Render Obvious "*controlling IP network resources by using a resource map in a Network Resource Manager (NRM) in order to provide said end-to-end QoS*" as Required by Claim 1

52. In my opinion, since Petitioner fails to show how the combination of Patel-225, Schelen-1999, and Schelen-1997 discloses, teaches, or suggests a "providing end-to-end Quality of Service (QoS) within a mobile telecommunication system comprising a Core Network (CN) connected to at least one Radio Access Network (RAN) using Internet Protocol (IP) based transmission," it therefore cannot disclose, teach, or suggest "controlling IP network resources by using a resource map in a Network Resource Manager (NRM) in order to *provide said end-to-end QoS*" Section VI.A.1.

53. In my opinion, Petitioner incorrectly relies upon Patel-225's bandwidth provider 28 of Fig. 1 to disclose the claimed Network Resource Manager ("NRM"). However, Patel-225's bandwidth provider 28 does not perform "**controlling** IP network resources," as required by the claim. Petitioner's cites to Col. 1 of Patel-225 to show that "bandwidth brokers [] control and allocate Internet or other network bandwidth" are misleading as Patel-225 is only discussing the background of "recent proposals" in those cited portions of Patel-225. Pet. at 38; Ex. 1005, 1:52-60 ("**Recent proposals** for the IP QoS architecture include supporting bandwidth brokers that control and allocate Internet or other network bandwidth."). The actual disclosure of Patel-225 distinguishes from such bandwidth brokers in those recent proposals because Patel-225's description of its bandwidth providers show that they receive requests from consumers, broadcast the requests to capable network providers, and negotiate with the consumer with responses from those network providers:

One or more bandwidth providers 28 **communicate with the resource managers** 26 of the cellular networks 12 and/or mobile gateways 22 within the cellular networks 12 to **intelligently broker bandwidth and other suitable wireless resources of the network providers to third parties** based on time and space considerations such as geo-location of the demand and supply within the networks 12. The bandwidth providers may be a service provider such as an Internet Service Provider (ISP) or a bandwidth broker. The bandwidth broker may broker bandwidth of a service provider in addition to that of a network provider. As described in more detail below, the

bandwidth providers 28 may receive requests for wireless services directly from consumers and broadcast the request to network providers capable of providing the specified wireless services. The bandwidth provider 28 receives, analyzes and/or evaluates responses from the different network providers to *generate a consumer response*. The consumer response may include an offer to provide wireless services at specified terms, several offers from several different network providers for evaluation and selection by the consumer, or one or more partial offers with *open terms to be negotiated with the consumer*. The *bandwidth provider 28 may also negotiate with network providers on behalf of consumers or facilitate negotiations between consumers and network providers*. After an agreement has been reached, the bandwidth provider 28 may *process billing, termination and other suitable transactions* regarding the wireless services.

Ex. 1005, 5:61-6:21. A person of skill in the art would thus understand that Patel-225's bandwidth provider (e.g., bandwidth broker) negotiates or "brokers" bandwidth instead of "controlling IP network resources." The only disclosure in Patel-225 related to "controlling bandwidth" is with respect to Patel-225's resource manager 26, which Petitioner agrees does not disclose the recited NRM. Section VI.A.2; Ex. 1005, 6:44-46 ("the resource manager 26 is implemented as a centralized system for controlling bandwidth within a cellular network 12.").

54. Additionally, I note that Patel-225 does not disclose, or even mention, the claimed "resource map." Petitioner alleges that Patel-225 somehow "suggests" using a resource map "by disclosing that the bandwidth broker is "programmed with...current allocation traffic, and new requests for allocations.'" Pet. at 39 (citing

Ex.1005, 1:54-56). However, a person of ordinary skill in the art would not make the leap between the vague “programming” disclosed in Patel-225 and “a resource map,” which Petitioner’s expert acknowledges “is a map of the resources in the overall network, and as an example, having a map of current allocated bandwidth and new requests for bandwidth would be one example of a resource map.” Ex. 2005, 55:18-56:2.

55. I note that Petitioner relies upon only one sentence in Schelen-1999 for disclosing the “resource map” of the claim limitation. Ex. 1011, at 17 (“Agents use the resource map to perform admission control in their domain.”). Even assuming Schelen-1999’s agents correspond to the claimed NRMs, Patel-225 is not a system that utilizes bandwidth brokers to “control” network resources, as described above. Therefore, in my opinion, a person of ordinary skill in the art would not seek to combine Patel-225, a system that uses a bandwidth broker to negotiate resources with a customer, with a contradictory system Schelen-1999 that describes “agents us[ing] the resource map to perform admission control.”

56. Therefore, it is my opinion that Claim 1 is not rendered obvious by the combination of Patel-225, Schelen-1999, and Schelen-1997.

4. The Combination of Patel-225, Schelen-1999, and Schelen-1997 Does Not Render Obvious “*the step of controlling the IP network resources including the steps of the NRM performing path-sensitive call admission control by using the resource map in the NRM*” as Required by Claim 1

57. In my opinion, since Petitioner fails to show how the combination of Patel-225, Schelen-1999, and Schelen-1997 discloses, teaches, or suggests “controlling IP network resources by using a resource map in a Network Resource Manager (NRM) in order to provide said end-to-end QoS,” it therefore cannot disclose, teach, or suggest “the step of controlling the IP network resources including the steps of the NRM performing path-sensitive call admission control by using the resource map in the NRM.” Section VI.A.3.

58. Relatedly, I note that Patel-225 does not describe or even use the words, “admission control” or “path” or “path-sensitive,” further indicating that Patel-225 is not directed to admission control, let alone path-sensitive admission control. Accordingly, a person of ordinary skill in the art at the time of the invention of the ’601 Patent would not be motivated to combine Patel-225 with any reference that does describe “path-sensitive call admission control.”

59. Therefore, it is my opinion that Claim 1 is not rendered obvious by the combination of Patel-225, Schelen-1999, and Schelen-1997.

5. The Combination of Patel-225, Schelen-1999, and Schelen-1997 Does Not Render Obvious “*the NRM checking that resources are available along a path,*” “*the NRM pre-allocating resources in an IP network,*” and “*scheduling resources over time by introducing a start and a stop time as a parameter in a resource request handled by the NRM,*” as Required by Claim 1

60. In my opinion, since Petitioner fails to show how the combination of Patel-225, Schelen-1999, and Schelen-1997 discloses, teaches, or suggests “the

NRM” or “path-sensitive call admission control,” it therefore cannot disclose, teach, or suggest “the NRM checking that resources are available along a path,” “the NRM pre-allocating resources in an IP network,” or “scheduling resources over time by introducing a start and a stop time as a parameter in a resource request handled by the NRM.” Sections VI.A.3 and VI.A.4.

61. Therefore, it is my opinion that Claim 1 is not rendered obvious by the combination of Patel-225, Schelen-1999, and Schelen-1997.

6. The Combination of Patel-225, Schelen-1999, and Schelen-1997 Does Not Render Obvious “*communicating resource information between the NRM and the radio resource manager*,” as Required by Claim 1

62. In my opinion, since Petitioner fails to show how the combination of Patel-225, Schelen-1999, and Schelen-1997 discloses, teaches, or suggests either “the NRM” or “the radio resource manager,” it therefore cannot disclose, teach, or suggest “communicating resource information between the NRM and the radio resource manager.” Sections VI.A.2 and VI.A.3.

63. Therefore, it is my opinion that Claim 1 is not rendered obvious by the combination of Patel-225, Schelen-1999, and Schelen-1997.

7. The Combination of Patel-225, Schelen-1999, and Schelen-1997 Does Not Render Obvious “*reserving the IP network resources along the path by the NRM to fulfill the end-to-end QoS*,” as Required by Claim 1

64. In my opinion, since Petitioner fails to show how the combination of Patel-225, Schelen-1999, and Schelen-1997 discloses, teaches, or suggests either

“providing end-to-end Quality of Service (QoS) within a mobile telecommunication system comprising a Core Network (CN) connected to at least one Radio Access Network (RAN) using Internet Protocol (IP) based transmission,” “the NRM,” or “path-sensitive call admission control,” it therefore cannot disclose, teach, or suggest “reserving the IP network resources along the path by the NRM to fulfill the end-to-end QoS.” Sections VI.A.1, VI.A.3, and VI.A.4.

65. Therefore, it is my opinion that Claim 1 is not rendered obvious by the combination of Patel-225, Schelen-1999, and Schelen-1997.

8. The Combination of Patel-225, Schelen-1999, and Schelen-1997 Does Not Render Obvious Claims 2-8

66. Claims 2-8 depend upon Claim 1, and for at least the same reasons as Claim 1, it is my opinion that any combination of Patel-225, Schelen-1999, and Schelen-1997 fails to obviate Claims 2-8.

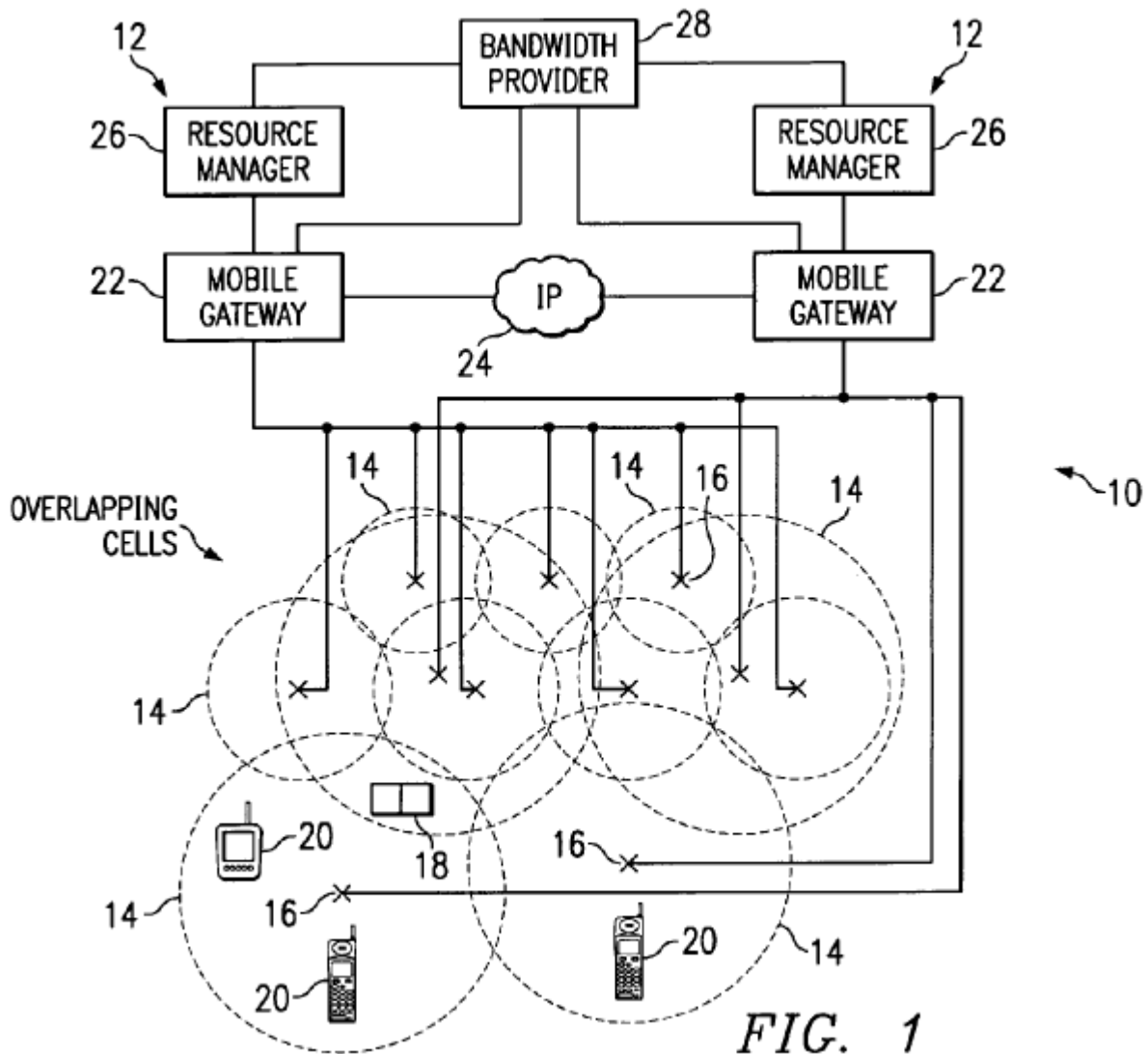
B. Ground 2: The Combination of Patel-225, Schelen-1999, Schelen-1997, and Patel-764 Does Not Render Claims 2-5 Obvious

1. The Combination of Patel-225, Schelen-1999, Schelen-1997, and Patel-764 Does Not Render Obvious “*wherein the NRM is used within the RAN and the CN,*” as Required by Claim 2, “*wherein the NRM is used within the RAN,*” as Required by Claim 3, and “*wherein the NRM is used within the CN,*” as Required by Claim 4

67. I note that, while Petitioner adds Patel-764 to its Ground 1 combination of Patel-225, Schelen-1999, and Schelen-1997, Petitioner still relies entirely upon Patel-225 for its argument that “the bandwidth broker is ‘*used within*’ the wireline

IP network 24 and the wireless network 12.” Pet. at 73.

68. However, in my opinion, a person of ordinary skill in the art would understand that Patel-225’s Fig. 1 and the accompanying description in the specification of Patel-225 show that Patel-225’s bandwidth broker or bandwidth provider 28 is not located within IP 24 or Resource Manager 26:



Ex. 1005, Fig. 1. The specification of Patel-225 describes that “[o]ne or more bandwidth providers 28 *communicate with* the resource managers 26 of the cellular networks 12 and/or mobile gateways 22 within the cellular networks 12 to intelligently broker bandwidth and other suitable wireless resources of the network providers to third parties” but they are not “used within” the cellular network 12 or resource manager 26. Ex. 1005, 5:61-65.

69. As I describe above, Patel-225’s IP 24 is also not the claimed “[one] Core Network” and Patel-225’s cellular networks 12 are not the claimed RANs. Section VI.A.1.

70. Therefore, it is my opinion that, for at least the same reasons disclosed in Section VI.A.1, Claims 2-4 are not rendered obvious by the combination of Patel-225, Schelen-1999, Schelen-1997, and Patel-764.

2. The Combination of Patel-225, Schelen-1999, Schelen-1997, and Patel-764 Does Not Render Obvious “*signalling resource information between the NRM and at least a second NRM used within at least a second network domain,*” as Required by Claim 5

71. I note that, while Petitioner adds Patel-764 to its Ground 1 combination of Patel-225, Schelen-1999, and Schelen-1997, Petitioner still relies entirely upon Patel-225’s bandwidth broker to disclose the claimed NRM. Pet. at 74-75. A person of ordinary skill in the art would have understood Patel-764’s bandwidth broker to be the same as Patel-225’s bandwidth broker since, as Petitioner notes, “Patel-225 cites to and incorporates by reference Patel-764.” Pet. at 67. However, as I describe

with respect to Petitioner's Ground 1 combination, Patel-225's (and Patel-764's) bandwidth broker does not correspond to the claimed NRM, and therefore cannot disclose, teach, or suggest one NRM let alone a second NRM and the claimed "signalling resource information between the NRM and at least a second NRM used within at least a second network domain." Section VI.A.3.

72. Therefore, in my opinion, Claim 5 is not rendered obvious by the combination of Patel-225, Schelen-1999, Schelen-1997, and Patel-764.

C. Ground 3: The Combination of Patel-225, Schelen-1999, Schelen-1997, and Degermark Does Not Render Claim 9 Obvious

73. Claim 9 depends upon Claim 1, and for at least the same reasons as Claim 1, in my opinion, any combination of Patel-225, Schelen-1999, Schelen-1997, and Degermark, fails to obviate Claim 9.

D. Ground 4: The Combination of Patel-225, Schelen-1999, Schelen-1997, Patel-185, and Patel-624 Does Not Render Claims 1-8 Obvious

1. The Combination of Patel-225, Schelen-1999, Schelen-1997, Patel-185, and Patel-624 Does Not Render Claim 1 Obvious

74. I note that Petitioner states that its "Claim 1 analysis of limitations [1.0.1]-[1.8] in Ground 1 remains the same in Ground 4" and that its reliance on Patel-185 is restricted to the limitation of "end-to-end QoS." Pet. at 83. For at least the same reasons provided above for Claim 1 of Ground 1, in my opinion, any combination of Patel-225, Schelen-1999, Schelen-1997, Patel-185, and Patel-624

fails to obviate Claim 1.

2. The Combination of Patel-225, Schelen-1999, Schelen-1997, Patel-185, and Patel-624 Does Not Render Claims 2-8 Obvious

75. I note that Petitioner does not provide any further analysis with respect to its Ground 4 for Claims 2-8 other than referring to its “analysis at Claim 1 of Ground 4 and Claims 2-8 of Ground 1.” Pet. at 84. For at least the same reasons provided above for Claim 1 of Ground 4 and Claims 2-8 of Ground 1, in my opinion, any combination of Patel-225, Schelen-1999, Schelen-1997, Patel-185, and Patel-624 fails to obviate Claims 2-8.

E. Ground 5: The Combination of Patel-225 Schelen-1999, Schelen-1997, Patel-185, Patel-624, and Patel-764 Does Not Render Claims 2-5 Obvious

76. I note that Petitioner does not provide any further analysis with respect to its Ground 5 other than referring to its “analysis at Claim 1 of Ground 4 and Claims 2-5 of Ground 2.” Pet. at 85. For at least the same reasons provided above for Claim 1 of Ground 4, in my opinion, any combination of Patel-225 Schelen-1999, Schelen-1997, Patel-185, Patel-624, and Patel-764 fails to obviate Claims 2-5.

F. Ground 6: The Combination of Patel-225, Schelen-1999, Schelen-1997, Patel-185, Patel-624, and Degermark Does Not Render Claim 9 Obvious

77. I note that Petitioner does not provide any further analysis with respect to its Ground 6 other than referring to its “analysis at Claim 1 of Ground 4 and Claim

9 of Ground 3.” Pet. at 85. For at least the same reasons provided above for Claim 1 of Ground 4 and Claim 9 of Ground 3, it is my opinion that any combination of Patel-225, Schelen-1999, Schelen-1997, Patel-185, Patel-624, and Degermark fails to obviate Claim 9.

VII. SECONDARY CONSIDERATIONS HEAVILY WEIGH IN FAVOR OF NON-OBVIOUSNESS OF THE CHALLENGED CLAIMS

1. The RC 5500 is the Embodiment of the Claimed Features of the ’601 Patent

78. It is my understanding that the RC 5500 Product, which was developed by Operax AB, former owner of the ’601 Patent. Ex. 2003, ¶¶ 4-5, 11-13. Based on the declaration of Olov Schelen, I have created the chart below that shows how I or any person of ordinary skill in the art would have understood that each of the features of the RC 5500 directly corresponds to at least one claim limitation in the ’601 Patent:

<u>Claim Limitations (Claim 1)</u>	<u>Embodiment By the RC 5500</u>
handling radio resources within the RAN by using a radio resource manager controlling IP network resources by using a resource map in a Network Resource Manager (NRM) in order to provide said end-to-end QoS	comprised a network resource manager and radio resource manager
handling radio resources within the RAN by using a radio resource manager;	handled radio resources within a radio access network, such as in the backhaul, when wireless and satellite

	links were used
providing end-to-end Quality of Service (QoS) within a mobile telecommunication system comprising a Core Network (CN) connected to at least one Radio Access Network (RAN) using Internet Protocol (IP) based transmission controlling the IP network resources including the steps of the NRM performing path-sensitive call admission control by using the resource map in the NRM	controlled IP network resources using a resource map in order to provide end-to-end QoS, estimate routes, and log provision end and booked resources end-to-end
controlling the IP network resources including the steps of the NRM performing path-sensitive call admission control by using the resource map in the NRM, the NRM checking that resources are available along a path, and the NRM pre-allocating resources in an IP network;	performed path-sensitive call admission control based on setup requests coming from another entity (<i>e.g.</i>, call manager/gatekeeper), because that entity was not aware of network paths and link resources
the NRM checking that resources are available along a path	checked resource availability along a communication path, because it had an understanding of routes that would be used, of link capacities, and of other approved bookings
the NRM pre-allocating resources in an IP network	pre-allocated resource requests in an IP network, in order to provide needed resources throughout mission critical calls;
scheduling resources over time by introducing a start and a stop time as a parameter in a resource request handled by the NRM	scheduled resources over time by introducing start and stop times in a resource requests, to accommodate pre-planned mission critical calls
communicating resource information	communicated resource information

between the NRM and the radio resource manager	among at least network and radio resource managers to monitor booking status and to plan network capacity and/or provisioning upgrades
reserving the IP network resources along the path by the NRM to fulfill the end-to-end QoS	reserved IP network resources along the communication path to fulfill end-to-end QoS and ensure end-to-end call quality

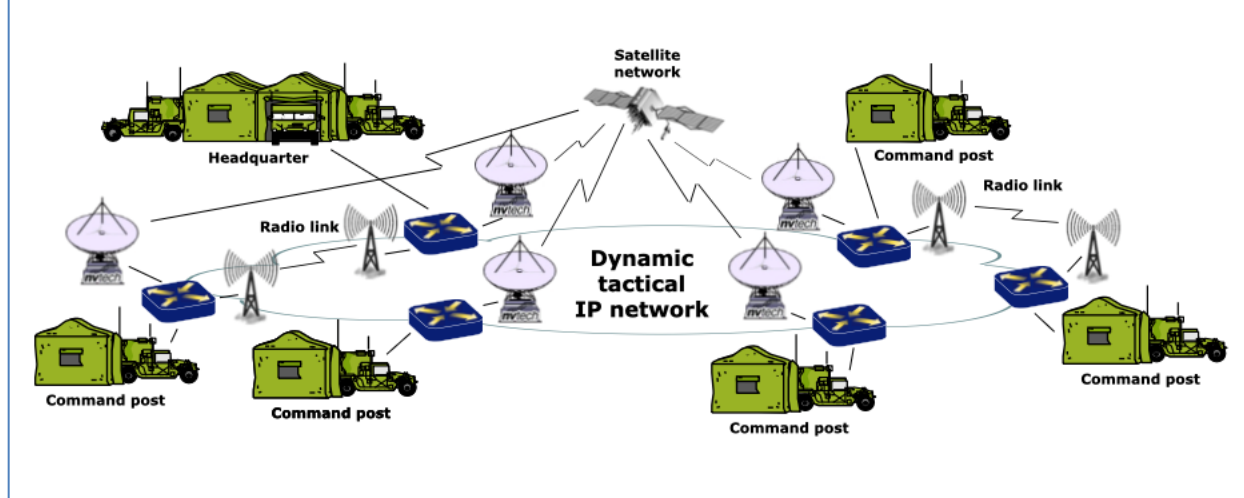
Ex. 2003, ¶ 7.

2. Secondary Considerations

a. The Invention of the '601 Patent Was a Commercial Success Through Its Use by the Royal Netherlands Army

79. I understand that Operax AB employees developed technologies related to United States Patent No. 7,616,601. Ex. 2003, ¶¶ 4-5. I further understand that one such project was the development of a product known as the RC 5500, which was sold by Operax AB to the Royal Netherlands Army. Ex. 2003, ¶ 6. I understand that the RC 5500 was successfully implemented by the Royal Netherlands Army within its TITAAN Project (“Theatre Independent Tactical Army and Airforce Network”). Ex. 2003, ¶ 8. I understand that a conceptual representation of how the RC 5500 was deployed by the Royal Netherlands Army is provided below:

Dynamic Tactical Network Architecture



Ex. 2003, ¶ 9.

80. I understand that the Royal Netherlands Army utilized the RC 5500 as a resource manager to control and manage wireless communication bandwidth in their TITAAN networks via mobile phones, IP call managers/gatekeepers and satellite equipment. Ex. 2003, ¶ 10.

81. In my opinion, the use of the RC 5500 by the Royal Netherlands Army represents the commercial success of the embodiment of the '601 Patent.

b. The Invention of the '601 Patent Was Significantly Recognized and Praised by the Industry

82. I understand that due in part to Operax's contribution to the TITAAN Project described above, the Royal Netherlands Army was awarded the best new Network Centric Warfare ("NCW") Programme within a NATO Coalition Nation

by the United States NCW community. Ex. 2003, ¶ 11 (citing <https://apps.dtic.mil/sti/tr/pdf/ADA469709.pdf>).

83. I understand that the success of Operax's contribution to the TITAAN Project via the utility of the '601 Patent is evidenced also in part by the Royal Netherlands Army's decisions to extend its involvement with Operax over time. Ex. 2003, ¶ 12 (citing <https://www.lightreading.com/cable-technology/dutch-army-deploys-operax#close-modal>).

84. I understand that industry recognition and praise of Operax's RC 5500 product is further evidenced by the InfoVision Award granted by the International Engineering Consortium and the Broadband World Forum Asia 2007 team. The InfoVision Award recognized Operax's RC 5500 being among "the most unique and beneficial to the telecommunications industry." Ex. 2003, ¶ 13 (citing <https://www.ossnewsreview.com/operax-wins-iec-infovision-award-1265>).

85. I understand that the RC 5500 was additionally recognized as a "new and imaginative product[]" by the European Council of Applied Sciences, Technologies and Engineering, with the sponsorship and support of the European Commission, through its award of the 2007 European ICT Prize at CeBIT, Hannover. Ex. 2003, ¶ 14 (citing <https://www.ossnewsreview.com/operax-awarded-2007-european-ict-prize-1147>).

86. In my opinion, the numerous awards afforded to the RC 5500 represents

the significant industry recognition and praise of the embodiment of the '601 Patent.

c. The Invention of the '601 Patent Solved Long Felt but Unresolved Needs

87. I understand and agree with the declaration of Olov Schelen that the RC 5500 and the inventions disclosed in United States Patent No. 7,616,601 solved a long-felt but unsolved problem in the field of networking, since there was a need for path aware admission control and the call managers/gatekeepers at the time of the invention did not have the required network awareness to perform such control. Ex. 2003, ¶ 15. Additionally, at that time, technologies such as RSVP were not used for per-call admission control in general, or in radio access networks. Ex. 2003, ¶ 15. Moreover, at the time RSVP didn't support admission control for advance scheduling of call resources. Ex. 2003, ¶ 15. One example of the technology at the time was the IntServ model of RSVP, which certainly could not solve the long felt need of issue resource reservation in heterogeneous networks.

88. I understand and agree with the declaration of Olov Schelen that the above limitations of the technologies that existed at the time of the invention of the '601 Patent led to unsolved problems such as network link overload, inefficient over-dimensioning of network resources, and/or lack of scalability among routers doing RSVP on a per-flow basis. Ex. 2003, ¶ 16.

89. I understand and agree that the RC 5500 was able to overcome these persistent and long-existing problems by implementing and embodying the

invention of the '601 Patent, which is why it was recognized for its ingenuity in the field of networking, as noted above. Ex. 2003, ¶ 16.

90. In my opinion, a person of ordinary skill in the art at the time of the invention of the '601 Patent would have been aware of the existing problems noted above and the lack of a solution to those problems absent the '601 Patent.

VIII. SUMMARY OF OPINIONS

91. 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. R. Michael Buehrer, and as the Board permits.

92. 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 dark ink, appearing to read "Paul Congdon", is written over a horizontal line.

Dr. Paul Congdon

EXHIBIT A

Paul Congdon

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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2. P. Congdon, "IEEE 802 Nendica Report: The Lossless Network for Data Centers", IEEE-SA Industry Connections White Paper, <https://ieeexplore.ieee.org/document/8462819>, Electronic ISBN: 978-1-5044-5102-4, August 2018
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US Patent 10,257,084 <i>Implementing a software defined network based on event records</i>	April 9, 2019
US Patent 10,135,673 <i>Communicating data associated with different personas of a user</i>	November 20, 2018
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US Patent 9,929,953 <i>Making a frame receive decision in a receiver PHY layer</i>	March 27, 2018
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US Patent 9,521,695 <i>Initializing network advertisements from probe requests</i>	December 13, 2016

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Pub. App. No. 20100118885

May 13, 2010

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Pub. App. No. 20080267179

October 30, 2008

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Pub. App. No. 20080229393

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Pub. App. No. 20080089246

April 17, 2008

Method and apparatus for selecting spanning tree root

Pub. App. No. 20050220092

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Methods and apparatus for selection of mirrored traffic

Pub. App. No. 20050220091

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Secure remote mirroring

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Remote mirroring using IP encapsulation

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Method and apparatus for access security services

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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