

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GOOGLE LLC,

Petitioner,

v.

HEADWATER RESEARCH LLC,

Patent Owner.

Patent No. 8,799,451
Case No. IPR2026-00466

DECLARATION OF DR. BILL LIN, PH.D.

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c.	1[b]: “at least one processor configured to execute one or more instructions that, when executed by the at least one processor, cause the at least one processor to:”	31
d.	1[b][i]: “provide a forwarding service to the one or more other end-user devices, the forwarding service for forwarding first traffic between the one or more other end-user devices and the network system,”	32
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I. INTRODUCTION

1. I have been retained by Google LLC (“Petitioner”) as an independent expert consultant in this proceeding before the Patent Trial and Appeal Board of the United States Patent and Trademark Office.

2. I am over 18 years of age and, if I am called upon to do so, I would be willing and able to testify as to the matters set forth herein.

3. My compensation is in no way contingent on the nature of my findings, the presentation of my findings in testimony, or the outcome of any related proceeding.

4. I understand that this proceeding involves U.S. Patent No. 8,799,451 (“the ‘451 patent,” EX1001). I have been asked by the Petitioner to provide my opinion on whether the claims of the ‘451 patent would have been obvious to a person of ordinary skill in the art at the time of the earliest claimed priority date of the ‘451 patent. In performing my analysis, I have been asked to assume that the priority date is January 28, 2009, which is the filing date of the earliest provisional application to which the ‘451 patent claims priority. My opinions are set forth below.

5. Throughout this declaration, I refer to specific pages, figures, or line numbers of various exhibits. These citations are illustrative and are not intended to

suggest that they are the only support for the propositions for which they are cited.

II. SUMMARY OF OPINIONS

6. This declaration considers claims 1-9, 11-16, 20, 22-28, 33, 36, 43-44, 50, and 52-69 of the '451 patent. Below, I set forth the opinions I have formed, the conclusions I have reached, and the bases for these opinions and conclusions. I believe the statements contained in this declaration to be true and correct to the best of my knowledge.

7. Based on my experience and knowledge of the art at the time of the earliest claimed priority date of January 28, 2009, it is my opinion that claims 1-9, 11-16, 20, 22-28, 33, 36, 43-44, 50, and 52-69 of the '451 patent would have been obvious based on the asserted grounds discussed below. A person of ordinary skill in the art would have found it obvious to combine the prior art references I cite and would have been motivated to do so before the priority date.

III. QUALIFICATIONS AND BACKGROUND

8. I believe that I am well qualified to serve as a technical expert in this matter based upon my qualifications, discussed in detail below.

9. I am currently a Full Professor of Electrical and Computer Engineering and the Associate Dean for Research at the University of California, San Diego (UCSD).

10. I received a Bachelor of Science in Electrical Engineering and Computer Sciences from University of California, Berkeley in May 1985. I received a Master of Science in Electrical Engineering and Computer Sciences in May 1988 and a Ph.D. in Electrical Engineering and Computer Sciences in May 1991, both from the University of California, Berkeley.

11. I joined UCSD in 1997, and I have been a tenured professor since 1999. My teaching and research focus on computer architecture and computer network problems, including the design of high-performance switches and routers, high-speed packet processors, wireless networks, data networks, and various hardware accelerators for networking applications. I regularly teach a senior-level design course on the design of advanced processors, and I have taught graduate courses and advanced special topics in computer architecture and computer networks.

12. At UCSD, I am a Principal Investigator in the UCSD Center for Networked Systems (CNS). CNS brings together researchers to work on a range of challenges in the design of future networked systems. My contribution to CNS has been expertise in the design of computer architecture solutions for packet processing, computer networking, and network measurements. I am also a Principal Investigator in the UCSD Center for Wireless Communications (CWC).

CWC brings together researchers to work on a range of challenges in the design of future wireless communications systems. My contribution to CWC has been expertise in the design of computer architecture solutions for wireless networking and mobile computing.

13. Prior to joining UCSD, I was the Head of the Systems and Communications Group at IMEC in Leuven, Belgium, where I led a team of researchers who worked on a range of computer design problems, including specialized processors for wireless communications and computer networking. I also previously held positions at Hewlett Packard, Hughes Electronics, and Western Digital.

14. During my career, I have received or worked on research efforts that received millions of dollars in research funding from both government agencies and industry, including funding for research in packet processing, computer networks, network measurements, and wireless communications.

15. I have served as an Associate or Guest Editor for several journals published by the Association for Computing Machinery (“ACM”) and the Institute of Electrical and Electronics Engineers (“IEEE”). I have also served as General Chair of several ACM/IEEE conferences, and on the Organizing or Steering Committees of many ACM/IEEE conferences, and I have served on the Technical

Program Committees of numerous ACM/IEEE conferences. I am the author of over 250 top-tier peer-reviewed publications in the field of computer engineering dating to the 1980s, including journal articles, conference papers, book chapters, technical reports, and invited papers. A number of these publications have received best paper awards or distinguished paper citations. I have also given numerous invited and keynote talks around the world.

16. I am a named inventor on six patents in the fields of computer design and computer networking.

17. My complete qualifications and professional experience are described in my curriculum vitae, filed as a separate Exhibit (EX1004).

IV. MATERIALS CONSIDERED

<u>Exhibit</u>	<u>Description</u>
EX1001	U.S. Patent No. 8,799,451 to Raleigh (“the ‘451 patent”).
EX1002	Prosecution History of U.S. Patent No. 8,799,451.
EX1005	U.S. Patent Appl. Publ. No. 2009/0017789 to Thomas et al. (“ <i>Thomas</i> ”).
EX1006	U.S. Patent Appl. Publ. No. 2008/0039102 to Sewall et al. (“ <i>Sewall</i> ”).
EX1009	U.S. Patent Appl. Publ. No. 2004/0103193 to Pandya et al. (“ <i>Pandya</i> ”).
EX1010	U.S. Patent Appl. Publ. No. 2008/0313327 to Sewall et al. (“ <i>Sewall</i> ’327”).

<u>Exhibit</u>	<u>Description</u>
EX1012	U.S. Patent Appl. Publ. No. 2006/0031515 to Van Gassel et al. (“ <i>Van Gassel</i> ”).
EX1013	U.S. Patent Appl. Publ. No. 2003/0035397 to Haller et al. (“ <i>Haller</i> ”).
EX1014	U.S. Patent Appl. Publ. No. 2009/0046591 to Krishnaswamy et al. (“ <i>Krishnaswamy Publication</i> ”).
EX1015	U.S. Patent Appl. Publ. No. 2007/0104169 to Polson (“ <i>Polson</i> ”).
EX1020	U.S. Patent No. 9,398,453 to Krishnaswamy et al. (“ <i>Krishnaswamy</i> ”).
EX1021	U.S. Patent Publication No. 2003/0088671 to Klinker et al. (“ <i>Klinker</i> ”).
EX1025	Joint Claim Construction Statement (D.I. 78) from <i>Headwater Research LLC v. Google LLC</i> , C.A. No. 7:25-cv-00376 (W.D. Tex.) (transferred to the Northern District of California as case number 3:26-cv-06230)

18. I have also relied on my education, experience, research, training, and knowledge in the relevant art and my understanding of legal principles described in this declaration.

19. All of the opinions contained in this declaration are based on the documents I reviewed and my knowledge and professional judgment. My opinions have also been guided by my understanding of how a person of ordinary skill in the art would have understood the claims of the ‘451 patent at the time of the earliest claimed priority date.

20. I reserve the right to supplement and amend any of my opinions in this declaration based on documents, testimony, and other information that becomes available to me after the date of this declaration.

V. LEGAL STANDARDS

21. In forming my opinions and considering the subject matter of the '451 patent and its claims in light of the prior art, I am relying on certain legal principles that counsel in this case explained to me. My understanding of these concepts is summarized below.

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

23. I understand that there are two ways in which prior art may render a patent claim unpatentable. First, I have been informed that the prior art can “anticipate” a claim. Second, I have been informed that the prior art can render a claim “obvious” to a person of ordinary skill in the art. I understand that a claim is patentable if it was not anticipated and would not have been obvious by the prior art at the effective filing date of the patent.

1. Claim Construction

24. I understand that the United States Patent and Trademark Office interprets claim terms in an *inter partes* review proceeding under the same claim construction standard that is used in a United States federal court. I understand that under this standard, the meaning of claim terms is considered from the viewpoint of one of ordinary skill in the art at the time of the alleged invention.

25. I have been informed that claim terms are generally given their ordinary and customary meaning as understood by one of ordinary skill in the art in light of the specification and the prosecution history pertaining to the patent. I understand, however, that claim terms are generally not limited by the embodiments described in the specification.

26. I understand that in addition to the claims, specification, and prosecution history, other evidence may be considered to ascertain the meaning of claim terms, including textbooks, encyclopedias, articles, and dictionaries. I have been informed that this other evidence is often less significant and less reliable than the claims, specification, and prosecution history.

2. Anticipation under 35 U.S.C. § 102

27. I understand that a patent claim is invalid as anticipated if a single piece of prior art teaches every element of the claims, viewed from the perspective

of a person of ordinary skill in the art. I also understand that an anticipatory reference does not have to recite word for word what is in the anticipated claims. Anticipation can also occur when a claimed limitation is inherent in the relevant reference. I have been advised that if the prior art necessarily functions in accordance with, or includes, the claims limitations, it can anticipate even though the limitation is not expressly disclosed.

3. Obviousness under 35 U.S.C. § 103

28. I understand that a patent claim is invalid as obvious if the claimed invention would have been obvious to a person of ordinary skill in the art at the time the claimed invention was made. This means that even if all of the elements of the claim cannot be found in a single prior art reference that would anticipate the claim, a person of ordinary skill in the field who knew about all the prior art would have come up with the claimed invention. I understand that in an obviousness determination, the person of ordinary skill in the art is presumed to have knowledge of all prior art. I understand that whether a claim is obvious is based upon the determination of several factual issues.

29. In considering obviousness, I understand that one must determine the scope and content of the prior art. I also understand that one must determine what differences, if any, existed between the claimed invention and the prior art.

30. I understand that a patent claim composed of several elements is not proved obvious merely by demonstrating that each of its elements was independently known in the prior art. In evaluating whether such a claim would have been obvious, one may consider whether a reason has been identified that would have prompted a person of ordinary skill in the art to combine the elements or concepts from the prior art in the same way as in the claimed invention. There is no single way to define the line between true inventiveness on the one hand (which is patentable) and the application of common sense and ordinary skill to solve a problem on the other hand (which is not patentable). For example, market forces or other design incentives may be what produced a change, rather than true inventiveness.

31. I also understand that, while there is no requirement that the prior art contain an express suggestion to combine known elements to achieve the claimed invention, and while a suggestion to combine known elements to achieve the claimed invention may come from the prior art as a whole or individually and may consider the inferences and creative steps a person of ordinary skill in the art would employ, as filtered through the knowledge of one skilled in the art, obviousness grounds cannot be sustained by mere conclusory statements and must include some articulated reasoning with some rational underpinning to support the

legal conclusion of obviousness. Moreover, I understand that a proper obviousness analysis requires a determination of whether a person of ordinary skill in the art would have a “reasonable expectation of success”—but not “absolute predictability” of success—in achieving the claimed invention by combining prior art references.

32. I understand that one may consider whether (1) the change was merely the predictable result of using prior art elements according to their known functions, or whether it was the result of true inventiveness; (2) there is some teaching or suggestion in the prior art to make the modification or combination of elements claimed in the patent; (3) the innovation applies a known technique that had been used to improve a similar device or method in a similar way; (4) the claimed invention would have been obvious to try, meaning that the claimed innovation was one of a relatively small number of possible approaches to the problem with a reasonable expectation of success by those skilled in the art; (5) the invention merely substituted one known element for another known element in order to obtain predictable results; (6) the invention merely applies a known technique to a known device, method, or product to yield predictable results, or (7) known work in the field may have prompted variations of use of the same inventions in the same or different fields due to market forces or design incentives

that would have been predictable to a person of ordinary skill in the art.

33. I understand that one must be careful not to determine obviousness using the benefit of hindsight; many true inventions might seem obvious after the fact. I understand that the determination should be based on the position of a person of ordinary skill in the field at the time the claimed invention was made and should not consider what is known today or what is learned from the teaching of the patent.

4. Secondary Considerations of Non-Obviousness

34. I understand that certain secondary considerations may be considered in evaluating obviousness in order to prevent hindsight bias. These secondary considerations include commercial success of products that practice the patent, long-felt need for the patented technology, failure by others to solve the problem addressed by the patent, initial skepticism by others in the industry, industry recognition and praise of the patented products, and efforts by others to copy the patented technology. I am not presently aware of any secondary considerations that would apply here.

35. I have been informed that these secondary considerations of non-obviousness must be balanced against the strength of the prima facie case of obviousness. Where the invention represents no more than the predictable use of

prior art elements according to their established functions, secondary considerations are inadequate to establish non-obviousness.

36. I have also been informed that the patentee must establish a nexus between any secondary consideration factors and the claimed invention. Where a secondary consideration factor results from something other than what is both claimed and novel in the patent, there is no nexus to the merits of the claimed invention.

37. I have been informed that, for example, the nexus requirement as it applies to the evidence of commercial success requires that the patentee must show that the sales of a product that allegedly practices the claimed invention must be a direct result of the unique characteristics of the claimed invention, as opposed to other economic and commercial factors that are unrelated to the patented invention. I understand that this means if the commercial success is due to an element that existed in the prior art or that is not claimed by the patent, then no nexus exists.

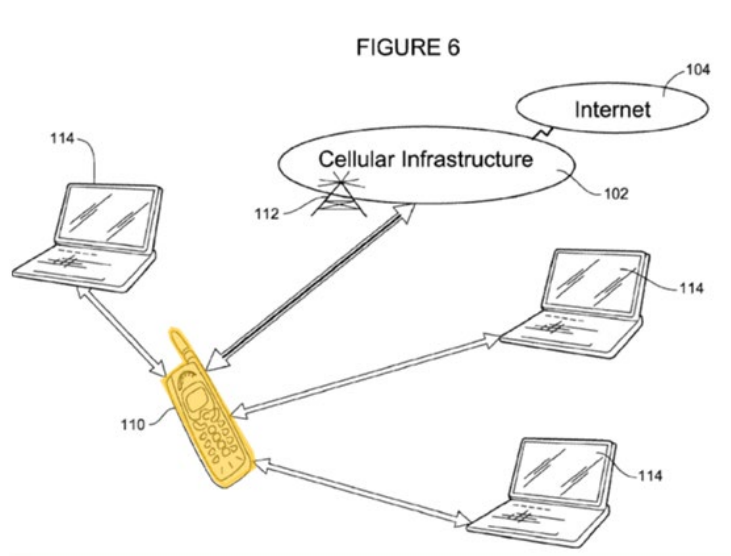
38. I have been further informed that, for example, the nexus requirement as it applies to the long-felt need element must likewise be supported by evidence. Where the differences between the prior art and the claimed invention are minimal, it cannot be said that any long-felt need was met by the patented invention or that

the patent solved any technological problems that were unaddressed by others.

39. I have been informed that evidence of industry praise must also show a nexus with the claimed invention, and that self-serving statements by the patentee regarding the merits of the claimed invention are generally not given weight.

VI. TECHNOLOGY OVERVIEW

40. By January 2009, the '451 patent's earliest claimed priority date, using an end-user device to provide a forwarding service was not merely known, but was considered old and "conventional." EX1005, ¶28. For example, the representative figures below from several U.S. Patent Publications that were filed and/or published before January 2009, demonstrate how ubiquitous mobile hotspot technology was at the claimed priority date of the '451 patent.



EX1005, Fig. 6 (annotated) (published January 15, 2009), ¶25.

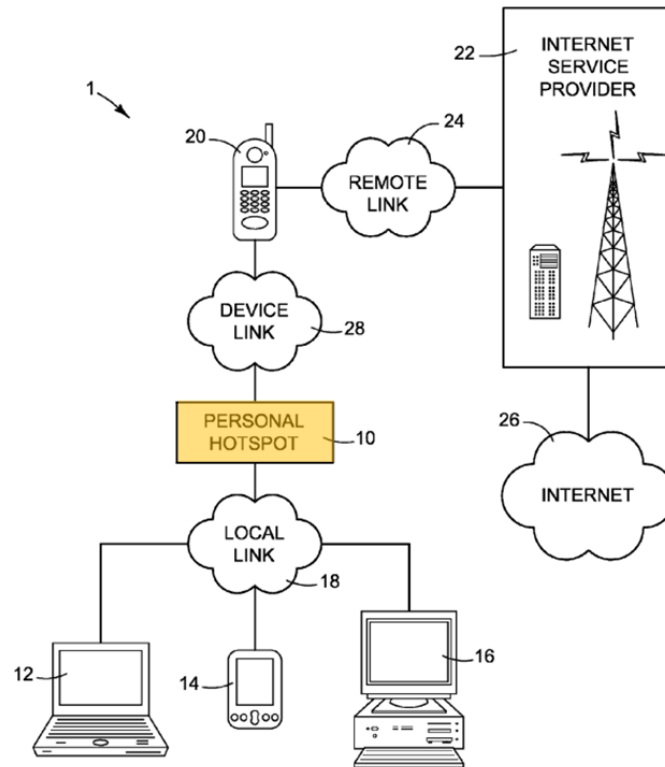


FIG. 1

EX1006, Fig. 1 (annotated) (published February 14, 2008), ¶9; EX1010, Fig. 1 (published December 18, 2008).

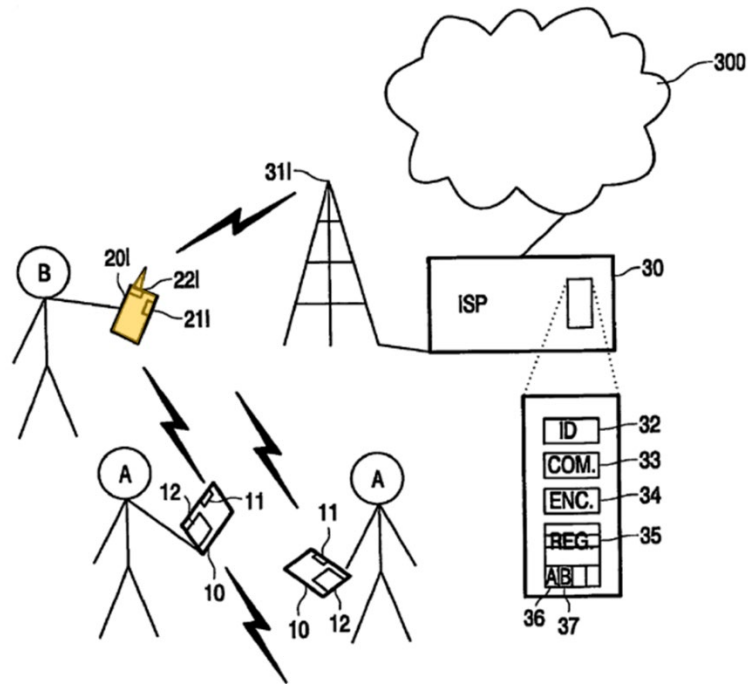


FIG. 1

EX1012, Fig. 1 (annotated) (published February 9, 2006), ¶¶69-71.

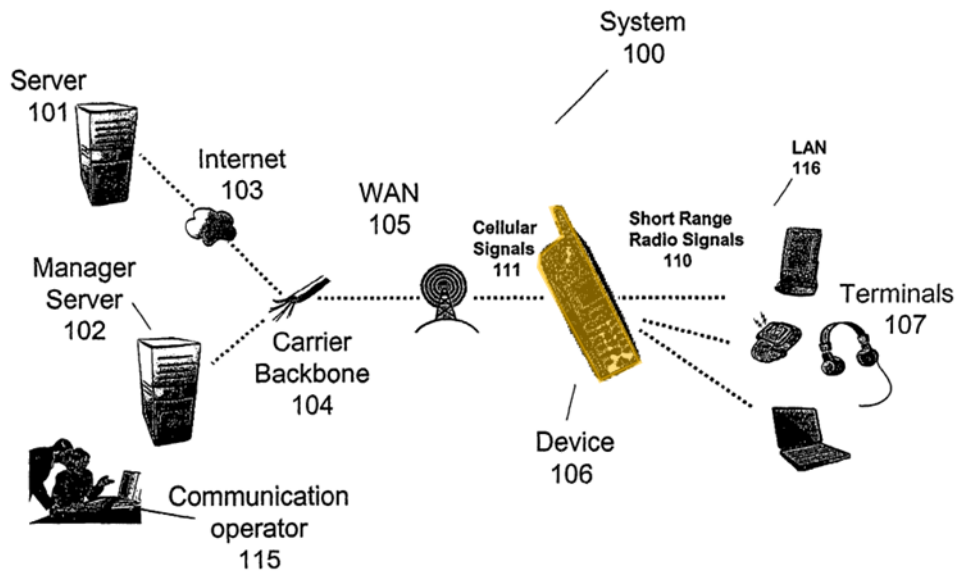


Fig. 1

EX1013, Fig. 1 (annotated) (published February 20, 2003), ¶¶40 and 43.

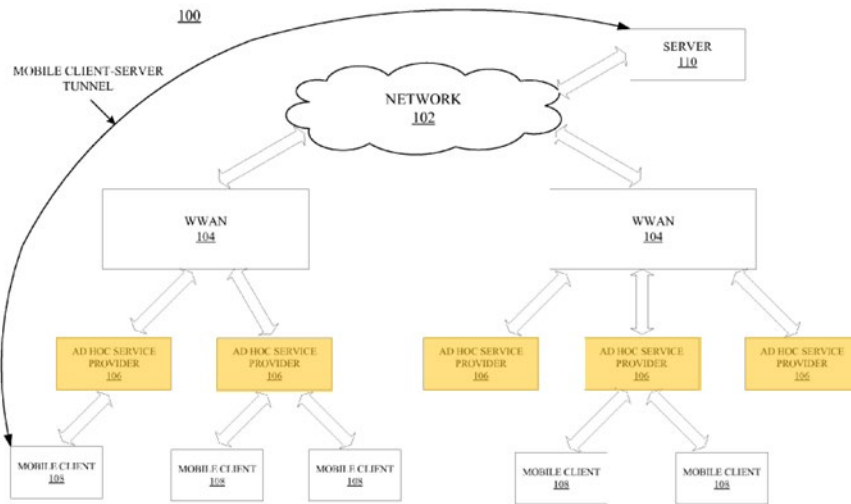
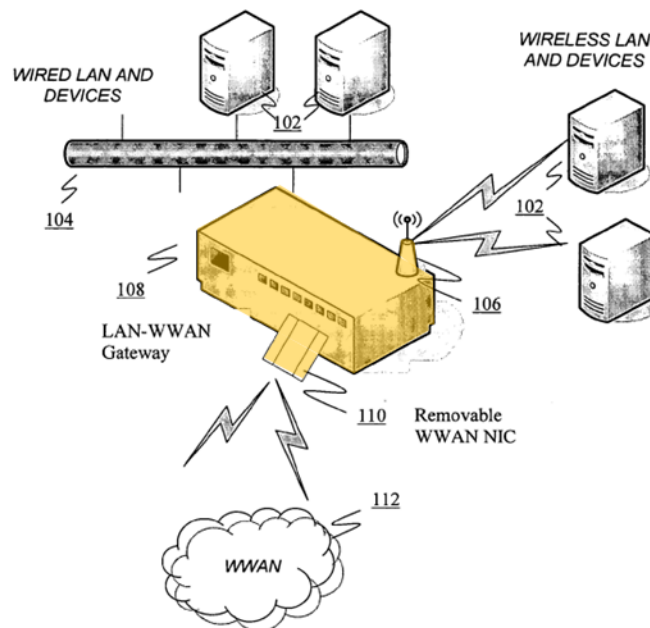


FIG. 1

EX1014, Fig. 1 (annotated) (published February 19, 2009 and claiming priority to Provisional App. No. 60/956,658, filed Aug. 17, 2007), ¶¶21-24.



EX1015, Fig. 1 (published May 10, 2007), ¶20.

41. Providing service plans for end-user devices to enable a forwarding service, providing notifications to users regarding information about the forwarding service, accounting for usage of the forwarding service by other end user devices, and controlling traffic associated with the forwarding service were similarly well-known by January 2009. EX1005, ¶¶46, 49, 54, 56, 76, 77; EX1006, ¶¶22, 25, 33, 36, 37, 38.

VII. THE '451 PATENT

1. Overview

42. The '451 patent discloses a system that allows an end-user device to be used as an intermediate networking device. EX1001, 32:34-44, 35:21-30. Figure 15 reflects the purported invention:

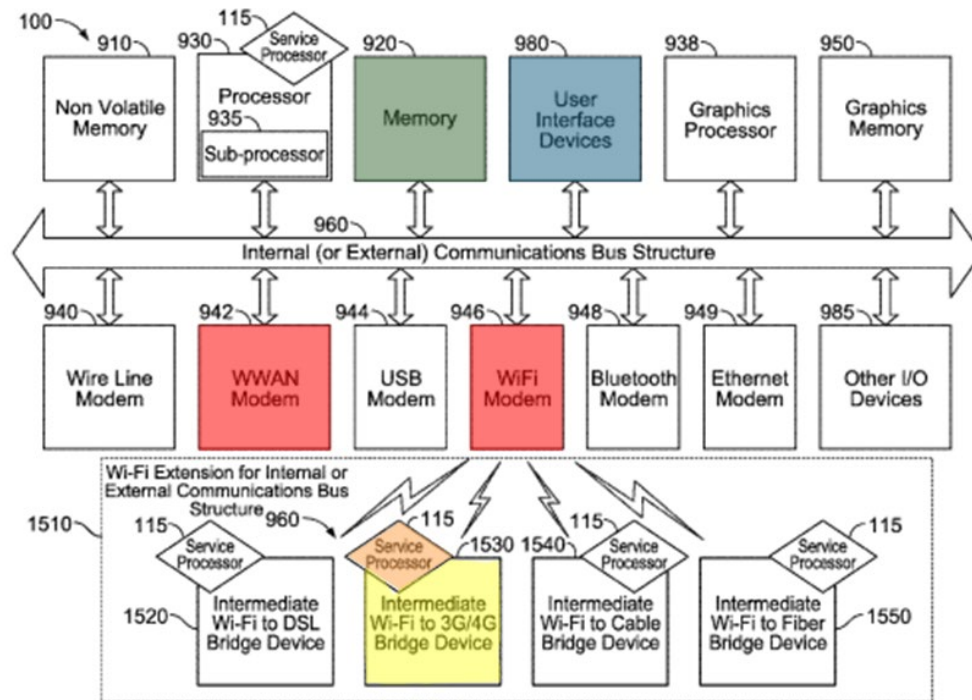


FIG. 15A

EX1001, Fig. 15A (annotated).

43. The end-user device includes a **modem** for communicating with one or more networks and one or more other devices. The **service processor** executes instructions to provide a forwarding service to the other devices, implements service policies for controlling traffic, and monitors successful or attempted use of the forwarding service. The **memory** of the end-user device is configured to provide the instructions for the service processor.

2. Prosecution History

44. The claims submitted in the original application that would become the '451 patent recited an “intermediate networking device” that acted as an

intermediary between devices and a network. EX1002, 242. The examiner, however, found those claims were anticipated by prior art routers. EX1002, 1501 (discussing *Klinker*) and 508 (rejecting the claims based on *Klinker* and *Pandya*).

45. The applicant next amended the claims to recite a “first end user device capable of operating” as an intermediate networking device and argued that the prior art did not disclose such a device. EX1002, 10, 24-25. The applicant also amended the claims to require providing a “forwarding service.” EX1002, 10, 24-25. But the examiner issued a final office action that withdrew the pending claims, finding the amendments departed too much from the originally submitted claims. EX1002, 56 (“Election by Original Presentation”).

46. The applicant next filed a request for continued examination cancelling all claims and presenting new ones. EX1002, 67. A different examiner then took over the case but rejected the claims as anticipated based on a new reference, *Robinson*. EX1002, 327. After receiving the rejection, the applicant again heavily amended the claims and added 54 new claims in response. EX1002, 661.

47. A Notice of allowance followed; however, the Examiner did not provide any comments on the reasons for allowance. EX1002, 837. In my opinion, as I detail further below, the examiner clearly erred because the prior art already

disclosed the allowed claims.

VIII. PRIOR ART

1. *Sewall*

48. *Sewall* discloses a device, such as a cellular phone, that is capable of routing communications between client devices and the internet. EX1006, Abstract. This device of *Sewall* functions as a personal hotspot and may implement access rules that limit network access to its traffic-forwarding service. EX1006, ¶¶7-9. The hotspot device of *Sewall* applies different network access rules based on different identified users or user types. EX1006, ¶22. The access rules may be defined by configuration data that can be modified and updated. EX1006, ¶¶24-25. The access rules and configuration data restrict data usage or otherwise control network access provided by the personal hotspot. EX1006, ¶34

2. *Thomas*

49. *Thomas* discloses a wireless device that provides access to the internet or other WAN for one or more other computing devices via a wireless local area network. EX1005, Abstract, ¶25. *Thomas*'s wireless device provides a dynamic, secure, and flexible networking environment by allowing real-time configuration of network connections. EX1005, ¶29.

50. As reflected in Figure 3, annotated below, the wireless device of *Thomas* includes a DSP, a memory including a client access application, a display,

and a processor:

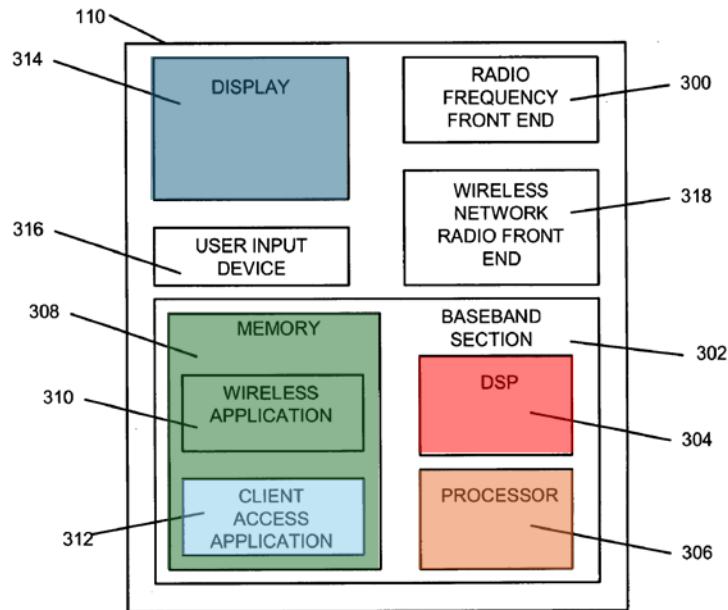
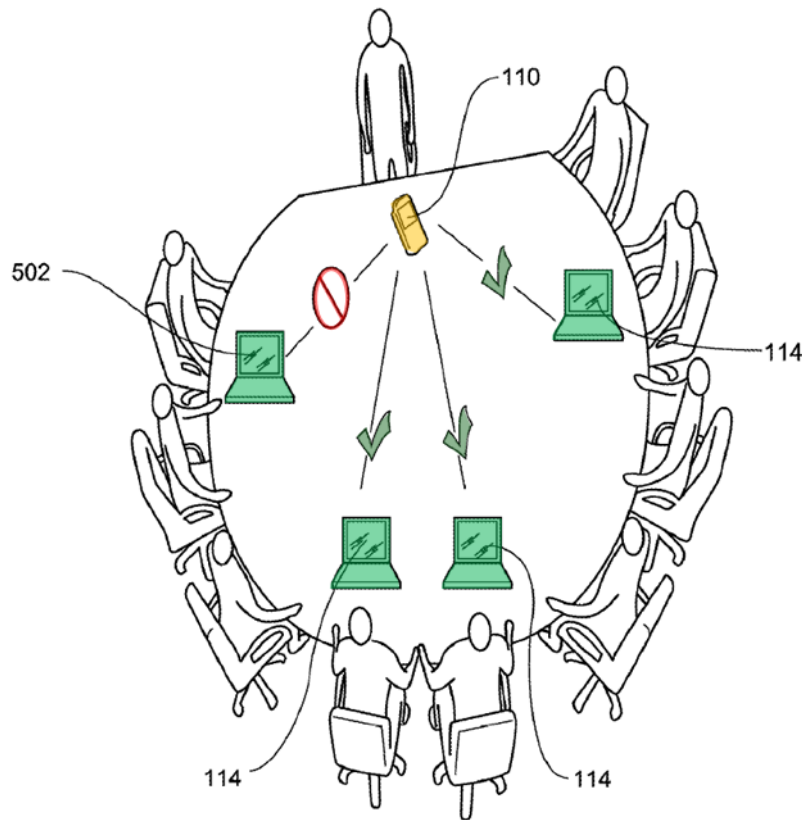


FIGURE 3

EX1005, ¶¶33-34, Fig. 3 (annotated). In my opinion, the DSP is a modem that “modulates and demodulates data” to process signals received from or transmitted to the radiofrequency front end. EX1005, ¶33. The client access application of *Thomas*’s wireless device provides “application-level point of presence capabilities” to the wireless device. EX1005, ¶34.

51. As further shown in Fig. 5, annotated below, the wireless device 110 of *Thomas* may authorize networking traffic by allowing a user, through a user interface, to accept or deny requests from client devices 114 to access the internet.

FIGURE 5



EX1005, Fig. 5 (annotated), ¶¶44. *Thomas*'s wireless device 110 may enable or disable the forwarding service by sending start and stop messages to a server, and the server may determine if the wireless device is authorized to provide the forwarding service. EX1005, ¶¶58-59, 65.

3. *Polson*

52. *Polson* discloses a gateway that is adapted to establish a connection between itself and a wireless wide area network (WWAN) with a WWAN interface adapted to receive data from and transfer data to the WWAN on behalf of

devices (e.g., PCs or wireless mobile phones) of a local area network (LAN).

EX1015, Abstract, ¶¶16, 21. *Polson* also discloses WWAN access management strategies, including adapting its gateway to prioritize specific data over the WWAN to manage conflicts between LAN end-user devices that are sharing limited WWAN capacity. EX1015, ¶46.

53. Furthermore, *Polson* recognizes that the mobility of its gateway is important and that the ability to connect to multiple WWANs is necessary when one WWAN is not available due to the location of the user, issues with the service provider, or the features of a service agreement. EX1015, ¶¶52-53. The gateway of *Polson* comprises a socket adapted to removably receive one or more WWAN interfaces 110, for example, a PC Card or Modem that plugs into the socket, that are adapted to send and receive data through one or more WWANs. EX1015, ¶¶20, 51.

4. *Krishnaswamy*

54. *Krishnaswamy* discloses an ad hoc service provider for a wireless network that includes a processing system configured to support both a first wireless access protocol and a wireless access point for at least one mobile client that utilizes a second wireless access protocol. EX1020, Abstract, 1:47-52. The ad hoc service provider 106 includes a service provider application

208 that maintains a session with the server 110 over the network 102 to exchange messages. EX1020, 6:62-64, Figs. 1-2. The service provider application 208 controls the interconnection and session monitoring module 206, which monitors the amount of content to and from the mobile clients 108 as well as WWAN and WLAN network resource utilization. *Id.*, 7:1-12, Figs. 1-2.

55. The ad hoc service provider 106 of Krishnaswamy may also be configured to alter the ad hoc service provider's ability to provide service for a wireless network in response to a resource-related event, like an indication that an available bandwidth is below a bandwidth threshold. EX1020, 10:51-54, 11:3-25. Once a resource-related event has been detected, the ad hoc service provider may alter one or more of its service attributes, like the data rate or duration of the service, and notify some or all of the mobile clients 108 that an alteration has occurred. EX1020, 11:26-44. Krishnaswamy discloses that the ad hoc service provider may also hand off mobile clients 108 to other ad hoc service providers based on, for example, quality of service factors. EX1020, 6:1-16.

5. *Pandya*

56. *Pandya* discloses a distributed network that includes servers and client devices connected over a network link. EX1009, ¶32. *Pandya*'s distributed network includes devices (e.g., cellular phones) that may function as control points

to manage network resources for other agent devices (e.g., computers). EX1009, ¶¶28, 44. *Pandya*'s control-point devices may monitor network events and congestion of network resources and provide a traffic-control mechanism to dynamically allocate bandwidth usage within the distributed network. EX1009, ¶¶28, 77.

IX. LEVEL OF ORDINARY SKILL IN THE ART

57. I am informed that patentability must be analyzed from the perspective of “one of ordinary skill in the art” in the same field as the patent-in-suit at the time of the invention. I am also informed that several factors are considered in assessing the level of ordinary skill in the art, including (1) the types of problems encountered in the art; (2) the prior art solutions to those problems; (3) the rapidity with which innovations are made; (4) the sophistication of the technology; and (5) the education level of active workers in the field.

58. In my opinion, a person of ordinary skill in the art pertinent to the ‘451 patent as of its earliest priority date would have had at least a bachelor’s degree in computer science, electrical engineering, or a related field, and at least two years of work/research experience in the field of computer networking and networking devices. More related education would compensate for fewer years of work experience (and vice versa). I meet this definition of one of ordinary skill in

the art now and at the priority date of the '451 patent.

X. CLAIM CONSTRUCTION

59. In my opinion, no claim terms need to be expressly construed.

60. I have been informed and understand that, in a different proceeding (*Headwater Research LLC v. Google LLC*, C.A. No. 7:25-cv-00376 (W.D. Tex.) (transferred to the Northern District of California as case number 3:26-cv-06230)), the parties submitted a joint claim construction statement. EX1025. The distinction between the parties' proposed constructions is not material to my patentability analysis here.

**XI. GROUND 1: CLAIMS 1-2, 6, 12-15, 24, AND 27 ARE OBVIOUS
OVER *SEWALL***

1. Independent Claim 1

61. In my opinion, claim 1 would have been obvious to one of skill based on *Sewall*.

- a. 1[pre]: “A **first end-user device** capable of operating as an intermediate networking device, the first end-user device comprising:”

62. *Sewall* discloses 1[pre]. *Sewall* discloses a personal hotspot that allows users to connect to the internet. EX1006, ¶7. The personal hotspot 10 is a device, such as an internet enabled cellular telephone (“mobile hotspot”), that is capable of routing network communications between client devices 12, 14, and 16 and the internet 26 via a data exchanger 20 that may be incorporated into the same device. *Id.*, ¶¶7, 9, 16. The personal hotspot 10 and its environment are illustrated in Figure 1 of *Sewall* (reproduced and annotated below).

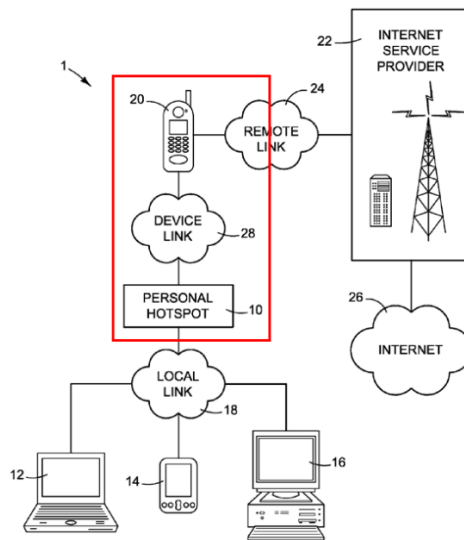


FIG. 1

63. One of skill would have understood that *Sewall*'s mobile hotspot is “[a] **first end-user device** capable of operating as an intermediate networking device,” as recited in claim 1[pre].

b. 1[a]: “one or more modems enabling the first end-user device to communicate with a network system over a first network and with one or more other end-user devices over a second network, the first network comprising a wireless access network;”

64. *Sewall* discloses 1[a]. One of skill would have understood that all mobile hotspots include a modem for communicating with the internet and with other computing devices utilizing the forwarding services (client devices). *Sewall*'s mobile hotspot is no different.

65. *Sewall* discloses that personal hotspot 10 may be “any combination of hardware and/or programming capable [of] functioning as a router for directing

network communications between client devices and the internet via a data exchanger such as a data capable cellular device, DSL modem, or cable modem.”

EX1006, ¶17. One of skill would have understood that every data-capable cellular device has a modem.

66. As illustrated in Figure 1 of *Sewall* (reproduced and annotated below), the modem in *Sewall*'s personal hotspot enables the personal hotspot to communicate (1) with the internet (**network system**) via remote link 24 (**first network**) and (2) with the client devices 12, 14, and 16 (other end user devices) via local link 18 (**second network**). EX1006, ¶¶7, 10, 13, 17, Fig. 1.

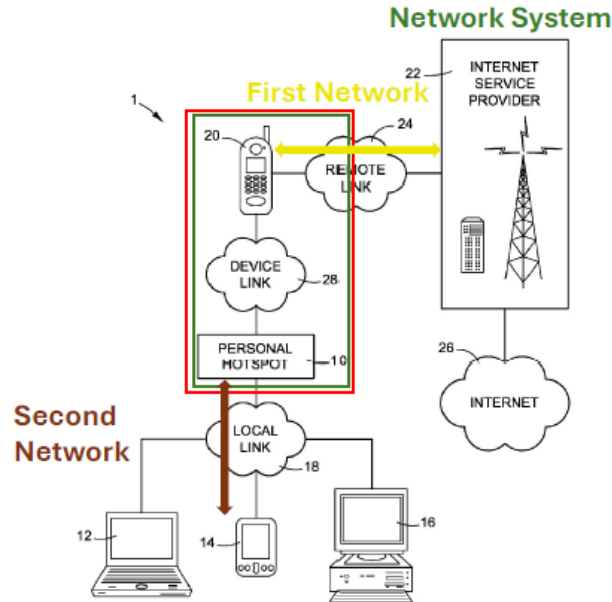


FIG. 1

Sewall further discloses that remote link 24 connecting (and supporting

communication between) the personal hotspot 10 and service provider 22 may be a wireless connection. *Id.*, ¶13.

67. Accordingly, *Sewall*'s mobile hotspot comprises "one or more modems enabling the first end-user device to communicate with a network system over a first network and with one or more other end-user devices over a second network, the first network comprising a wireless access network," as recited in claim 1[a].

c. 1[b]: "at least one processor configured to execute one or more instructions that, when executed by the at least one processor, cause the at least one processor to:"

68. *Sewall* discloses 1[b]. One of skill would have understood that all mobile hotspots include a processor that is configured to execute one or more instructions. *Sewall*'s mobile hotspot is no different. *Sewall* discloses that its personal hotspot 10 may be embodied in "any computer-readable media for use by or in connection with an instruction execution system such as a computer/processor based system or an ASIC (Application Specific Integrated Circuit) or other system that can fetch or obtain the logic from computer-readable media and execute the instructions contained therein." EX1006, ¶58.

69. Accordingly, *Sewall*'s mobile hotspot comprises "at least one processor configured to executed one or more instructions," as recited in claim

1[b]. As detailed below, when executed by the processor(s), those instructions cause the processor(s) to perform the various functions recited in claim 1[b][i]-[iv].

d. 1[b][i]: “provide a forwarding service to the one or more other end-user devices, the forwarding service for forwarding **first traffic between the one or more other end-user devices and the network system,”**

70. *Sewall* discloses 1[b][i]. As discussed above, *Sewall*’s personal hotspot 10 is “a device [that is] capable o[f] routing network communications between client devices 12, 14, and 16 and [the] internet 26 via a data exchanger 20.” EX1006, ¶9. As illustrated in Figure 1 of *Sewall* (reproduced and annotated below), the mobile hotspot (data exchanger 20 and personal hotspot 10) forwards **first traffic** between the client devices 12, 14, and 16 (i.e., “the one or more other end-user devices”) and the internet 26 via local link 18 and remote link 24. *Id.*, Fig. 1.

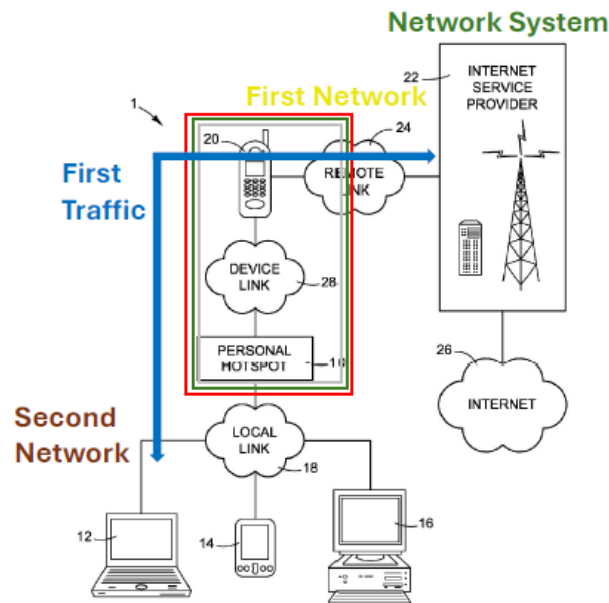


FIG. 1

“Communication between client devices 12, 14, and 16 and internet 26 is dependent upon personal hotspot 10” and the forwarding service it provides. *Id.*, ¶15.

71. One of skill would have further understood that *Sewall's* mobile hotspot comprises a processor that executes instructions from computer-readable media, as discussed above, and that those instructions, when executed, cause the mobile hotspot to provide the forwarding service to client devices. EX1006, ¶¶ 18, 57-58, claim 11

e. 1[b][ii]: “implement a **first service policy**, the first service policy for assisting in control of the first traffic,”

72. *Sewall* discloses 1[b][ii]. As defined in claim 1 of the '451 patent, the

“first service policy” assists in the control of “first traffic” between the “one or more other end-user devices” and the network system. EX1001, Claim 1. In this regard, *Sewall*’s personal hotspot contains a limiter 40, which includes configuration data 42 with access rules for the personal hotspot. EX1006, ¶¶19, 23, Fig. 3, Fig. 4. These elements are illustrated in Figures 3 and 4 of *Sewall* (reproduced and annotated below).

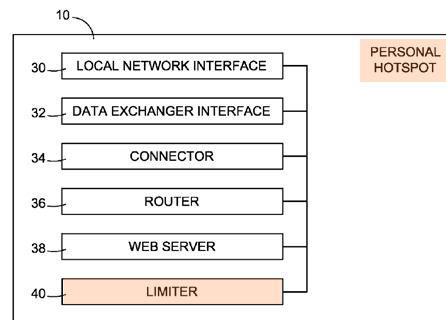


FIG. 3

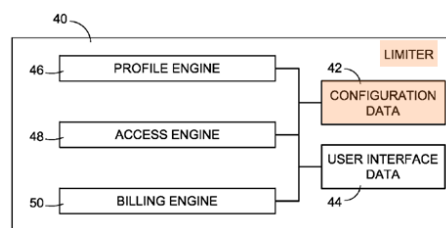


FIG. 4

73. *Sewall*’s personal hotspot—specifically, the limiter 40—is capable of distinguishing among the users of client devices and applying different internet access rules for different users. EX1006, ¶¶15, 22. For example, certain internet access rules may apply to the owner of the personal hotspot—i.e., “the individual or entity that is a subscriber with respect to a service provider” who also typically

has physical possession or control of the personal hotspot. *Id.*, ¶22. Different internet access rules can apply to users that are authorized by the owner. *Id.* And “[y]et other internet access rules apply to anonymous users” who are able to connect their client device with the personal hotspot wirelessly but are not known by the owner. *Id.*

74. As depicted in Figure 5 of *Sewall* (reproduced and annotated below), the configuration data includes default profiles that are used by the limiter 40, specifically its access engine 48, to determine whether or not a communication from a client device (and its user) will be blocked. *Id.*, ¶¶ 26, 33, Fig. 5.

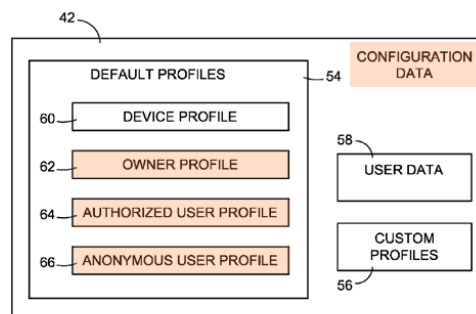


FIG. 5

These default profiles include an owner profile 62, authorized user profile 64, and anonymous user profile 66, as follows:

- Owner profile 62 represents access rules for the owner of the mobile hotspot;
- Authorized user profile 62 represents access rules for the users of the mobile hotspot that are authorized by the owner; and
- Anonymous user profile 66 represents access rules for anonymous users of the mobile hotspot. *Id.*, ¶36.

Further, the owner of the personal hotspot may provide custom profiles 56 with customized access rules for a particular user. *Id.*, ¶37. For example, the owner may desire “to provide a spouse or personal friend with less limited access than other authorized users” or “to provide a child with more limited access.” *Id.*

Accordingly, the first access rules (**first service policy**) vary depending on the client device and its associated user profile.

75. *Sewall*’s first access rules (**first service policy**) assist in the control of “first traffic” between the “one or more other end-user devices” and the network system, as recited in claim 1. Specifically, the first access rules may “specify upload and download bandwidth limits” or “limit the amount of data transfer allowed in a given time period.” EX1006, ¶36. “Typically, anonymous user access rules will be more limiting than authorized user access rules, and authorized user access rule[s] will be more limiting than owner access rules.” *Id.* In fact, the anonymous user profile “may indicate anonymous user[s] are to be blocked” altogether or that “payment is required” for access. *Id.*; *see id.*, ¶22 (stating that internet access rules for anonymous users “may be quite limiting”).

76. When the user of a client device sends a request for content from the internet through *Sewall*’s personal hotspot, before that communication is routed, the access engine 48 applies access rules obtained from configuration data 42.

EX1006, ¶26. “The configuration data may indicate that the source of the communication is not an owner and is not authorized by the owner to access personal hotspot 10.” *Id.* If the configuration data 42 indicates that such anonymous communications are to be blocked, the access engine 48 prevents the communication from being routed to the internet. *Id.* If paid access is allowed, the billing engine 50 will cause the server to return a user interface having controls for supplying payment information to a payment service on the internet. *Id.*, ¶28. If the payment information is verified, the anonymous user is authorized for access. *Id.*, ¶29.

77. When *Sewall*’s personal hotspot receives a routable communication—i.e., a communication that is not per se blocked—the personal hotspot identifies the communication type based on its associated user profile (owner, authorized, anonymous, custom). EX1006, ¶47. This may be accomplished by examining identifying information associated with the communication—for example, a hardware address identifying the client device from which the communication originated. *Id.* If the source of the communication is known to personal hotspot 10, the access engine 48 identifies first access rules for its source by parsing the configuration data and identifying the corresponding user profile associated with the source. *Id.*, ¶48. “From the identified profile, access engine 48 extrapolates the

access rules for the source [of the communication] and limits access to personal hotspot 10 according to those access rules.” *Id.*, ¶49. The communication may be blocked if it violates the applicable access rules, for example, by exceeding a limit on the (i) available bandwidth, (ii) amount of data that may be uploaded or downloaded, or number of simultaneous connections. *Id.* Otherwise, the communication is routed to its intended destination. *Id.*

78. Accordingly, one of skill would have understood that *Sewall*’s mobile hotspot implements first access rules (**first service policy**) based on the user profile associated with each client device in order to assist in the control of “first traffic” between the “one or more other end-user devices” and the network system, as recited in claim 1[b][ii]. One of skill would have further understood that *Sewall*’s mobile hotspot comprises a processor that executes instructions from computer-readable media, as discussed above, and that those instructions, when executed, cause the mobile hotspot to implement the **first service policy**. EX1006, ¶¶ 26, 46-55, 57-58.

- f. 1[b][iii]: “implement a **second service policy**, the second service policy for assisting in control of **second traffic**, the **second traffic** associated with access by the first end-user device to one or more services over the first network, wherein the second service policy differs from the first service policy, and”

79. *Sewall* discloses 1[b][iii]. As defined in claim 1 of the ’451 patent, the

“second service policy” assists in the control of “second traffic” between the first end-user device and the first network. EX1001, Claim 1. As discussed above, *Sewall*’s personal hotspot contains a limiter 40, which includes configuration data 42 with access rules for the personal hotspot. EX1006, ¶¶19, 23, Fig. 3, Fig. 4; *supra* § XI.1.e. These elements are illustrated in Figures 3 and 4 of *Sewall* (reproduced above in § XI.1.e).

80. As depicted in Figure 5 of *Sewall* (reproduced and annotated below), the configuration data includes default profiles that are used by the access engine 48 to determine whether or not a communication from a client device (and its user) will be blocked. *Id.*, ¶¶ 26, 33, Fig. 5.

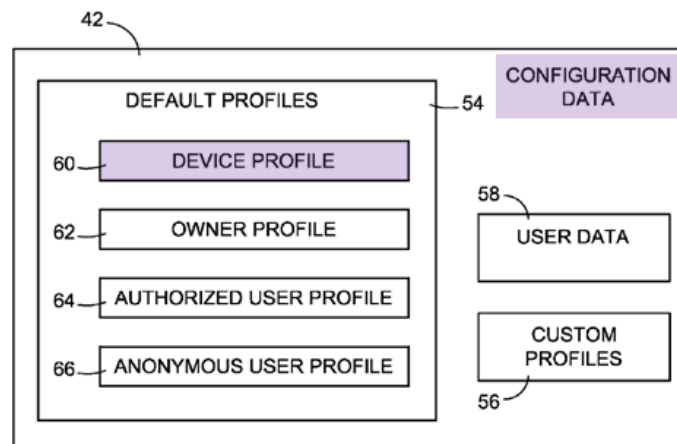


FIG. 5

One of the default profiles is the device profile 60, which provides access rules that apply to all users of personal hotspot 10. *Id.*, ¶34. These device access rules may

“specify upload and download bandwidth limits,” “limit the amount of data transfer allowed in a given period,” or “limit the number of simultaneous users or sessions supported by [the] personal hotspot.” *Id.* Moreover, “the nature of the device access rules may be dependent upon the nature of the data subscription package the owner of [the personal hotspot] has with [the] service provider.” *Id.* As *Sewall* explains, “[a] basic subscription package [paid for by the owner of the personal hotspot] might . . . have more stringent access rules than a premium subscription package.” *Id.*, ¶25.

81. When *Sewall*’s personal hotspot (through data exchanger 20) establishes a data connection with the service provider, the service provider 22 returns configuration data for use by the limiter. EX1006, ¶¶25, 43-44. For example, the service provider will supply a device profile, which may not be editable by the owner of the personal hotspot. *Id.*, ¶35. The limiter—specifically, access engine 48—will then limit access for all users of the personal hotspot in accordance with the access rules in the device profile obtained from the service provider. *Id.*, ¶¶23, 26.

82. One of skill would thus understand that *Sewall*’s mobile hotspot implements second access rules (second service policy) based on the device profile 60 to assist with controlling the second traffic between the mobile hotspot and the

internet via remote link 24, as recited in claim 1[b][iii]. *Id.*, ¶34.

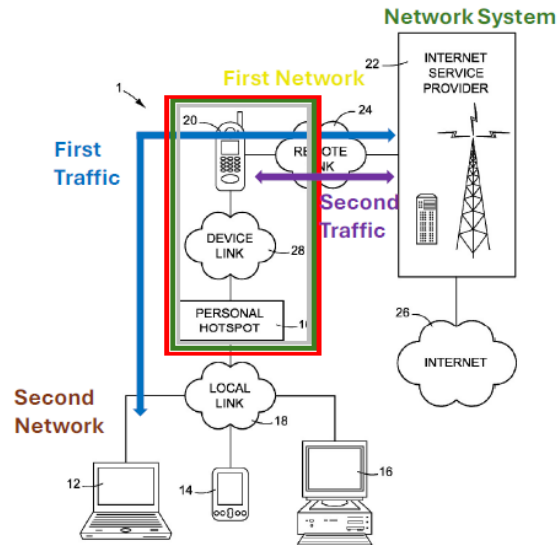


FIG. 1

In my opinion, one of skill would have further understood that *Sewall's* mobile hotspot comprises a processor that executes instructions from computer-readable media, as discussed above, and that those instructions, when executed, cause the mobile hotspot to implement the **second service policy**. EX1006, ¶¶ 25-26, 34-35, 43-45, 57-58.

83. One of skill would have further understood that the **second service policy** implemented by *Sewall's* personal hotspot differs from the first service policy. Whereas **first traffic** involves data that the personal hotspot forwards on behalf of the other devices, **second traffic** involves the hotspot's own network communication with the network system (over the first network). In contrast to

Sewall's first access rules (first service policy), which are user-specific, *Sewall*'s second access rules apply generally to the personal hotspot and to all users of the personal hotspot. One of skill would understand that the second access rules dictate the types of services (e.g., email, web browsing, multimedia) that are supported over the first network and available for the personal hotspot itself as well as other connected devices.

g. 1[b][iv]: “monitor or identify successful use or attempted use of the forwarding service; and”

84. *Sewall* discloses 1[b][iv]. As detailed above (in §XI.1.e), when *Sewall*'s mobile hotspot receives a communication from a computing device attempting to use its forwarding service, the access engine 48 applies access rules obtained from configuration data 42. EX1006, ¶26. To do so, the access engine 48 monitors the source of the communication from user data 58 and identifies a profile (e.g., owner, authorized user, anonymous user, or custom) that is associated with the source of the communication. *Id.*, ¶¶38-39, 47-48, Figs. 4-5, 8.

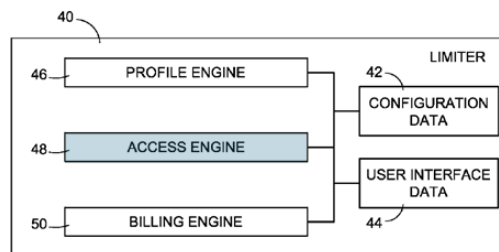


FIG. 4

“From the identified profile, access engine 48 extrapolates the access rules for the source [of the communication] and limits access to personal hotspot 10 according to those access rules.” *Id.*, ¶49. This process is illustrated in Figure 8 of *Sewall* (reproduced and annotated below).

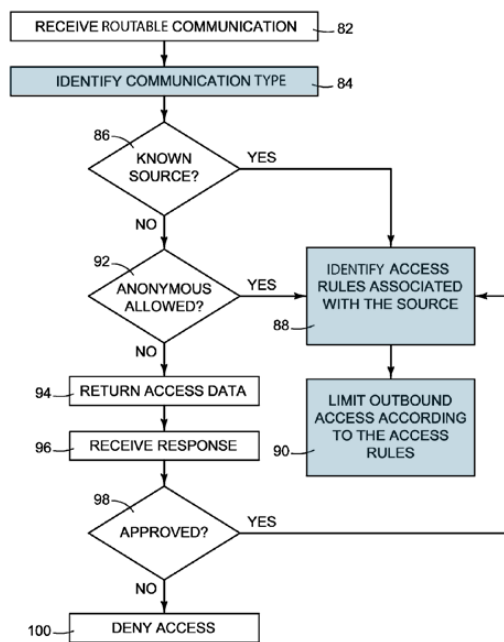


FIG. 8

85. As illustrated in Figure 9 of *Sewall* (reproduced below), a user’s session with personal hotspot 10 is further monitored (step 112) to determine if that session has ended (step 114). EX1006, ¶55, Fig. 9.

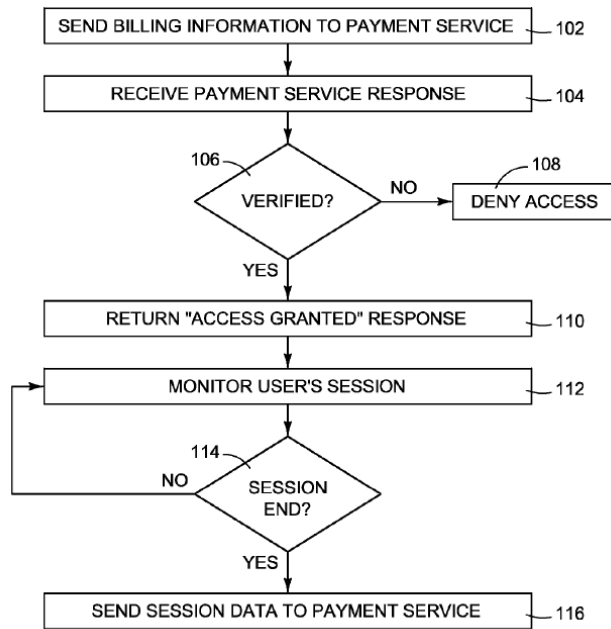


FIG. 9

As long as a user's session is active, user data 58 for that particular user may be present in the configuration data 42. *Id.*, ¶55. When the session ends, user data for that session is send to the payment service so that the payment service can bill the user accordingly. *Id.*, ¶56.

86. Accordingly, *Sewall*'s mobile hotspot "monitor[s] or identif[ies] successful use or attempted use of the forwarding service," as recited in claim 1[b][iv]. In my opinion, one of skill would have understood that *Sewall*'s mobile hotspot comprises a processor that executes instructions from computer-readable media, as discussed above, and that those instructions, when executed, cause the mobile hotspot to perform the above functions for monitoring or identifying

successful or attempted use of the forwarding service.

h. 1[c]: “memory coupled to the at least one processor and configured to provide the at least one processor with the one or more instructions.”

87. *Sewall* discloses 1[c]. As discussed above, *Sewall* discloses that its personal hotspot 10 may be embodied in “any computer-readable media for use by or in connection with an instruction execution system such as a computer/processor based system or an ASIC (Application Specific Integrated Circuit) or other system that can fetch or obtain the logic from computer-readable media and execute the instructions contained therein.” EX1006, ¶58. *Sewall* further states that “computer-readable media” may be “any media that can contain, store, or maintain programs and data for use by or in connection with the instruction execution system,” including, for example, “a portable magnetic computer diskette such as floppy diskettes or hard drives, a random access memory (RAM), a read-only memory (ROM), an erasable programmable read-only memory, or a portable compact disc.” *Id.*

88. Accordingly, *Sewall*’s mobile hotspot comprises “memory coupled to the at least one processor and configured to provide the at least one processor with the one or more instructions,” as recited in claim 1[c].

2. Claim 2: “wherein the first service policy assists in controlling whether the first end-user device is authorized to provide the forwarding service to the one or more other end-user devices.”

89. Claim 2 depends from claim 1, which would have been obvious as discussed above. *Supra* § XI.1. In my opinion, claim 2 would have been obvious to one of skill based on *Sewall*.

90. *Sewall*'s personal hotspot includes a limiter, which is capable of distinguishing among the users of different client devices and applying different internet access rules for different users. EX1006, ¶¶15, 22. To assist with controlling the first traffic between the client devices and the internet, in particular, *Sewall*'s mobile hotspot implements first access rules (first service policy) that govern whether (and to what extent) *Sewall*'s mobile hotspot provides forwarding services to the different client devices seeking access. EX1006, ¶36.

91. The first access rules can vary depending on the client device and its associated user profile (e.g., owner, authorized user, anonymous user, or custom). *Id.* Typically, the first access rules for anonymous users are the most limiting. *Id.* For anonymous user profiles, the first access rules for *Sewall*'s mobile hotspot may dictate that one or more other end user devices using an anonymous user profile 66 is not authorized to receive forwarding services through the mobile hotspot and, as such, is to be blocked from accessing the internet through the mobile hotspot. *Id.*

3. Claim 6: “wherein, when executed by the at least one processor, the one or more instructions further cause the at least one processor to set a traffic speed.”

92. Claim 6 depends from claim 1, which would have been obvious as discussed above. *Supra* § XI.1. In my opinion, claim 6 would have been obvious to one of skill based on *Sewall*.

93. To assist with controlling traffic speed, *Sewall*’s mobile hotspot applies access rules obtained from configuration data on the mobile hotspot. *E.g.*, EX1006, ¶¶23, 26. The configuration data, including the access rules, are (at least in part) set by the service provider providing data access to the internet and may be modified by the owner of the mobile hotspot. *Id.*, ¶25. The access rules may limit bandwidth or the amount of data a particular user can download on a given end user device during a given time period. *Id.*, ¶26 (describing access rules setting “duration, download, or bandwidth limit(s).”). Accordingly, one of skill would recognize that the access rules, which are executed by the at least one processor, set a traffic speed.

4. Claim 12: “wherein, when executed by the at least one processor, the one or more instructions further cause the at least one processor to modify a policy setting based on the monitored or identified successful use or attempted use of the forwarding service.”

94. Claim 12 depends from claim 1, which would have been obvious as

discussed above. *Supra* § XI.1. In my opinion, claim 12 would have been obvious to one of skill based on *Sewall*.

95. As discussed above, *Sewall*'s mobile hotspot has a processor that is configured to execute one or more instructions. EX1006, ¶¶7, 58. *Sewall* further discloses that those instructions, when executed by the processor, cause the processor to modify a policy setting based on monitored or identified successful use or attempted use of the forwarding service. This may occur, for example, when *Sewall*'s mobile hotspot receives a routable communication (i.e., request for access) from an unknown or anonymous client device. If access by the client device is approved, configuration data 42 is *updated* or *modified* on the mobile hotspot to include user data 58 for the client device requesting access. EX1006, ¶52. That user data 58 "associates the source [of the request] with either a default profile 54 or a custom profile 56." EX1006, ¶52. Once the client device requesting access becomes associated with a profile and user data upon a successful (or attempted) use of the forwarding service, *Sewall* discloses modifying its mobile hotspot policy settings to provide, limit, or deny access according to the modified policy settings. *Id.*

5. Claim 13: "wherein, when executed by the at least one processor, the one or more instructions further cause the at least one processor to: obtain a service usage measurement providing an

indication of usage of the forwarding service by the one or more other end-user devices.”

96. Claim 13 depends from claim 1, which would have been obvious as discussed above. *Supra* § XI.1. In my opinion, claim 13 would have been obvious to one of skill based on *Sewall*.

97. As discussed above, *Sewall*'s mobile hotspot has a processor that is configured to execute one or more instructions. EX1006, ¶¶7, 58. *Sewall* further discloses that those instructions, when executed by the processor, cause the processor to obtain a service usage measurement indicating usage of the forwarding service by the client devices.

98. Specifically, *Sewall*'s mobile hotspot associates each particular user with a profile and tracks user data 58 indicating their usage of the forwarding service. EX1006, ¶38, Fig. 5. *Sewall* discloses that user data 58 “may be a table having a series of records, one for the owner and one for each authorized user.” *Id.* “Each record will have a field containing data for identifying the particular user and another field containing data identifying the profile associated with that user.” *Id.* “Each record may also contain usage data and expiration data for a particular user,” including “the amount of data uploaded or downloaded” by that particular user “in a particular time frame.” *Id.*

6. Independent Claim 14

99. In my opinion, claim 14 would have been obvious to one of skill based on *Sewall*.

- a. **14[pre]: “A computer program product embodied in a non-transitory computer readable storage medium and comprising computer instructions for causing one or more processors of a first end-user device to:”**

100. *Sewall* discloses 14[pre]. EX1006, ¶¶7, 9, 16, Figs. 1-2; *supra* §§ XI.1.a, XI.1.c, XI.1.h.. *Sewall* explains that its disclosed invention may be embodied in a computer program stored on computer-readable storage media for execution by one or more processors. EX1006, ¶¶7, 9, 16, 57-58, Figs. 1-2. Indeed, *Sewall* expressly discloses that “the present invention can be embodied in any computer-readable media for use by or in connection with an instruction execution system such as a computer/processor based system or an ASIC (Application Specific Integrated Circuit) or other system that can fetch or obtain the logic from computer-readable media and execute the instructions contained therein.” *Id.*, ¶58.

- b. **14[a]: “provide a forwarding service to one or more other end-user devices communicatively coupled to the first end-user device over a first network, the forwarding service for forwarding first traffic between the one or more other end-user devices and a network system communicatively coupled to the first end-user device over a second network, the second network comprising a wireless access network;”**

101. At the outset, it is important to note that the networks labeled as the

“first” and “second” networks in claim 14 are swapped in comparison to claim 1.

Whereas claim 1 refers to the network over which the first end-user device communicates with a network system as the “first” network, the same network is referred to as the “second” network in claim 14. Additionally, whereas claim 1 refers to the network over which the first end-user device communicates with one or more other end-user devices as the “second” network, as the same network is referred to as the “first” network in claim 14.

102. Notwithstanding this difference, it is my opinion that *Sewall* discloses claim 14[a] for the reasons discussed above regarding claim 1[a]-[b][i]. EX1006, ¶¶7, 10, 13, 15, 17, Figs. 1-2; *supra* §§ XI.1.b-XI.1.d.

c. 14[b]: “implement a first service policy, the first service policy for assisting in control of the first traffic;”

103. *Sewall* discloses claim 14[b] for the reasons discussed above regarding claim 1[b][ii]. EX1006, ¶¶16, 19, 23, 33, 34, 36, Figs. 3-5; *supra* § XI.1.e.

d. 14[c]: “implement a second service policy, the second service policy for assisting in control of second traffic, the second traffic associated with access by the first end-user device to one or more services over the second network, wherein the second service policy differs from the first service policy; and”

104. *Sewall* discloses claim 14[c] for the reasons discussed above

regarding claim 1[b][iii]. EX1006, ¶¶16, 19, 23, 33, 34, 36, 43-44, Figs. 3-5; *supra* §XI.1.f.

e. 14[d]: “monitor or identify successful use or attempted use of the forwarding service.”

105. *Sewall* discloses claim 14[d] for the reasons discussed above regarding claim 1[b][iv]. EX1006, ¶¶16, 47-49, Figs. 4-5, 8; *supra* § XI.1.g.

106. Accordingly, *Sewall* discloses all elements of claim 14 and, as such, it is my opinion that claim 14 would have been obvious over *Sewall*.

7. Independent Claim 15

107. In my opinion, claim 15 would have been obvious to one of skill based on *Sewall*.

f. 15[pre]: “A method performed by a first end-user device capable of operating as an intermediate networking device, the method comprising:”

108. *Sewall* discloses claim 15[pre] for the reasons discussed above regarding claim 1[pre]. EX1006, ¶¶7, 9, 16, Figs. 1-2; *supra* § XI.1.a. *Sewall* expressly discloses an embodiment of its disclosed invention “is directed to a method for limiting network communications.” EX1006, Abstract. *Sewall* further discloses that “[t]he method is implemented at a device through which communications can be routed between client devices and the internet.” *Id.* Accordingly, one of skill would recognize that *Sewall* discloses a method

performed by its mobile hotspot, which is capable of operating as an intermediate networking device.

- g. 15[a]: “providing a forwarding service to one or more other end-user devices communicatively coupled to the first end-user device over a first network, the forwarding service for forwarding first traffic between the one or more other end-user devices and a network system communicatively coupled to the first end-user device over a second network, the second network comprising a wireless access network;”**

109. At the outset, it is important to note that, as in claim 14, the networks labeled as the “first” and “second” networks in claim 15 are swapped in comparison to claim 1. Whereas claim 1 refers to the network over which the first end-user device communicates with a network system as the “first” network, the same network is referred to as the “second” network in claim 15. Additionally, whereas claim 1 refers to the network over which the first end-user device communicates with one or more other end-user devices as the “second” network, as the same network is referred to as the “first” network in claim 15.

110. Notwithstanding this difference, it is my opinion that *Sewall* discloses claim 15[a] for the reasons discussed regarding claim 1[a]-[b][i]. EX1006, ¶¶7, 10, 13, 15, 17, Figs. 1-2; *supra* §§ XI.1.b-XI.1.d.

- h. 15[b]: “implementing a first service policy, the first service policy for assisting in control of the first traffic;”**

111. *Sewall* discloses claim 15[b] for the reasons discussed above

regarding claim 1[b][ii]. EX1006, ¶¶16, 19, 23, 33, 34, 36, Figs. 3-5; *supra* § XI.1.e.

- i. **15[c]: “implementing a second service policy, the second service policy for assisting in control of second traffic, the second traffic associated with access to the first end-user device to one or more services over the second network, wherein the second service policy differs from the first service policy; and;”**

112. *Sewall* discloses claim 15[c] for the reasons discussed above regarding claim 1[b][iii]. EX1006, ¶¶16, 19, 23, 33, 34, 36, 43-44, Figs. 3-5; *supra* § XI.1.f.

- j. **15[d]: “monitoring or identifying successful use or attempted use of the forwarding service.”**

113. *Sewall* discloses claim 15[d] for the reasons discussed above regarding claim 1[b][iv]. EX1006, ¶¶16, 47-49, Figs. 4-5, 8; *supra* § XI.1.g.

114. Accordingly, *Sewall* discloses all elements of claim 15 and, as such, it is my opinion that claim 15 would have been obvious over *Sewall*.

- 8. **Claim 24: “wherein, when executed by the at least one processor, the one or more instructions further cause the at least one processor to: identify one or more network destinations for which the first end-user device is authorized to provide the forwarding service.”**

115. Claim 24 depends from claim 1, which would have been obvious as discussed above. *Supra* § XI.1. In my opinion, claim 24 would have been obvious to one of skill based on *Sewall*.

116. As discussed above, *Sewall*'s mobile hotspot has a processor that is configured to execute one or more instructions. EX1006, ¶¶7, 58. *Sewall* further discloses that those instructions, when executed by the processor, cause the processor to identify one or more network destinations for which its mobile hotspot is authorized to provide the forwarding service.

117. For example, *Sewall*'s mobile hotspot may require payment for access. EX1006, ¶28 (“[C]onfiguration data 42 may indicate that paid access is allowed.”), Fig. 4. As such, when an anonymous user first attempts to access the internet via *Sewall*'s mobile hotspot, the access engine 48 will block the communication except as to reaching a payment page. *Id.*, ¶¶28, 51. The billing engine 50 will then cause web server 38 to access user interface data 44 and return a user interface to the anonymous user through which the anonymous user is prompted to supply payment information to a payment service on internet 26. *Id.* After the anonymous user submits payment information to the payment service, the payment service verifies that information and informs the billing engine 50 that the anonymous user is now authorized for broader network access. *Id.*, ¶29. Accordingly, one of skill would recognize that until other network destinations become authorized by *Sewall*'s mobile hotspot, it is only authorized to direct the anonymous user to the payment service on the internet.

9. Claim 27: “wherein, when executed by the at least one processor, the one or more instructions further cause the at least one processor to: limit a number of the one or more other end-user devices authorized to use the forwarding service.”

118. Claim 27 depends from claim 1, which would have been obvious as discussed above. *Supra* § XI.1. In my opinion, claim 27 would have been obvious to one of skill based on *Sewall*.

119. As discussed above, *Sewall*’s mobile hotspot has a processor that is configured to execute one or more instructions. EX1006, ¶¶7, 58. *Sewall* further discloses that those instructions, when executed by the processor, cause the processor to limit the number of other end-user devices authorized to use the forwarding service. More specifically, *Sewall*’s mobile hotspot has a device profile 60 with access rules that apply to all users of its mobile hotspot. *Id.*, ¶34. *Sewall* discloses that “[t]he device access rules may limit the number of simultaneous users or sessions supported by [the mobile] hotspot”. EX1006, ¶34.

XII. GROUND 2: CLAIMS 3-5, 7-9, 11, 16, 22, 26, 36, 52-65, AND 69 ARE OBVIOUS OVER *SEWALL* AND *THOMAS*

1. Motivation to Combine

120. One of skill would have recognized that *Sewall* and *Thomas* are analogous art to the ‘451 patent. They are in the same field of endeavor: mobile devices and wireless access points for computer networking. EX1005, ¶¶2, 6, 9, 23, 28, 84-85, Figs. 1-11; EX1006, ¶¶3, 7-8, 11, Figs. 1-9.

121. *Sewall* and *Thomas* also share a common goal with the ‘451 patent: improving the customizability and monetization of mobile hotspot technology. These references disclose using end-user devices for bridging or routing traffic from other devices to a network system (e.g., the internet), including the provisioning of services seeking to improve usage control, user interactivity and notifications via graphical user interfaces, and billing features. EX1005, ¶¶23, 28, 44-45, 54-55, 79-80; EX1006, Abstr., ¶¶7-9, 17, 22, 25, 28-31; EX1001, 32:38-34:64, 65:31-67, 122:52-123:27, Fig. 15A-F.

122. In my opinion, one of skill would have been motivated to combine *Sewall*’s and *Thomas*’s end user devices for providing a personal hotspot, which would include a user interface for receiving user input and presenting notifications, access and usage restrictions, and billing features. In my opinion, as detailed below, one of skill would have been motivated to make this combination for

several reasons. Indeed, these references disclose highly compatible hotspot features that one of skill would have readily combined with a reasonable expectation of success.

123. First, these references both describe the same types of devices for advantageously providing internet access to other computing devices. *Sewall* describes using an internet-enabled cellular telephone as a “personal hotspot.” EX1006, ¶7, Figs. 1, 2. That hotspot service allows laptops, PDAs, and other computing devices to access the internet. *Id.* *Thomas* similarly describes using cell phones or other wireless devices to provide an “ad hoc point of presence on a wireless network.” EX1005, ¶¶2, 9, Figs. 5, 6. *Thomas*’s point-of-presence feature is another way of describing a hotspot service, as the owner of user device 110 may use it to provide internet access to other computing devices.

124. Second, both references provide compatible solutions for extending internet access to users who may not have their own subscriptions to an internet-enabled wireless plan (e.g., 2G, 3G, or 4G service providers). EX1006, ¶¶2-3, 22; EX1005, ¶¶32, 54-56, 83. One of skill would recognize that the ad hoc point-of-presence (hotspot) features of *Sewall* and *Thomas* provide flexible, on-demand internet access without requiring all users to have their own wireless plan subscriptions.

125. Third, *Sewall* and *Thomas* support using mobile devices' WLAN capabilities to provide hotspot services to a greater number of computing devices than was previously possible. As *Thomas* discloses, its ad hoc point of presence technology overcomes some of the known limitations of previous hotspot services that depended on range-limited Bluetooth or infrared connections between a mobile device and a laptop, which often precluded more than one laptop at a time from accessing the internet via the mobile device. EX1005, ¶¶27-28. *Sewall* also discloses personal hotspots that use IEEE 802.11 WLAN capabilities to connect to other computing devices as appropriate alternatives to Bluetooth or infrared connections. EX1006, ¶¶14, 18.

126. Fourth, *Sewall* and *Thomas* provide complementary billing and reward systems encouraging mobile device users to provide hotspot services to others. As *Thomas* discloses, a wireless carrier "reward" plan may incentivize mobile device users to share internet access with others. EX1005, ¶¶55-56 ("For example, for every new connection session, a payment could be credited to the user."). As *Sewall* discloses, its hotspot device may include a billing agent to facilitate computing devices seeking access to the hotspot service in making direct payments to the hotspot owner. EX1006, ¶¶28-32.

127. One of skill would have been motivated to implement a combination

having both *Thomas*'s wireless carrier "reward" and *Sewall*'s billing agent features. One of skill would have understood that these complementary reward systems incentivize mobile users to provide hotspot services while minimizing or eliminating their responsibility for any increased data or bandwidth costs due to providing the hotspot service. Moreover, combining these features provides for increased flexibility for potentially compensating the owner of *Thomas*'s wireless device 110 or *Sewall*'s hotspot owner and encouraging them to extend their hotspot services to other devices, as those owners could earn payments from either the wireless carrier, users of other computing devices, or both.

128. Fifth, *Sewall* and *Thomas* describe complementary features for controlling or limiting access to their personal hotspot services. *Thomas* provides a user interface that provides users with the ability to identify and select which other computing devices (e.g., laptops) can access the service. *Id.*, ¶¶44-46, Figs. 5, 6. *Sewall* discloses configuring a mobile hotspot with user profiles associated with other computing devices that provide access, limit access, or deny access to the hotspot service. EX1006, ¶¶47-50. As a result, differing access rules may be applied to computing devices of the hotspot owner, computing devices of other users authorized by the owner, and computing devices of anonymous users (to whom potentially the most restrictive rules may apply). *Id.* *Sewall* discloses

configuring a mobile hotspot with user profiles (e.g., owner, authorized user, anonymous user) that provide access, limit access, or deny access to the hotspot service, which are implemented by, e.g., *Sewall*'s hotspot limiter, configuration data, user-interface data, and access engine components. EX1006, ¶¶47-50.

129. One of skill would have been motivated to implement a combination with both *Sewall*'s and *Thomas*'s access-control features. Using a user interface to make on-the-fly determinations would improve the flexibility and customizability of *Sewall*'s profile-based access configurations, including during conditions in which the hotspot operator may desire to deviate from default access rules (e.g., during roaming sessions, if network bandwidth is low, or based on needs of a given hotspot session). EX1005, ¶¶29, 54-56, Figs. 5, 6. One of skill would also have recognized the benefits of combining *Sewall*'s user profiles with *Thomas*'s system so that trusted devices (e.g., the wireless device 110 owner's other computing devices or other previously authorized devices) could easily and quickly access the hotspot service without necessitating a manual approval from wireless device 110.

130. In my opinion, for any or all of the potential benefits detailed above that *Sewall* and *Thomas* individually and collectively disclose and suggest, one of skill would have been motivated to combine *Sewall* and *Thomas*. One of skill also would have had a reasonable expectation of success in doing so, given that both

references are generally directed to conventional mobile hotspot technologies.

Combining their disclosures was within a POSITA's capabilities and would predictably apply known techniques such as hotspot access controls, billing services, user profiles, and user-interface features to known mobile cellular devices to provide known and "conventional" hotspot services that advantageously allow other computing devices to access network systems.

2. Claim 3: "wherein the first network comprises a 2G network, a 3G network, a 4G network, or a Wi-Fi network."

131. Claim 3 depends from claim 1, which would have been obvious as discussed above. *Supra* § XI.1. In my opinion, claim 3 would have been obvious to one of skill based on *Sewall* and *Thomas*.

132. *Sewall* discloses a mobile hotspot that communicates with (i) the internet via remote link 24 and (ii) client devices 12, 14, and 16 via local link 18. EX1006, ¶¶7, 10, 13, 17. *Sewall* discloses that the remote link 24 (first network) connecting the mobile hotspot and the service provider that provides internet-related data services, which corresponds to the "first network" recited in claim 3, is "any combination of a cable, wireless, or remote connection via a telecommunication link, an infrared link, a radio frequency link, or any other connector or system that provides electronic communication between data exchanger 20 and service provider 22." EX1006, ¶13. *Sewall* further discloses that

its personal hotspot may be “any combination of hardware and/or programming capable [of] functioning as a router for directing network communications between client devices and the internet via a data exchanger,” including, for example, “a data capable cellular device.” *Id.*, ¶17. Accordingly, in my opinion, one of skill would have recognized that *Sewall*’s mobile hotspot communicates with the internet via remote link 24 using a cellular data network as recited in claim 3. *See id.*, ¶¶2-3 (seeking to address a problem faced by cellular service providers), 7 (describing the invention as “allow[ing] a user to connect to the internet using a device such as an internet enabled cellular telephone”).

133. In my opinion, *Thomas* also discloses communicating with the internet over a first network that comprises a cellular data network. In fact, *Thomas* discloses that its wireless device “may utilize any cellular data network technology (e.g., 2.5G, 3G, 4G, or any future technology).” EX1005, ¶32. Accordingly, as detailed above, and in view of *Thomas*’s explicit and complementary disclosure, one of skill would have understood that the “data capable cellular device” of the *Sewall-Thomas* combination communicates with the internet via remote link 24 using a cellular data network—namely a 2G network, a 3G network, or a 4G network—as recited in claim 3.

3. Claim 4: “wherein the second network comprises a Wi-Fi network, a Bluetooth network, a USB network, an Ethernet

network, a FireWire network, or a near field communication network.”

134. Claim 4 depends from claim 1, which would have been obvious as discussed above. *Supra* § XI.1. In my opinion, claim 4 would have been obvious to one of skill based on *Sewall* and *Thomas*.

135. *Sewall*'s personal hotspot interconnects with client devices via local link 18, which corresponds to the “second network” recited in claim 4. EX1006, ¶10. *Sewall* discloses that local link 18 is “a cable, wireless, or remote link via a telecommunication link, an infrared link, a radio frequency link, or any other connector or system that provides electronic communication between [client] devices 10, 12, and 14 and personal hotspot 16.” EX1006, ¶10. Further, *Sewall*'s personal hotspot includes a local network interface 30 that “may include a transceiver operable to exchange network communications utilizing a wireless protocol such as ultrawideband (UWB), Bluetooth, or 802.11.” EX1006, ¶17. One of skill would have understood that 802.11 is a set of Wi-Fi standards that define communication on a wireless local area network (WLAN). *See, e.g.*, EX1005, p. 21 (providing a glossary defining “802.11” as “a set of standards for wireless local area network (WLAN) computer communications, developed by the IEEE LAN/MAN Standards Committee”); EX1020, 10:64-66 (referring to IEEE 802.11 as a wireless access protocol).

136. *Thomas* also describes Bluetooth as a “conventional” means for a client computing device to communicate with a wireless hotspot. EX1005, ¶¶6, 28, 32. As *Thomas* explains, Bluetooth “allows [a] laptop to access the Internet from anywhere that the wireless device has an adequate cell signal.” *Id.*, ¶6. However, Bluetooth has several disadvantages including that: (1) “only a small percentage [of wireless devices] have Bluetooth connections or other short range wireless technologies (e.g., infrared)”; (2) it “requires someone with some level of skill to set up the connection between the laptop and the wireless device”; and (3) “some short range wireless technologies, such as Bluetooth, offer limited connectivity options (e.g., generally point-to-point connections), limited transmission distance and power (e.g., close, unobstructed line-of-sight communication with a laptop), and insufficient bandwidth for high speed data connections.” *Id.*

137. The wireless hotspot device in *Thomas* improves upon this “conventional” approach using Bluetooth by allowing for client computing devices to communicate with it “using a Wi-Fi or other link,” thereby allowing the client computing devices to “choose among different wireless devices 110 based upon available signal strength and bandwidth capacities” rather than being forced to link to “a specific cellular device” offering specific network characteristics. EX1005, ¶32. According to *Thomas*, the use of Wi-Fi instead of Bluetooth is further

advantageous because it allows the wireless hotspot device to support connections with multiple client devices at a time, including potential use by a client device that was previously unknown to the wireless hotspot. EX1005, ¶28. Accordingly, *Thomas* teaches or suggests a wireless hotspot that communicates with other end-user devices through Bluetooth or Wi-Fi—describing Wi-Fi as particularly advantageous.

138. *Sewall* and *Thomas* thus disclose a second network that comprises “a Wi-Fi network, a Bluetooth network, a USB network, an Ethernet network, a FireWire network, or a near field communication network, as recited in claim 4.

4. Claim 5: “wherein, when executed by the at least one processor, the one or more instructions further cause the at least one processor to: identify one or more network types over which the first end-user device is authorized to act as the intermediate networking device.”

139. Claim 5 depends from claim 1, which would have been obvious as discussed above. *Supra* § XI.1. In my opinion, claim 5 would have been obvious to one of skill based on *Sewall* and *Thomas*.

140. *Sewall* discloses a mobile hotspot that communicates with (i) the internet via remote link 24 and (ii) client devices 12, 14, and 16 via local link 18. EX1006, ¶¶7, 10, 13, 17. *Sewall*’s mobile hotspot acts as an intermediate networking device by connecting to a service provider, which provides internet-

related data services. *Id.*, ¶12 (“Service provider 22 represents generally any infrastructure configured to provide internet related data services to subscribers such as an owner of [the personal hotspot].”). One of skill would have understood from *Sewall* that the owner of the mobile hotspot’s paid subscription plan with the service provider dictates the network type(s) over which *Sewall*’s mobile hotspot is authorized to act as an intermediate networking device. One of skill would have further understood that *Sewall*’s mobile hotspot comprises a processor that executes instructions from computer-readable media and that those instructions, when executed, cause the mobile hotspot to identify such network(s) before providing a forwarding service. *See* EX1006, ¶¶25, 58. Specifically, as a precursor to providing a forwarding service, *Sewall*’s mobile hotspot establishes a data connection with the service provider and requests that the service provider supply configuration data, including access rules that apply to all user devices. *See* EX1006, ¶25.

141. Additionally, *Thomas* discloses a process by which its wireless hotspot device identifies a particular type of cellular network over which it is authorized to act as an intermediate networking device. As an initial matter, *Thomas* states that its wireless device 110 “may utilize any cellular data network technology (e.g., 2.5G, 3G, 4G, or any future technology)” to communicate with

the internet. EX1005, ¶32. With respect to network types, *Thomas* further discloses that roaming may be included in the data plan coverage with the service provider. EX1005, ¶71 (“[D]ata plans may be provided by which a user may include roaming within the plan coverage.”). One of skill would appreciate that 2.5G, 3G, 4G, and roaming are each different network types. However, as detailed below, before *Thomas*’s wireless hotspot device is used as an intermediate networking device, it must be configured and authorized to do so—including by verifying whether the network type (e.g., 2.5G, 3G, 4G, or roaming) is acceptable.

142. Figure 7 of *Thomas* (reproduced below) “illustrates an exemplary message flow 700 between the wireless device 110 and the server 108 to configure the wireless device 110 for operation and to authorize the client computing device 114 for operation.” EX1005, ¶57, Fig. 7.

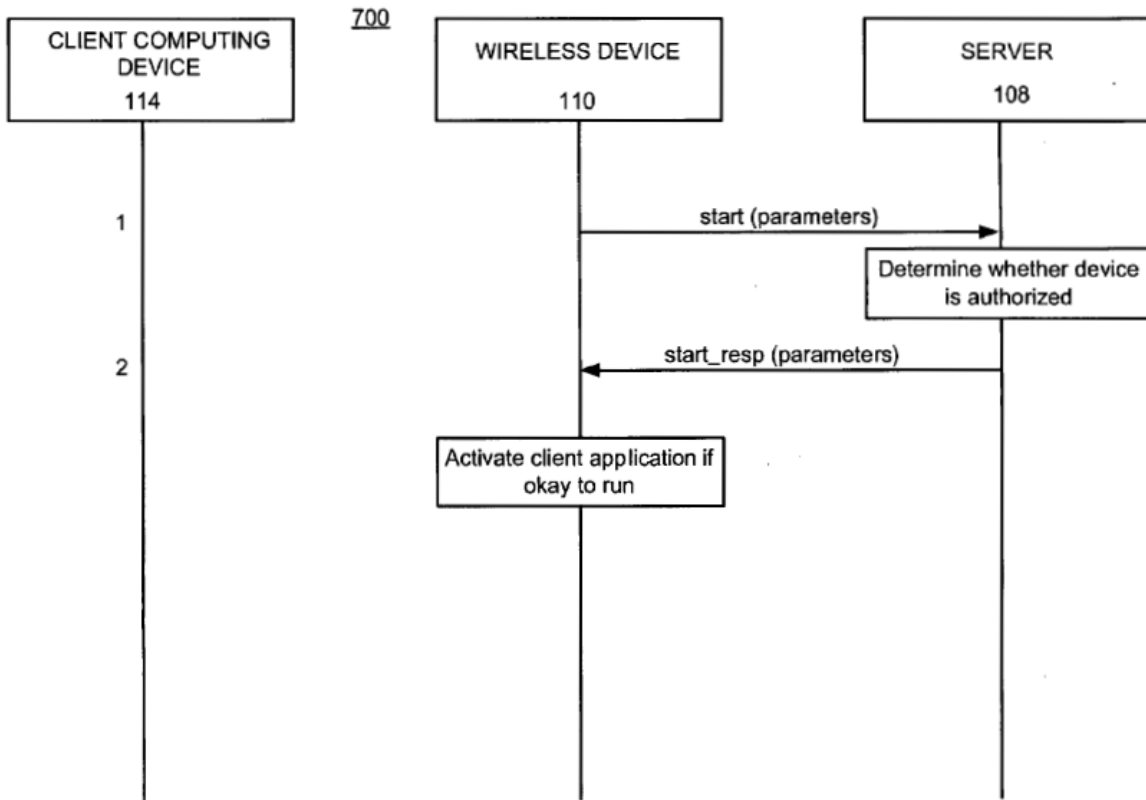


FIGURE 7

“When the user of the wireless device 110 starts the client access application 312, a start message is sent from the wireless device 110 to the server 108 (line 1).”

EX1005, ¶58 (“The start message includes parameters, such as message type, phone international mobile equipment identification (IMEI), cell identifier, software version, and comments. Other parameters are also possible.”). “In response to receipt of the start message, the server 108 determines whether the requesting wireless device 110 is authorized to operate within the network”—including whether the network type (e.g., roaming) is acceptable—and “sends a

start response message (line 2) to the requesting wireless device 110” that indicates, among other things, whether the wireless device 110 is authorized to use the server to provide a forwarding service. EX1005, ¶59 (“The start response message includes parameters such as . . . response (e.g., okay to run or never start . . .”). One of skill would have thus understood that the configuration and authorization process disclosed in *Thomas* involves authorizing the wireless device to act as an intermediate networking device over a particular cellular network type.

143. Like any mobile hotspot, *Thomas*’s wireless device includes a processor configured to execute one or more instructions. Specifically, *Thomas* discloses that its wireless device has (1) a processor that “provides computational and processing capabilities for the wireless device 110 and includes signal processing capabilities to perform signal and channel correlations”; and (2) memory that “provides data storage . . . and executable code space . . . capabilities for the wireless device 110.” EX1005, ¶33. Thus, in my opinion, one of skill would have understood that the configuration and authorization process disclosed in *Thomas* is attributable to its processor executing instructions.

144. Accordingly, as detailed above, one of skill would have understood that *Sewall*’s mobile hotspot, through its processor, executes instructions that cause it to “identify one or more network types” over which it is authorized to act as an

intermediate networking device, as recited in claim 5. To the extent this process is not explicitly described in *Sewall*, it nonetheless would have been obvious in view of *Thomas* and its disclosure of a process by which its wireless hotspot device identifies a particular type of cellular network over which it is authorized to act as an intermediate networking device.

5. Claim 7: “wherein, when executed by the at least one processor, the one or more instructions further cause the at least one processor to notify a user when the first end-user device is authorized to provide the forwarding service.”

145. Claim 7 depends from claim 1, which would have been obvious as discussed above. *Supra* § XI.1. In my opinion, claim 7 would have been obvious to one of skill based on *Sewall* and *Thomas*.

146. *Sewall*’s personal hotspot “may require payment for access.” EX1006, ¶53. Accordingly, *Sewall*’s personal hotspot comprises a billing engine 50, which may be “any combination of hardware and/or programming capable of interacting with an internet payment service.” *Id.*, ¶28. Through the process *Sewall* discloses for billing new users of client devices seeking to connect to its personal hotspot, such users are notified when the hotspot is authorized to provide the forwarding service.

147. Figure 9 of *Sewall* (reproduced below) “is an exemplary flow diagram that helps illustrate actions taken by personal hotspot 10 related to billing.”

EX1006, ¶53.

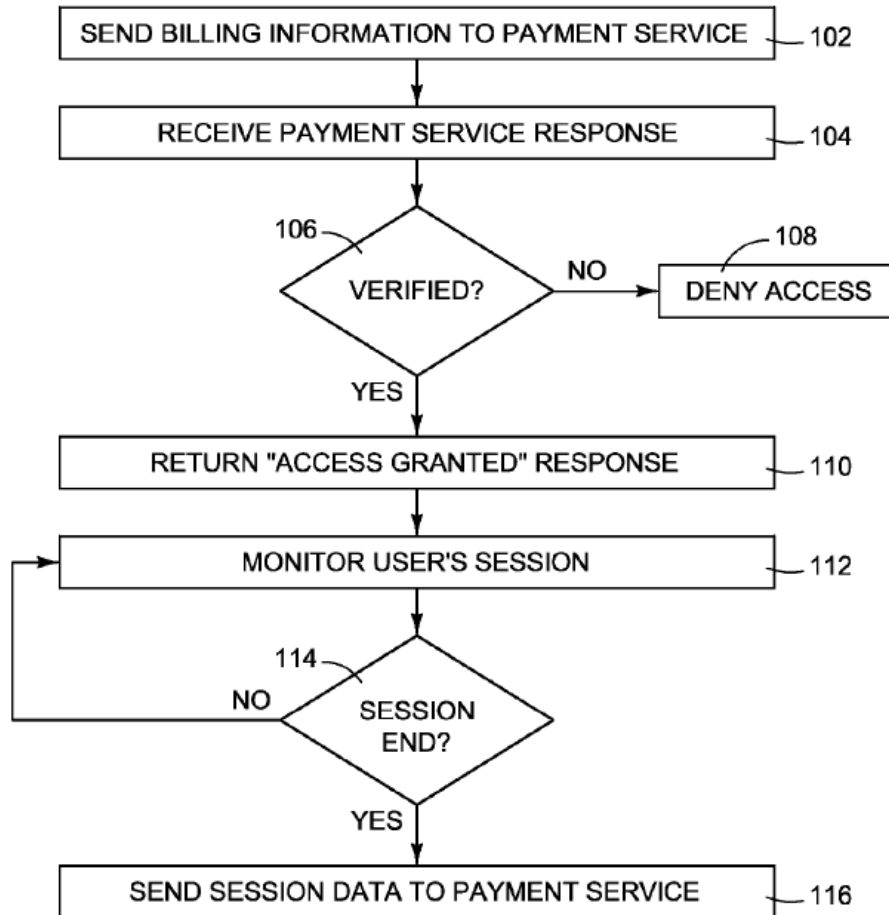


FIG. 9

When an anonymous user first attempts to access the internet via *Sewall's* personal hotspot, the communication is blocked and the billing engine causes the user's client device to be directed to a web page for the user to supply payment information . EX1006, ¶¶ 28, 51, 53, FIG. 9. As depicted in Figure 9, after the anonymous user submits payment information, the payment information is sent to

a payment service (e.g., PAYPAL) for verification. *Id.*, ¶¶ 28, 31. If the payment information is verified, the payment service informs the billing engine that the anonymous user is now authorized for access and “personal hotspot 10 returns an ‘access granted’ response to the user (step 110).” *Id.*, ¶¶ 28, 53-54. Through this billing process, users of client devices seeking to connect to the mobile hotspot are notified when the hotspot is authorized to provide the forwarding service. *Id.* Further, one of skill would have understood that *Sewall’s* personal hotspot comprises a processor that executes instructions from computer-readable media and that those instructions, when executed, cause the personal hotspot to perform this process resulting in notifying the user when the personal hotspot is authorized to provide the forwarding service. *See* EX1006, ¶58.

148. *Thomas* also discloses a process through which a user is notified when *Thomas’s* wireless device is authorized to provide the forwarding service. Specifically, as discussed above (*supra* § XII.4), when the user of *Thomas’s* wireless device starts the client access application, the wireless device 110 sends a start message to the server 108 (line 1) and receives a start response message (line 2) indicating whether the wireless device 110 is authorized to use the server to provide a forwarding service. EX1005, ¶59 (“The start response message includes parameters such as . . . response (e.g., okay to run or never start . . .”).

149. Further, as depicted in Figure 9 (reproduced below), *Thomas's* wireless device 110 also has a user interface screen 900 includes an activation section 902 indicating “whether the client access application 312 is on or off” and an active connections section 904 providing “connection information for the wireless device 110.” EX1005, ¶76, FIG. 9.

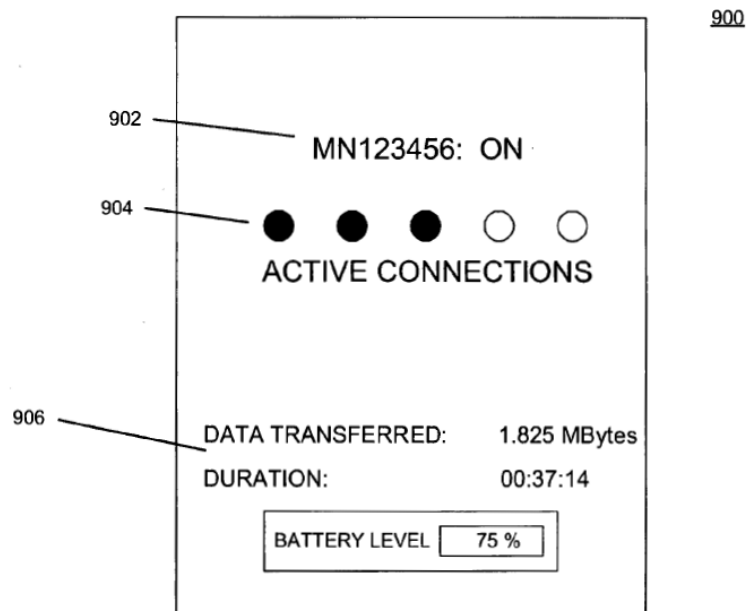


FIGURE 9

Thus, the user interface screen 900 on *Thomas's* wireless device notifies its user of whether the wireless device is authorized to provide the forwarding service. *Id.*

150. As discussed above, *Thomas's* wireless device—like any mobile hotspot—includes a processor configured to execute one or more instructions. *See supra* §XII.4; EX1005, ¶33. In my opinion, one of skill would have understood

that the notifications presented to the user of *Thomas*'s wireless device—through the start response message as well as the user interface screen—indicating whether the wireless device is authorized to provide the forwarding service are attributable to its processor executing instructions.

151. In my opinion, and as detailed above, one of skill would have been motivated to combine the notifications disclosed in *Sewall* (to end users) and *Thomas* (to the mobile hotspot user) to keep all users informed about the availability and use of the forwarding service. This would benefit users of client devices by allowing them to promptly begin using the forwarding service once authorized. It would also benefit the owner of the mobile hotspot by facilitating monitoring use of the mobile hotspot in order to ensure device access rules are not nearing their limits. *See* EX1006, ¶34 (“The device access rules may limit the number of simultaneous users or sessions supported by personal hotspot.”).

6. Claim 8: “wherein, when executed by the at least one processor, the one or more instructions further cause the at least one processor to notify a user whether the first end-user device is authorized to provide the forwarding service when the first network comprises a roaming network.”

152. Claim 8 depends from claim 1, which would have been obvious as discussed above. *Supra* § XI.1. In my opinion, claim 8 would have been obvious to one of skill based on *Sewall* and *Thomas*.

153. *Thomas* discloses security features for its wireless device, including “roaming awareness and management.” EX1005, ¶¶70-71. *Thomas* further discloses that a “roaming notification” may be presented on the user interface screen for its wireless device. EX1005, ¶76 (“There are many other possible parameters and information that may be presented on the user interface screen For example, a roaming notification . . . [may] be presented on the user interface”); *see id.*, ¶77 (“FIG. 10 illustrates an additional exemplary user interface screen 1000 for the wireless device 110 that provides additional connection information for the wireless device 110.”); Fig. 10.

154. As detailed above, the user interface screen on *Thomas*’s wireless device notifies its user of whether the wireless device is authorized to provide the forwarding service. *Supra* § XII.5. Given that a “roaming notification” may also be presented on the user interface screen, the user interface screen may be configured to notify the user of the wireless device of whether the wireless device is authorized to provide the forwarding service when the first network is a roaming network.

155. Further, as discussed above, *Thomas*’s wireless device—like any mobile hotspot—includes a processor configured to execute one or more instructions. *See supra* § XII.4; EX1005, ¶33. In my opinion, one of skill would

have understood that the notifications presented to the user of *Thomas*'s wireless device through the user interface screen indicating whether the wireless device is roaming and whether it is authorized to provide the forwarding service are attributable to its processor executing instructions.

156. In my opinion, one of skill would have been motivated to combine *Thomas*'s "roaming notification" on its user interface screen with *Sewall*'s mobile hotspot so that the mobile-hotspot user would be notified when leaving their home network for a roaming network and would remain informed as to whether the mobile hotspot was authorized to provide the forwarding service while roaming. *See supra* § XII.1.

7. Claim 9: "wherein the first service policy is based on whether the first network comprises a home network or a roaming network."

157. Claim 9 depends from claim 1, which would have been obvious as discussed above. *Supra* § XI.1. In my opinion, claim 9 would have been obvious to one of skill based on *Sewall* and *Thomas*.

158. As discussed above, *Thomas* discloses security features for its wireless device, including "roaming awareness and management." EX1005, ¶¶70-71. *Thomas* also states that "data plans *may* be provided by which a user *may* include roaming within the plan coverage." EX1005, ¶71 (emphases added). One of skill would have understood based on *Thomas*'s disclosures that roaming

coverage is optional for users and, as such, not all users would purchase data plans that include roaming coverage. Further, one of skill would have understood that *Thomas*'s "roaming management" security feature prevents *Thomas*'s wireless hotspot device from authorizing use of its forwarding service on a roaming network when the user's data plan does not include roaming coverage. *Id.*, ¶71 ("The roaming management function may be performed to run on top of the WAN transport supplied by a given carrier and is controlled by standard subscriber identification module (SIM) authentication."). Accordingly, *Thomas* discloses that the first service policy controlling traffic between the client computing device and the internet is based on whether the first network is a home network or a roaming network, as recited in claim 9.

159. In my opinion, one of skill would have been motivated to modify *Sewall*'s first access rules to account for whether the first network is a home or roaming network, as disclosed in *Thomas*, in order to allow users with less restrictions (e.g., the device owner) to continue using the forwarding service over a roaming network while preventing other users with more restrictions (e.g., anonymous users) from doing so. *See supra* § XII.1.

8. Claim 11: "wherein, when executed by the at least one processor, the one or more instructions further cause the at least one processor to notify a user when one of the one or more other end-

user devices attempts to use or succeeds in using the forwarding service.”

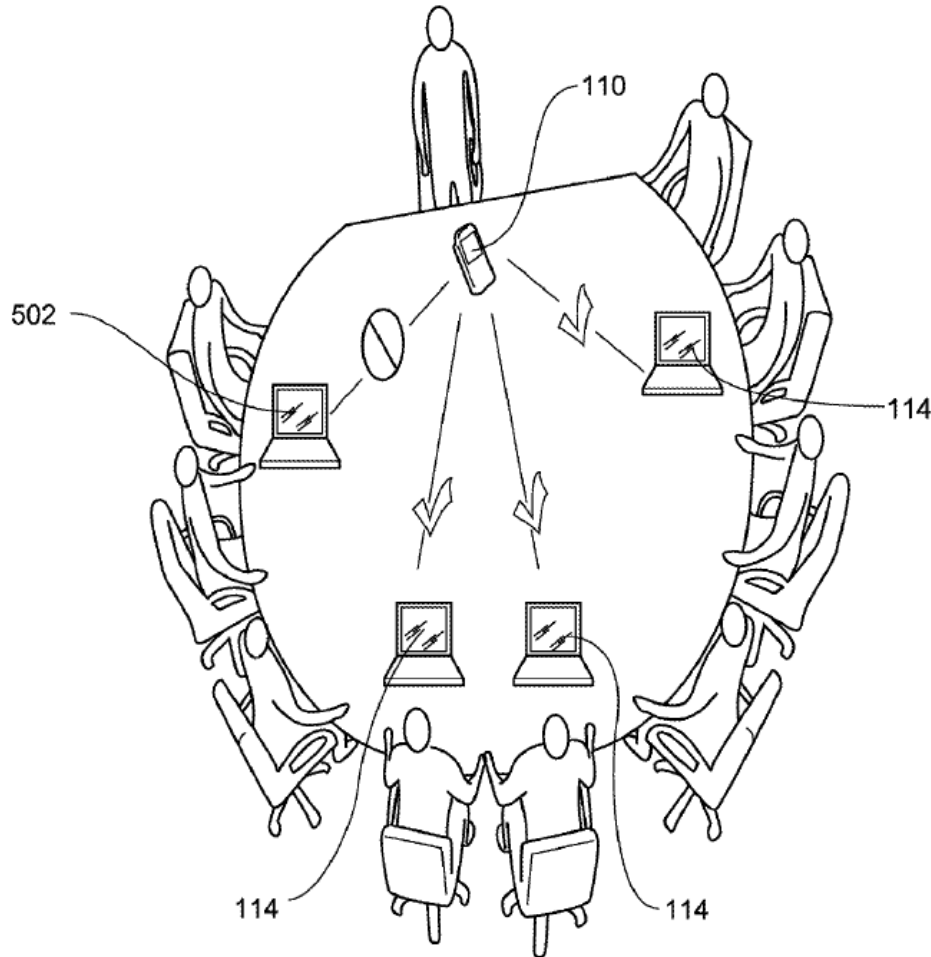
160. Claim 11 depends from claim 1, which would have been obvious as discussed above. *Supra* § XI.1. In my opinion, claim 11 would have been obvious to one of skill based on *Sewall* and *Thomas*.

161. As discussed above, *Sewall*’s personal hotspot “may require payment for access.” EX1006, ¶53, FIG. 9, FIG. 9. When an anonymous user attempts to access the internet via *Sewall*’s personal hotspot, the communication is blocked and the user’s client device is directed to a web page to supply payment information. EX1006, ¶¶ 28, 51, 53, FIG. 9. The payment information is then sent to a payment service (e.g., PAYPAL) for verification. *Id.*, ¶¶ 28, 31. And if the payment information is verified, “personal hotspot 10 returns an ‘access granted’ response to the user (step 110).” *Id.*, ¶¶53-54. Thus, users seeking to connect to their end-user devices to *Sewall*’s mobile hotspot are notified (1) when they attempt to use the hotspot’s forwarding service through a request for payment information and (2) when they succeed in using the hotspot’s forwarding service through an “access granted” response. *Id.*. Further, one of skill would have understood that *Sewall*’s personal hotspot comprises a processor that executes instructions from computer-readable media and that those instructions, when executed, cause the personal hotspot to perform this process resulting in notifying

the user when their end-user device attempts to use or succeeds in using the forwarding service through *Sewall*'s personal hotspot. *See* EX1006, ¶58.

162. *Thomas* also discloses methods for programming its wireless device 110 to authorize computer traffic. EX1005, ¶46. For example, Figure 5 of *Thomas* (reproduced below) illustrates an exemplary configuration “where a single wireless device 110 is provided with a user interface to allow or disallow access to a connection via the Internet 104 by computing devices that are within range of the wireless device.” *Id.*, ¶44, Fig. 5.

FIGURE 5



Three of the computing devices (114) in Figure 5 have been approved to use the wireless device 110, while one additional computing device (502) is not authorized to use the wireless device for networking activities. *Id.*

163. *Thomas* further states that “the request to use the wireless device 110 may appear on the display 314 on the wireless device 110” along with identifying information regarding the requesting computing device. *Id.*, ¶46. The user of

Thomas's wireless device is thereby notified of attempted use of the forwarding service. In response, "[t]he user of the wireless device 110 may accept or deny the request to access the Internet 104 through the wireless device 110." *Id.* The user of *Thomas*'s wireless device is notified of successful use of the forwarding service when, after accepting such a request, the user interface providing connection information indicates the presence of an additional connected device. *Id.*, ¶¶ 76-77, Fig. 9 (indicating the number of active connections), Fig. 10 (providing identifying information about each connected device).

164. Further, as discussed above, *Thomas*'s wireless device—like any mobile hotspot—includes a processor configured to execute one or more instructions. *See supra* § XII.4; EX1005, ¶33. In my opinion, one of skill would have understood that the notifications presented to the user of *Thomas*'s wireless device through the user interface screen communicating a request from a computing device to use the forwarding service and indicating the presence of an additional connected device are attributable to its processor executing instructions.

165. In my opinion, and as detailed above, one of skill would have been motivated to combine the notifications regarding attempted or successful use of the forwarding service disclosed in *Sewall* (to end users) and *Thomas* (to the mobile hotspot user) to keep all users informed about access to and use of the forwarding

service. This would benefit users of client devices by allowing them to promptly begin using the forwarding service once authorized. It would also benefit the owner of the mobile hotspot by facilitating their ability to monitor use of the mobile hotspot in order to ensure device access rules are not nearing their limits. *See* EX1006, ¶34 (“The device access rules may limit the number of simultaneous users or sessions supported by personal hotspot.”).

9. Claim 16: “wherein the first network comprises a cellular network and the second network comprises a Wi-Fi network.”

166. Claim 16 depends from claim 1, which would have been obvious as discussed above. *Supra* § XI.1. In my opinion, claim 16 would have been obvious to one of skill based on *Sewall* and *Thomas*.

167. *Sewall* and *Thomas* render claim 16 obvious for the reasons discussed above with respect to claims 3 and 4. *Supra* §§ XII.2, XII.3. With respect to the first network connecting the mobile hotspot and the service provider that provides internet-related data services, *Sewall* discloses that its personal hotspot may be “a data capable cellular device.” EX1006, ¶17; *see id.*, ¶¶2-3 (seeking to address a problem faced by cellular service providers), 7 (describing the invention as “allow[ing] a user to connect to the internet using a device such as an internet enabled cellular telephone”). Thus, one of skill would have recognized that *Sewall*’s mobile hotspot communicates with the internet via remote link 24 using a

cellular data network. Further, *Thomas* also discloses communicating with the internet over a first network that comprises a cellular data network, stating that its wireless device “may utilize any cellular data network technology (e.g., 2.5G, 3G, 4G, or any future technology).” EX1005, ¶32.

168. With respect to the second network connecting the mobile hotspot with other end-user devices, *Sewall*’s personal hotspot includes a local network interface 30 that “may include a transceiver operable to exchange network communications utilizing a wireless protocol such as . . . 802.11,” which one of skill would have understood is a set of Wi-Fi standards. EX1006, ¶17. *Thomas* not only discloses, but also describes advantages of allowing for client computing devices to communicate with its wireless device “using a Wi-Fi or other link.” EX1005, ¶¶6, 28, 32 (“[A] client computing device 114 using a Wi-Fi or other link may choose among different wireless devices 110 based upon available signal strength and bandwidth capacities of the respective wireless devices 110. Thus, use of Wi-Fi or an analogous communication protocol may allow greater redundancy than conventional solutions of using a private Bluetooth link to a specific cellular device connected to a specific cellular service provider.”) In my opinion, one of skill would have been motivated in view of *Sewall*’s and *Thomas*’s disclosures to use a Wi-Fi network (e.g., IEEE 802.11) as the second network (local link 18) to

capitalize on the mobility and convenience of allowing users to connect wirelessly from anywhere within range.

10.Claim 22: “wherein the first service policy or the second service policy is based on a type of the first network or the second network.”

169. Claim 22 depends from claim 1, which would have been obvious as discussed above. *Supra* § XI.1. In my opinion, claim 22 would have been obvious to one of skill based on *Sewall* and *Thomas*.

170. As detailed above, *Sewall*'s mobile hotspot implements (1) first access rules (first service policy) based on the user profile associated with each client device in order to assist in the control of “first traffic” between the mobile hotspot and the network system; and (2) second access rules (second service policy) based on the device profile 60 to assist with controlling the second traffic between the mobile hotspot and the internet via remote link 24. *Supra* §§ XI.1.e, XI.1.f. One of skill would have further understood that *Sewall*'s mobile hotspot comprises a processor that executes instructions from computer-readable media, as discussed above, and that those instructions, when executed, cause the mobile hotspot to implement the first access rules (first service policy) and second access rules (second service policy). *Id.*

171. Further, as discussed above, one of skill would have recognized that

Sewall's mobile hotspot communicates with the internet (via remote link 24) using a cellular data network based on *Sewall*'s disclosure that its personal hotspot may be "a data capable cellular device." EX1006, ¶17; *see id.*, ¶¶2-3 (seeking to address a problem faced by cellular service providers), 7 (describing the invention as "allow[ing] a user to connect to the internet using a device such as an internet enabled cellular telephone"). *Thomas* similarly states that its wireless device may utilize "any cellular data network technology (e.g., 2.5G, 3G, 4G, or any future technology)" and further discloses, as was known in the art, that cellular network characteristics (e.g., bandwidth, speed) may vary based on the type of cellular data network technology as well as the wireless data standards of any particular wireless carrier. EX1005, ¶¶32 (stating that "different wireless carriers have different wireless data standards for bandwidth at the cell towers"), 83 (noting that "the present disclosure also works on data networks prior to 3G, but at slower speeds due to certain limitations of such data networks"). Accordingly, one of skill would have understood that the second service policy for *Sewall*'s personal hotspot varies based on the type of "first network" used by the personal hotspot to communicate with the internet.

172. *Thomas* also discloses different types of "second networks" that can be used by its wireless device to communicate with other computing devices. For

example, *Thomas* describes Bluetooth as a “conventional” means for a client computing device to communicate with a wireless hotspot, however, it notes that Bluetooth has several disadvantages including that it “offer[s] limited connectivity options (e.g., generally point-to-point connections), limited transmission distance and power (e.g., close, unobstructed line-of-sight communication with a laptop), and insufficient bandwidth for high speed data connections.” EX1005, ¶¶6, 28, 32. *Thomas* seeks to overcome these limitations of Bluetooth by allowing client computing devices to connect to its wireless device “using a Wi-Fi or other link,” thereby allowing the client computing devices to “choose among different wireless devices 110 based upon available signal strength and bandwidth capacities” rather than being forced to link to “a specific cellular device” offering specific network characteristics. EX1005, ¶32. According to *Thomas*, the use of Wi-Fi is further advantageous because it allows the wireless hotspot device to support connections with multiple client devices at a time, whereas Bluetooth can only support a single point-to-point connection. EX1005, ¶28. *Thomas* thus recognizes that the type of “second network” used by the mobile hotspot to communicate with other computing devices will impact the first service policy assisting in control of first traffic between those other computing devices and the network system.

173. Accordingly, in my opinion, one of skill would have understood from

the disclosures in *Thomas* that the first access rules (first service policy) and second access rules (second service policy) for *Sewall*'s personal hotspot are based on the type of the first network and/or second network.

11.Claim 26: “wherein, when executed by the at least one processor, the one or more instructions further cause the at least one processor to: identify the one or more other end-user devices.”

174. Claim 26 depends from claim 1, which would have been obvious as discussed above. *Supra* § XI.1. In my opinion, claim 26 would have been obvious to one of skill based on *Sewall* and *Thomas*.

175. As detailed above, *Sewall*'s mobile hotspot “monitor[s] or identif[ies] successful use or attempted use of the forwarding service” and, in so doing, “identif[ies] the one or more other end-user devices” using the forwarding service. *Supra* § XI.1.e. Specifically, *Sewall*'s mobile hotspot includes a limiter 40 that distinguishes among users of client devices 12, 14, and 16 in order to apply different first access rules for different users. EX1006, ¶¶15, 22. When *Sewall*'s mobile hotspot receives a communication from a computing device attempting to use its forwarding service, the access engine 48 applies access rules obtained from configuration data 42. EX1006, ¶26. To do so, the access engine 48 monitors the source of the communication from user data 58 and identifies a profile (e.g., owner, authorized user, anonymous user, or custom) that is associated with the

source of the communication. *Id.*, ¶¶38-39, 47-48, Figs. 4-5, 8. From the identified profile, access engine 48 extrapolates the first access rules and blocks or limits access according to those rules. *Id.*, ¶49, Fig. 8.

176. More specifically, *Sewall* discloses that the user data 58 for identifying the particular user can be “a hardware address of the user’s client device.” EX1006, ¶38. In fact, *Sewall* explains that “[w]hen determining if a particular communication is to be blocked,” the access engine 48 “may analyze the communication to identify the hardware address of the source client device” as an “indicator of the nature of the particular user from or to which the communication is to be routed.” *Id.*, ¶39.

177. Accordingly, *Sewall*’s mobile hotspot “identif[ies] the one or more other end-user devices,” as recited in claim 26. One of skill would have understood that *Sewall*’s mobile hotspot comprises a processor that executes instructions from computer-readable media and that those instructions, when executed, cause the personal hotspot to perform this process of identifying computing devices attempting to access the forwarding service as well as their associated profiles in order to apply access rules.

178. *Thomas* discloses that its wireless device 110 can be programmed to accept computer traffic from a select number of client computing devices 114 (i.e.,

end-user devices). EX1005, ¶46. It further states that traffic from client computing devices may be authorized using any number of methods, including “plug in keys; an identified parameter of the computing device such as MAC ID; a WEP key coded into the laptop to provide access to the particular wireless device 110; and software keys loaded on the client computing device 114.” EX1005, ¶46. In another method, “the request to use the wireless device 110 may appear on the display 314 on the wireless device 110 along with some identifier, such as the service set identifier (SSID) or MAC address of the client computing device 114 that is attempting to use the ad hoc point of presence capabilities of the wireless device 110.” *Id.* In either case, *Thomas* discloses embodiments in which wireless device 110 identifies the client computing device(s) seeking forwarding services.

179. As illustrated in Figure 10 of *Thomas* (reproduced below), *Thomas* also discloses an exemplary user interface screen 1000 with “[a] connection detail section 1002 [that] indicates device names, MAC addresses, or other identifying information for the connected client computing devices 114.”

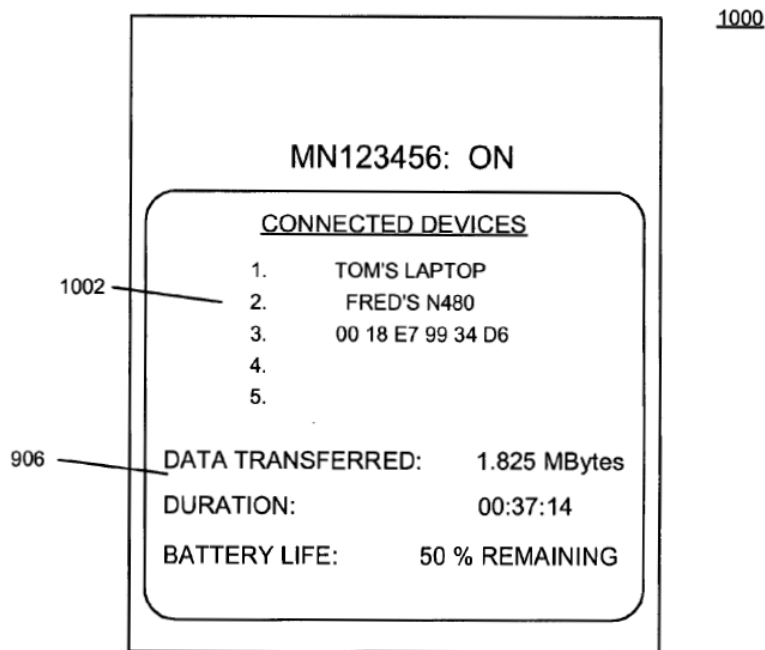


FIGURE 10

180. Further, as discussed above, *Thomas*'s wireless device—like any mobile hotspot—includes a processor configured to execute one or more instructions. *See supra* § XII.4; EX1005, ¶33. In my opinion, one of skill would have understood that the processes *Thomas*'s wireless device uses to identify computing devices using or attempting to use its forwarding service are attributable to its processor executing instructions.

181. In my opinion, one of skill would have been motivated to modify *Sewall*'s mobile hotspot to include a user interface displaying identifying information regarding users or attempted users of the mobile hotspot (as well as their devices), as disclosed in *Thomas*, so that the owner of the mobile hotspot

could more conveniently monitor and control traffic from client devices. *See, e.g.*, EX1005, ¶¶44-46 (explaining benefits of allowing the wireless-device owner to control traffic).

12.Claim 36: “wherein implement the first service policy comprises limit a number of the one or more other end-user devices allowed to use the forwarding service.”

182. Claim 36 depends from claim 1, which would have been obvious as discussed above. *Supra* § XI.1. In my opinion, claim 36 would have been obvious to one of skill based on *Sewall* and *Thomas*.

183. As detailed above, *Sewall*’s mobile hotspot receives a device profile from the service provider providing access rules that apply to all users of the mobile hotspot. *Supra* § XI.1.f. “The device access rules may limit the number of simultaneous users or sessions supported by [the] personal hotspot.” EX1006, ¶34. Further, *Thomas* discloses “programming the wireless device 110 to accept computer traffic from a select number of client computing devices 114.” EX1005, ¶46.

184. In my opinion, one of skill would have been motivated to expand upon *Sewall*’s device access rules in view of *Thomas*’s capability to set a limit on the number of client devices through programming so that the owner of the mobile hotspot could implement additional limits on the number of client devices allowed

to use the forwarding service beyond those in the data subscription package. For example, the data subscription package may limit the mobile hotspot to four client devices, but the owner of the mobile hotspot may prefer to limit the hotspot to three client devices to increase the quality of service. One of skill would have been readily able to combine the disclosures in *Sewall* and *Thomas* through basic programming to limit the number of simultaneous users.

13.Claim 52: “further comprising a user interface, and wherein, when executed by the at least one processor, the one or more instructions further cause the at least one processor to cause a notification to be presented through the user interface.”

185. Claim 52 depends from claim 1, which would have been obvious as discussed above. *Supra* § XI.1. In my opinion, claim 52 would have been obvious to one of skill based on *Sewall* and *Thomas*.

186. *Sewall* discloses that the limiter 40 for its mobile hotspot includes user interface data 44, which is “data used to present a client device with user interfaces such as web pages or other content that can be served to a client device.” EX1006, ¶23. *Sewall* further explains that such user interfaces “can be informational” or “can provide controls for supplying identifying information such as a username and password as well as any payment information needed to access personal hotspot 10.” *Id.* The user interface also has “controls for updating configuration data.” *Id.*, ¶24.

187. Accordingly, *Sewall*'s mobile hotspot "causes a notification to be presented through the user interface," as recited in claim 52. One of skill would have understood that *Sewall*'s mobile hotspot comprises a processor that executes instructions from computer-readable media and that those instructions, when executed, cause the personal hotspot to present a notification to the end-user through the user interface. *Supra* § XI.1.c.

188. As illustrated in Figures 6 and 7 of *Thomas* (reproduced below), *Thomas* discloses embodiments of its wireless device that have a user interface on the wireless device itself. *E.g.*, EX1005, ¶¶44, 76-77, Fig. 6 (exemplary user interface screen for the wireless device), Fig. 7 (same).

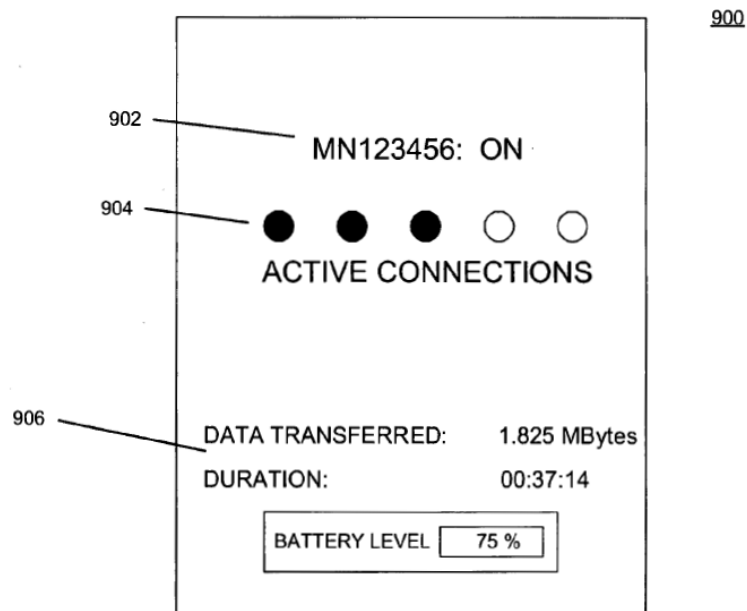


FIGURE 9

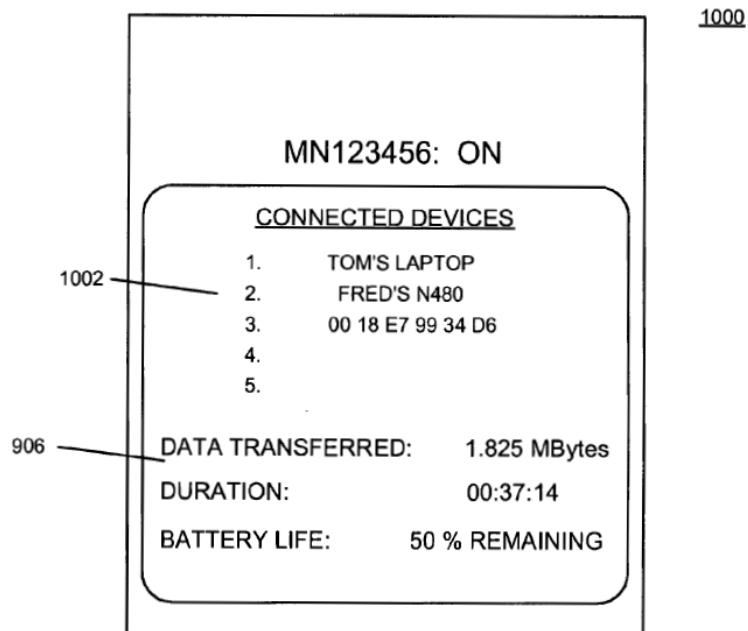


FIGURE 10

189. *Thomas* discloses that the user interface on its wireless device may be configured “to allow or disallow access to a connection via the Internet 104 by computing devices that are within range of the wireless device 110.” EX1005, ¶44. For example, a notification that another computing device is requesting to use the wireless device 110 “may appear on the display 314 on the wireless device along with some identifier, such as the service set identifier (SSID) or MAC address of the client computing device 114 that is attempting to seek authorization to use the ad hoc point of presence capabilities of the wireless device 110.” EX1005, ¶46. “The user of the wireless device 110 may accept or deny the request to access the

Internet 104 through the wireless device 110.” *Id.* Alternatively, the user interface may present other types of notifications such as, “[f]or example, a roaming notification, a startup or shutdown message display sequence, data limitations based upon service level agreement, and battery status indications.” EX1005, ¶76.

190. Further, as discussed above, *Thomas*’s wireless device—like any mobile hotspot—includes a processor configured to execute one or more instructions. *See supra* § XII.4; EX1005, ¶33. In my opinion, one of skill would have understood that those instructions, when executed, cause *Thomas*’s wireless device to present a notification through the user interface on the device.

191. In my opinion, one of skill would have been motivated to modify *Sewall*’s mobile hotspot in view of *Thomas* to provide a user interface on the mobile hotspot with notifications regarding use or attempted use of the forwarding service so that the owner of the mobile hotspot could more conveniently authorize, control, and monitor traffic from client devices as well as other information regarding the status of the mobile hotspot itself. *Supra* § XII.1.

14.Claim 53: “wherein the notification is based on the monitored or identified successful use or attempted use of the forwarding service or of the one or more services.”

192. Claim 53 depends from claim 52, which depends from claim 1.

Claims 1 and 52 would have been obvious as discussed above. *Supra* §§ XI.1,

XII.13. In my opinion, claim 53 would have been obvious to one of skill based on *Sewall and Thomas*.

193. In my opinion, *Sewall and Thomas* render claim 53 obvious for at least the reasons discussed above regarding claim 52. *Supra* § XII.13. Specifically, *Thomas* discloses that the user interface for its wireless device may be configured to provide notifications of attempted and successful use of the forwarding service, as monitored and identified by the wireless device. For example, a notification of attempted use of the forwarding service “may appear on the display 314 on the wireless device 110” for the user of the wireless device to accept or deny the request to access the internet through the wireless device. EX1005, ¶¶44, 46. As another example, Figure 9 of *Thomas* (reproduced above in § XII.13) depicts an exemplary user interface screen with an “active connections section [that] provides connection information” indicating how many connections “are active on the wireless device 110.” EX1005, ¶76, Fig. 9. The exemplary user interface screen of Figure 9 may also be configured to present, for example, “a roaming notification.” EX1005, ¶76. Figure 10 of *Thomas* (reproduced above in § XII.13) depicts another exemplary user interface screen that “provides additional connection information,” including “[a] connection detail section 1002 indicat[ing] device names, MAC addresses, or other identifying information for the connected client computing

devices 114.” EX1005, ¶77, Fig. 10. When configured as depicted in Figures 9 and 10, the user interface on *Thomas*’s wireless device provides a notification based on the monitored or identified successful use of the forwarding service.

194. In my opinion, one of skill would have been motivated to modify *Sewall*’s mobile hotspot in view of *Thomas* to provide a user interface on the mobile hotspot with notifications regarding successful use or attempted used of the forwarding service so that the owner of the mobile hotspot could more conveniently authorize, control, and monitor traffic from client devices. *Supra* § XII.1.

15.Claim 54: “wherein the notification comprises a warning.”

195. Claim 54 depends from claim 52, which depends from claim 1. Claims 1 and 52 would have been obvious as discussed above. *Supra* §§ XI.1, XII.13. In my opinion, claim 54 would have been obvious to one of skill based on *Sewall* and *Thomas*.

196. *Thomas* discloses “[s]everal security features [that] may also be provided for the wireless device 110,” such as “ensuring that only valid client computing devices 114 may connect to the wireless device 110; utilization of Wi-Fi security settings from the wireless device 110; access restrictions based upon MAC address; roaming awareness and management; and power management.”

EX1005, ¶70. Accordingly, to incorporate such security features, *Thomas* discloses embodiments in which the wireless device 110—specifically, its user interface—is configured to present warning notifications, such as, “[f]or example, a roaming notification, a startup or shutdown message display sequence, data limitations based upon service level agreement, and battery status indications.” *Id.*, ¶76. In my opinion, the warning notifications disclosed in *Thomas* are consistent with those described in the ’451 patent, which discloses exemplary “user service warning[s]” displayed on the user interface screen, e.g., “in response to user input or requests” or “in accordance with a certain amount of service usage.” EX1001 3:9-14, Figs. 26G, 27A-P (describing embodiments in which a “warning is sent to the UI to notify the user” that, e.g., a “[n]etwork service usage measure is in conflict with expected service usage” or to “[v]erify that service policies in effect are as intended”).

197. In my opinion, one of skill would have been motivated to modify *Sewall*’s mobile hotspot in view of *Thomas* to implement these specific types of warning notifications on *Sewall*’s mobile hotspot so that its owner could be made aware of circumstances that could potentially impact the mobile hotspot’s ability to provide the forwarding service or the cost associated with doing so. *Supra* § XII.1.

16.Claim 55: “wherein the notification comprises information about an offer or an option.”

198. Claim 55 depends from claim 52, which depends from claim 1.

Claims 1 and 52 would have been obvious as discussed above. *Supra* §§ XI.1, XII.13. In my opinion, claim 55 would have been obvious to one of skill based on *Sewall and Thomas*.

199. As discussed above, *Thomas* discloses that the user interface for its wireless device may be configured such that a notification of attempted use of the forwarding service “may appear on the display 314 on the wireless device 110” for the user of the wireless device to accept or deny the request to access the internet through the wireless device. EX1005, ¶¶44, 46. If the user of *Thomas*’s wireless device accepts such a request, the user of the client computing device is billed for their use of the forwarding service based on the amount of time their client computing device accesses the network. *Id.*, ¶¶23 (“Authorization is performed and billing measures are established in real time and billing credits are provided to an account associated with the user of the wireless device based upon the duration of access to the network by the client computing device.”), 46. In this regard, the user interface of *Thomas*’s wireless device provides a notification regarding attempted use of the forwarding service and presents the user of *Thomas*’s wireless device with an option to accept or deny an offer to be paid for allowing such use.

200. In my opinion, one of skill would have been motivated to modify *Sewall*'s mobile hotspot in view of *Thomas* to include a user interface providing such notifications on *Sewall*'s mobile hotspot so that its owner could readily control access to the forwarding service. *Supra* § XII.1.

17.Claim 56: “wherein the notification comprises an offer to enable or activate the forwarding service.”

201. Claim 56 depends from claim 52, which depends from claim 1. Claims 1 and 52 would have been obvious as discussed above. *Supra* §§ XI.1, XII.13. In my opinion, claim 56 would have been obvious to one of skill based on *Sewall* and *Thomas*.

202. *Sewall* and *Thomas* render claim 56 obvious for at least the reasons discussed regarding claims 52 and 55. *Supra* §§ XII.13, XII.16. Specifically, *Thomas* discloses a user interface for its wireless device that provides a notification of an offer to enable or activate the forwarding service for the user of the wireless device to accept or deny. EX1005, ¶¶44, 46. In my opinion, one of skill would have been motivated to modify *Sewall*'s mobile hotspot in view of *Thomas* to include a user interface providing such notifications on *Sewall*'s mobile hotspot so that its owner could readily control access to the forwarding service. *Supra* § XII.1.

18.Claim 57: “wherein, when executed by the at least one processor, the one or more instructions further cause the at least one processor to obtain a response to the notification.”

203. Claim 57 depends from claim 52, which depends from claim 1.

Claims 1 and 52 would have been obvious as discussed above. *Supra* §§ XI.1, XII.13. In my opinion, claim 57 would have been obvious to one of skill based on *Sewall* and *Thomas*.

204. *Sewall* and *Thomas* render claim 57 obvious for at least the reasons discussed regarding claim 52. *Supra* §XII.13. Specifically, *Thomas* discloses a user interface for its wireless device that provides a notification of a request from a client computing device to use the wireless device’s forwarding service. EX1005, ¶¶44, 46. “The user of the wireless device 110 may accept or deny the request to access the Internet 104 through the wireless device 110.” EX1005, ¶46.

205. Further, as discussed above, *Thomas*’s wireless device—like any mobile hotspot—includes a processor configured to execute one or more instructions. *See supra* § XII.4; EX1005, ¶33. One of skill would have understood that those instructions, when executed, cause *Thomas*’s wireless device to present a notification regarding attempted use of the forwarding service and obtain a response through the user interface on the device.

206. In my opinion, one of skill would have been motivated to modify

Sewall's mobile hotspot in view of *Thomas* to include a user interface configured to obtain a response to a request for access on *Sewall*'s mobile hotspot so that its owner could readily control access to the forwarding service. *Supra* § XII.1.

19.Claim 58: “wherein the response to the notification comprises an acknowledgment.”

207. Claim 58 depends from claim 57, which depends from claim 52, which depends from claim 1. Claims 1, 52, and 57 would have been obvious as discussed above. *Supra* §§ XI.1, XII.13, XII.18. In my opinion, claim 58 would have been obvious to one of skill based on *Sewall* and *Thomas*.

208. *Sewall* and *Thomas* render claim 58 obvious for the reasons discussed regarding claim 57. In my opinion, one of skill would have understood that the user of the wireless device 110's response to a request to access the forwarding service—accepting or denying that request—“comprises an acknowledgement” of that notification, as recited in claim 58.

20.Claim 59: “wherein the response to the notification comprises an indication of a response to an offer.”

209. Claim 59 depends from claim 57, which depends from claim 52, which depends from claim 1. Claims 1, 52, and 57 would have been obvious as discussed above. *Supra* §§ XI.1, XII.13, XII.18. In my opinion, claim 59 would have been obvious to one of skill based on *Sewall* and *Thomas*.

210. *Sewall* and *Thomas* render claim 59 obvious for the reasons discussed regarding claims 55 and 57. *Supra* §§ XII.16, XII.18. In my opinion, one of skill would have understood that the user of the wireless device 110's response to a request to access the forwarding service—accepting or denying that request—“comprises an indication of a response to an offer,” as recited in claim 59. Specifically, it is a response to an offer to purchase internet access through the wireless device and its forwarding service.

21.Claim 60: “wherein the response to the notification comprises an indication of a selection of an option.”

211. Claim 60 depends from claim 57, which depends from claim 52, which depends from claim 1. Claims 1, 52, and 57 would have been obvious as discussed above. *Supra* §§ XI.1, XII.13, XII.18. In my opinion, claim 60 would have been obvious to one of skill based on *Sewall* and *Thomas*.

212. As discussed above, *Thomas* discloses that its wireless device 110 can be configured to display a request from a client computing device to access the forwarding service on the user interface for the user of the wireless device to accept or deny. EX1005, ¶¶44, 46; *supra* § XII.13. When the user of the wireless device responds to such a notification, that response—accepting or denying the request for access—“comprises an indication of a selection of an option,” as recited in claim 60.

213. For example, *Thomas* explains that the client computing devices may only reach the network (e.g., internet) when authorized by the user of the wireless device and authenticated at the wireless device or through the server. EX1005, ¶47 (“Once authenticated, the client computing device 114 is allowed to communicate normal traffic through the wireless device 110 to reach a network, such as the Internet 104, or to access information on the server 108.”). One of skill would thus have understood that the client computing device requesting access to the internet through the wireless device and its user receive an indication of the user of the wireless device’s response—either accepting or denying access—based on whether the client computing device ultimately receives access to the internet after making such a request.

22.Claim 61: “wherein the response to the notification comprises a directive to enable or activate the forwarding service.”

214. Claim 61 depends from claim 57, which depends from claim 52, which depends from claim 1. Claims 1, 52, and 57 would have been obvious as discussed above. *Supra* §§ XI.1, XII.13, XII.18. In my opinion, claim 61 would have been obvious to one of skill based on *Sewall* and *Thomas*.

215. *Sewall* and *Thomas* render claim 61 obvious for the reasons discussed above regarding claims 57 and 59. *Supra* §§ XII.18, XII.20. In my opinion, one of skill would have understood that the user of the wireless device 110’s response to a

request to access the forwarding service—particularly, if it is an acceptance—
“comprises a directive to enable or activate the forwarding service,” as recited in
claim 61.

**23.Claim 62: “further comprising a user interface, and wherein,
when executed by the at least one processor, the one or more
instructions further cause the at least one processor to obtain a
user input through the user interface.”**

216. Claim 62 depends from claim 1, which would have been obvious as
discussed above. *Supra* § XI.1. In my opinion, claim 62 would have been obvious
to one of skill based on *Sewall* and *Thomas*.

217. *Sewall* and *Thomas* render claim 62 obvious for the reasons discussed
above regarding claim 57. *See supra* §XII.18. As discussed above, *Thomas*
discloses that its wireless device 110 can be configured to display a request from a
client computing device to access the forwarding service on the user interface for
the user of the wireless device to accept or deny through the user interface.

EX1005, ¶¶44, 46; *supra* § XII.13.

**24.Claim 63: “wherein the user input comprises an
acknowledgment.”**

218. Claim 63 depends from claim 62, which depends from claim 1.
Claims 1 and 62 would have been obvious as discussed above. *Supra* §§ XI.1,
XII.23. In my opinion, claim 63 would have been obvious to one of skill based on

Sewall and Thomas.

219. *Sewall and Thomas* render claim 63 obvious for the reasons discussed above regarding claim 62. *Supra* § XII.23. One of skill would have understood that the user of the wireless device 110's response accepting or denying a request by a client computing device to access the internet through the wireless device is user input that "comprises an acknowledgement" of that notification, as recited in claim 63.

25.Claim 64: "wherein the user input comprises an indication of an intention to activate or select a service offer or a service plan."

220. Claim 64 depends from claim 62, which depends from claim 1. Claims 1 and 62 would have been obvious as discussed above. *Supra* §§ XI.1, XII.23. In my opinion, claim 64 would have been obvious to one of skill based on *Sewall and Thomas*.

221. As discussed above, *Thomas* discloses that its wireless device 110 can be configured to display a request from a client computing device to access the forwarding service on the user interface for the user of the wireless device to accept or deny through the user interface. EX1005, ¶¶44, 46; *supra* § XII.13. Further, as discussed above, *Sewall and Thomas* each disclose billing features through which client devices are charged to access the internet using the forwarding service provided by the wireless device. *Supra* §§XI.8, XII.1, XII.5,

XII.16. In my opinion, one of skill would have understood that the user of the wireless device 110's response to a request to access the forwarding service—particularly, if it is an acceptance—is user input that “comprises an indication of an intention to activate or select a service offer or a service plan,” as recited in claim 64.

26.Claim 65: “wherein the user input comprises a directive to enable or activate the forwarding service.”

222. Claim 65 depends from claim 62, which depends from claim 1.

Claims 1 and 62 would have been obvious as discussed above. *Supra* §§ XI.1,

XII.23. In my opinion, claim 65 would have been obvious to one of skill based on *Sewall* and *Thomas*.

223. *Sewall* and *Thomas* render claim 65 obvious for the reasons discussed above regarding claims 61 and 62. *Supra* §§ XII.22, XII.23. Specifically, *Thomas* discloses a user interface for its wireless device that provides a notification of a request from a client computing device to use the wireless device's forwarding service. EX1005, ¶¶44, 46. “The user of the wireless device 110 may accept or deny the request to access the Internet 104 through the wireless device 110.” EX1005, ¶46. In my opinion, one of skill would have understood that the user of the wireless device 110's response to a request to access the forwarding service—particularly, if it is an acceptance—is user input that “comprises a directive to

enable or activate the forwarding service,” as recited in claim 65.

27.Claim 69: “wherein the user input comprises an indication of a limit on a number of the one or more other end-user devices authorized to use the forwarding service.”

224. Claim 69 depends from claim 62, which depends from claim 1.

Claims 1 and 62 would have been obvious as discussed above. *Supra* §§ XI.1, XII.23. In my opinion, claim 69 would have been obvious to one of skill based on *Sewall* and *Thomas*.

225. As discussed above, *Sewall* and *Thomas* each disclose configuring the wireless device to limit the number of client devices that are able to use the forwarding service. *Supra* §XII.12. For example, *Thomas* discloses a user interface for its wireless device 110 that receives user input authorizing computer traffic for a limited number of client computing devices 114. EX1005, ¶¶44, 46 (discussing accepting traffic from “a select number of client computing devices 114” and limiting authorization to “eligible computing devices.”).

226. In my opinion, it would have been obvious combine the disclosures in *Sewall* and *Thomas* to allow the user of the wireless device to “program[] the wireless device 110 to accept computer traffic from a select number of client computing devices 114” as an input provided through the user interface. EX1005, ¶46. Modifying *Sewall*’s personal hotspot to include a user interface that could be

used to set a limit on the number of client devices authorized to use the forwarding service would increase its versatility. Indeed, in explaining the utility of its user interface, *Thomas* provides an example of a traveling sales team with members that need to share a single high-bandwidth connection via the wireless device. *See* EX1005, ¶¶44-46. In such a scenario, it would be advantageous for any limit on the number of client devices allowed to access the forwarding service to be readily adjustable, in order to accommodate variations in the size of the sales team.

227. Accordingly, in my opinion, it would have been obvious to modify *Sewall*'s personal hotspot to incorporate a limit on the number of end-user devices authorized for the forwarding service, as disclosed in *Sewall* and *Thomas*, that could be set or adjusted by user input through a user interface (like that disclosed in *Thomas*). One of skill would have been motivated to incorporate this feature through a user interface so that the owner of the mobile hotspot could more conveniently control traffic from client devices by adjusting the limit on the number of devices allowed to access the forwarding service.

XIII. GROUND 3: CLAIMS 20 AND 23 ARE OBVIOUS OVER *SEWALL* AND *POLSON*

1. Motivation to Combine

228. One of skill in the art would have recognized that *Polson*, like *Sewall*, is analogous art to the '451 patent. It also is in the field of endeavor—

namely, mobile devices and wireless access points for computer networking. EX1015, Abstract, ¶¶2, 16, 20-23, 26, 56, Figs. 1, 2, 9-15. *Sewall* and *Polson* share a common goal with the '451 patent: using devices to bridge or route traffic from other devices to a network system (e.g., the internet). EX1015, Abstract, ¶¶2, 16, 20-23, 26, 29-35, 38-39, 44-46, 52-53, 56, 78-79, Figs. 1, 2, 9-15.

229. In my opinion, one of skill would have been motivated to combine *Sewall*'s profiles for implementing access rules on its end-user hotspot device with *Polson*'s WWAN access-management features. Both references disclose highly compatible hotspot features that one of skill would have readily combined with a reasonable expectation of success. For example, *Polson* discloses adapting its gateway to prioritize specific data over the WWAN to manage conflicts between connected devices sharing limited WWAN capacity. EX1015, ¶46. One of skill would have recognized that certain network tasks are more important than others, and would have been motivated to modify the access rules for *Sewall*'s mobile hotspot to prioritize those more critical tasks where the capacity of the WWAN is limited and cannot support all forwarding activity.

230. *Polson* also discloses that its hotspot ("gateway 108") device may be capable of accessing multiple WWANs via different service providers. EX1015,

¶¶38-39. One of skill would have recognized that having multiple WWANs available for access would improve the flexibility and reliability of the combination's end-user hotspot services by, for example, allowing the mobile hotspot to switch WWANs if necessary (e.g., due to a location change) and avoid losing internet access. In fact, one of skill would recognize from *Polson* that the mobility of its gateway is important and that the ability to connect to multiple WWANs is necessary when one WWAN is not available due to the location of the user, issues with the service provider, or the features of a service agreement. EX1015, ¶¶52-53. A skilled artisan would have reasonably sought to avoid such interruptions in the forwarding service provided by the mobile hotspot.

231. In my opinion, combining *Polson*'s disclosure with the disclosure of *Sewall* was within a POSITA's skillset and would predictably apply known techniques, such as basic programming to implement rules prioritizing specific data where WWAN capacity is limited and incorporating known hardware elements to accommodate multiple WWAN interfaces providing access to different WWANs. This combination would reasonably provide for more efficient management of available network resources and promote stronger and more continuous availability of WWAN access by being able to connect to different WWANs—ultimately improving routing traffic between networks and devices.

2. Claim 20: “wherein the first service policy or the second service policy is based on a network capacity or congestion.”

232. Claim 20 depends from claim 1, which would have been obvious as discussed above. *Supra* § XI.1. In my opinion, claim 20 would have been obvious to one of skill based on *Sewall* and *Polson*.

233. As discussed above, *Sewall* discloses implementing access rules to assist with controlling traffic. *Supra* §§ XI.1.e, XI.1.f; EX1006, ¶26. These access rules may cause a communication from an unauthorized user to be blocked or may “limit a user’s duration of use, limit bandwidth available to a given user, or limit the amount of data a particular user or type of user can download in a given time period.” *Id.* *Polson* discloses adapting its gateway “to prioritize specific data over the WWAN 112 to manage conflicts between [client] devices 102 of LANs 104 that are sharing limited WWAN 112 capacity.” EX1015, ¶46.

234. In my opinion, one of skill would have been motivated to extend *Sewall*’s access rules by implementing additional access rules to address the potential for a limited WWAN (first network) capacity by effectively managing conflicts among end-user devices resulting from sharing the limited capacity of the first network, as disclosed in *Polson*. *Supra* § XIII.1.

3. Claim 23: “wherein the first service policy or the second service policy is based on an aspect of a hardware element that provides the first network or the second network.”

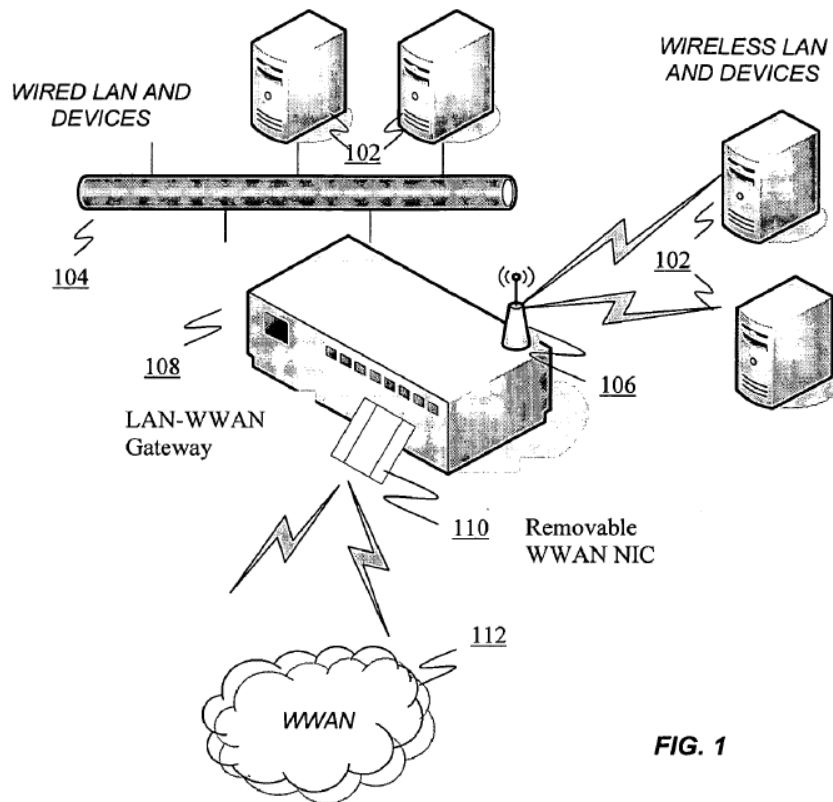
235. Claim 23 depends from claim 1, which would have been obvious as discussed above. *Supra* § XI.1. In my opinion, claim 23 would have been obvious to one of skill based on *Sewall* and *Polson*.

236. As discussed above, *Sewall* discloses implementing second access rules to assist with controlling the second traffic between the mobile hotspot and the internet via remote link 24. *Supra* § XI.1.f; EX1006, ¶34. The second access rules (referred to as “device access rules”) apply to all users of the mobile hotspot and may “specify upload and download bandwidth limits,” “limit the amount of data transfer allowed in a given time period,” or “limit the number of simultaneous users or sessions supported by the personal hotspot. EX1006, ¶34.

237. *Polson* discloses that its gateway comprises one or more sockets adapted to “removably receive” one or more WWAN interfaces that are adapted to send and receive data through one or more WWANs. EX1015, ¶¶20, 51-53. The WWAN interface “may be of any sort known in the art, such as cellular, PCS, and WiMax WWAN interfaces” and “may come in the form of a PC Card or Modem . . . capable of plugging into the socket of gateway 108.” *Id.*, ¶51.

238. Figure 1 of *Polson* (reproduced below) illustrates an exemplary

gateway 108 that is configured with a single socket to removably receive one WWAN interface at a time (e.g., WWAN interface 110). EX1015, Fig. 1.



However, *Polson* also discloses that “[i]n still other embodiments not illustrated, gateway 108 may support multiple WWAN interfaces removably received by multiple sockets of gateway 108.” *Id.*, ¶53.

239. “[E]ach WWAN interface may be adapted for a specific wireless service provider . . . and may be associated with a service agreement with that service provider,” as may be determined by the gateway 108. EX1015, ¶¶39-40, 52. Thus, regardless of how many sockets the gateway has, the ability to support

different WWAN interfaces will enhance the mobility of the gateway by “facilitat[ing] the switching of WWAN interfaces in areas where another [service] provider having a different WWAN interface is stronger, or where the provider associated with [a] current WWAN interface 110 does not provide service.” *Id.*, ¶52. This is even more seamless when the gateway comprises more than one socket. “By employing multiple sockets and multiple WWAN interfaces 110, gateway 108 may facilitate connection to multiple WWAN service providers” and if WWAN “is not available because of the location of the user, issues with the service provider of the WWAN 112, or because of the features of a service agreement, WWAN access may be provided via the other WWAN connection” without any need for switching the WWAN interface. *Id.*

240. In my opinion, one of skill would have been motivated to modify *Sewall*’s mobile hotspot (and related access rules) to include one or more sockets for removably receiving a hardware element in the form of a WWAN interface—such as the PC Card or Modem taught in *Polson*—in order to facilitate switching between WWANs to prevent the mobile hotspot (and client devices) from experiencing interruptions in internet access. *Supra* § XIII.1.

**XIV. GROUND 4: CLAIMS 33, 43, AND 44 ARE OBVIOUS OVER
*SEWALL AND KRISHNASWAMY***

1. Motivation to Combine

241. One of skill in the art would have recognized that *Krishnaswamy*, like *Sewall*, is analogous art to the '451 patent. It is in the same field of endeavor—namely, mobile devices and wireless access points for computer networking.

EX1020, Abstract, 3:51-4:21, Figs. 1-2. *Sewall* and *Krishnaswamy* also share a common goal with the '451 patent: using end-user devices for bridging or routing traffic from other devices to a network system (e.g., the internet), including providing services seeking to improve the customizability, monetization, and quality of service for mobile-hotspot technology (e.g., usage control, user interactivity and notifications via graphical user interfaces, and billing features).

EX1020, Abstract, 3:51-4:21, 6:1-16, 7:61-8:15, 9:54-63, 11:26-44, Figs. 1-2.

242. In my opinion, one of skill would have been motivated to combine *Sewall*'s and *Krishnaswamy*'s access-limiting and access-enabling features for providing forwarding services over a mobile hotspot. Both references disclose highly compatible hotspot features that one of skill would have readily combined with a reasonable expectation of success. For example, *Krishnaswamy* discloses that its ad hoc service provider can limit, terminate, or alter the attributes of access to its forwarding service in response to resource-related events indicating that

usage is reaching a threshold. EX1020, 11:3-44. One of skill would have recognized that the mobile hotspot may not always have the battery life, processing capability, or available bandwidth to facilitate optimal networking for all connected client devices, and would have been motivated to modify *Sewall*'s access rules to prioritize client device belonging to preferred users where the capacity of the mobile hotspot or network is limited and cannot support all forwarding activity.

243. *Krishnaswamy* also discloses that its ad hoc service provider 106 monitors information regarding content flow and data usage and sends that information to the network system. EX1020, 7:1-15. Given that *Sewall*'s mobile hotspot collects user data 58 containing similar information (EX1006, ¶38), one of skill would have been motivated to ensure all such user data 58 collected by *Sewall*'s mobile hotspot was sent to the network system, as disclosed in *Krishnaswamy*, in order to monitor and optimize network resource utilization. Not only would this ensure that network resources are appropriately apportioned based on the needs or anticipated needs of client devices, but it also would ensure that those network resources are appropriately priced and paid for.

244. In my opinion, by January 2009, combining *Krishnaswamy*'s disclosure with the disclosure of *Sewall* was within a POSITA's skillset and would

predictably apply known techniques, such basic programming to limit access when device or network resources reach a threshold or to send user data to the network. This combination would reasonably provide for more efficient management of the available capacity to provide the forwarding service and the compensation received for access.

2. Claim 33

245. Claim 33 depends from claim 1, which would have been obvious as discussed above. *Supra* §XI.1. In my opinion, claim 33 would have been obvious to one of skill based on *Sewall* and *Krishnaswamy*.

a. 33[a]: “wherein, when executed by the at least one processor, the one or more instructions further cause the at least one processor to: determine, based on the monitored or identified successful use or attempted use of the forwarding service, that the usage of the forwarding service has reached the limit or allowance, and”

246. In my opinion, *Sewall* and *Krishnaswamy* render claim 33[a] obvious. As discussed above, *Sewall* discloses implementing access rules to assist with controlling traffic. *Supra* §§ XI.1.e, XI.1.f; EX1006, ¶26. The first access rules may cause a communication from an unauthorized user to be blocked or may “limit a user’s duration of use, limit bandwidth available to a given user, or limit the amount of data a particular user or type of user can download in a given time period.” *Id.* Additionally, the second access rules (referred to as “device access

rules”) apply to all users of the mobile hotspot and may “specify upload and download bandwidth limits,” “limit the amount of data transfer allowed in a given time period,” or “limit the number of simultaneous users or sessions supported by [the] personal hotspot.” EX1006, ¶34. As *Sewall* explains, “access engine 48 is responsible for blocking communications from and even to a user once that user[] has reached a duration, download, or bandwidth limit.” *Id.*, ¶26. In my opinion, as discussed above, one of skill would have understood that *Sewall*’s mobile hotspot comprises a processor that executes instructions from computer-readable media, as discussed above, and that those instructions, when executed, cause the mobile hotspot to monitor or identify successful or attempted use of the forwarding service and implement the first and second access rules accordingly. *Supra* §§ XI.1.c, XI.1.e, XI.1.f, XI.1.g.

247. *Krishnaswamy* similarly discloses that its ad hoc service provider 106 “may be configured to alter the ad hoc service provider’s ability to provide service for a wireless network in response to a resource related event.” EX1020, 10:51-54. *Krishnaswamy* also discloses examples of such resource-related events, including, for example, “an indication that the ad hoc service provider’s energy level (e.g., battery life of the ad hoc service provider) is below an energy threshold,” “an indication that the loading on the processing system 306 (e.g., loading due to

processing/communications/actions internal or external to the ad hoc service provider) is above a loading threshold,” “an indication that an available bandwidth for communications utilizing the first wireless access protocol (e.g., communications with the WWAN 104, the network 102, and/or the server 110) is below a first bandwidth threshold, or an indication “that an available bandwidth for communications utilizing the wireless access point (e.g., communications with the mobile clients 108) is below a second bandwidth threshold.” *Id.*, 11:3-25.

248. Like any mobile hotspot, *Krishnaswamy*’s ad hoc service provider includes a processor configured to execute one or more instructions. Specifically, *Krishnaswamy* discloses that its ad hoc service provider comprises a “processing system” that “may be implemented with one or more processors” that can “perform calculations or other manipulations of information” as well as “one or more machine-readable media for storing software” and instructions for the processor to execute. EX1020, 9:14-53, Fig. 3, claim 26 (claiming “[a] non-transitory machine-readable medium comprising instructions executable by one or more processors . . .”). Thus, in my opinion, one of skill would have understood that the ability of *Krishnaswamy*’s ad hoc service provider to make service adjustments in response to a resource-related event is attributable to its processor executing instructions. *Id.*, 1:53-55 (“[T]he processing system is configured to alter the ad

hoc service provider's ability to provide service for a wireless network in response to a resource related event.”).

b. 33[b]: “based on the determination that the usage of the forwarding service has reached the limit or allowance, modify the first service policy to throttle or restrict the first traffic.”

249. In my opinion, *Sewall* and *Krishnaswamy* render claim 33[b] obvious. *Krishnaswamy* discloses that “[i]n response to detecting a resource related event,” the ad hoc service provider 106 may perform one or more of several exemplary actions including “not admit[ting] any new mobile clients into the wireless network,” “terminat[ing] the ad hoc service provider’s service being provided to some or all of the existing mobile clients,” or “alter[ing] one or more attributes of the ad hoc service provider’s service such as a data rate of the service or the duration of the service.” EX1020, 11:26-44. Each of these actions “restrict[s] the first traffic” between the client devices and the network system, as recited in claim 33[b]. Moreover, *Krishnaswamy* discloses that “[t]he ad hoc service provider 106 (or the processing system 306) may take a different action with respect to each of the existing mobile clients and the server 110.” *Id.*, 11:45-48.

250. One of skill would have been motivated to modify *Sewall*’s first access rules to restrict traffic between client devices and the network system when usage of the forwarding system reaches a limit or allowance, as taught in

Krishnaswamy. For example, by restricting traffic from anonymous user profiles when usage of the forwarding system reaches a limit or allowance, *Sewall*'s mobile hotspot could prevent client devices—particularly those belonging to the owner or authorized users--from losing internet access due to the limit or allowance on usage. *Supra* § XIV.1.

3. Claim 43: “wherein, when executed by the at least one processor, the one or more instructions further cause the at least one processor to cause information to be sent to the network system, the information comprising a measure of usage of the forwarding service.”

251. Claim 43 depends from claim 1, which would have been obvious as discussed above. *Supra* § XI.1. In my opinion, claim 43 would have been obvious to one of skill based on *Sewall* and *Krishnaswamy*.

252. *Sewall* discloses that its mobile hotspot tracks user data 58 containing, among other things, “usage data and expiration data for a particular user” as well as “the amount of data uploaded or downloaded in a particular timeframe.”

EX1006, ¶38, Fig. 5.

253. *Krishnaswamy* discloses that its ad hoc service provider 106 “includes a service provider application 208” that “maintains a session with the server 110 to exchange custom messages with the server 110.” EX1020, 6:47-51, 6:62-64, Figs. 1-2. The service provider application 208 communicates and works in tandem with

the interconnection and session monitoring module 206, which “monitors information regarding content flow related to mobile clients 108 such as the amount of content outbound from the mobile clients 108, and regarding WWAN and WLAN network resource utilization and available bandwidths on the wireless channels.” *Id.*, 7:1-12, Figs. 1-2. The filtered interconnection and session monitoring module 206 can provide such information to the service provider application 208 to communicate to the server 110. *Id.*, 6:62-64, 7:12-15.

254. Further, as discussed above, *Krishnaswamy*’s ad hoc service provider—like any mobile hotspot—includes a processor configured to execute one or more instructions. *See supra* § XIV.2.a; EX1020, 9:14-53, Fig. 3, claim 26. One of skill would have understood that those instructions, when executed, cause *Krishnaswamy*’s ad hoc service provider to send information regarding usage of the forwarding service to the network system.

255. In my opinion, one of skill would have been motivated to modify the instructions for *Sewall*’s mobile hotspot in view of *Krishnaswamy*’s disclosures to ensure that the user data collected by *Sewall*’s mobile hotspot, including the amount of data uploaded or downloaded in a given time frame, is sent to the network system. Sending this usage information to the network system would help ensure that network resources are appropriately provisioned based on the expected

needs of the client devices and are appropriately paid for based on the actual usage by the client devices. *Supra* § XIV.1.

4. Claim 44: “wherein, when executed by the at least one processor, the one or more instructions further cause the at least one processor to cause information to be sent to the network system, the information being associated with usage of the forwarding service.”

256. Claim 44 depends from claim 1, which would have been obvious as discussed above. *Supra* § XI.1. In my opinion, claim 44 would have been obvious to one of skill based on *Sewall* and *Krishnaswamy*.

257. *Sewall* and *Krishnaswamy* render claim 44 obvious for the reasons discussed regarding claim 43. *Supra* § XIV.3. One of skill would have understood that sending the user data collected by *Sewall*’s mobile hotspot to the network system, including the amount of data uploaded or downloaded in a given time frame, would involve sending the network system information “associated with usage of the forwarding service,” as recited in claim 44.

XV. GROUND 5: CLAIMS 25 AND 28 ARE OBVIOUS OVER *SEWALL*, *KRISHNASWAMY*, AND *PANDYA*

1. Motivation to Combine

258. As detailed above, one of skill in the art would recognize that *Sewall* and *Krishnaswamy* are analogous art to the ’451 patent because they are in the same field of endeavor: mobile devices and wireless access points for computer

networking. *Supra* § XIV.1. *Sewall* and *Krishnaswamy* each disclose using end-user devices for bridging or routing traffic from other devices to a network system, such as the internet, which includes controlling traffic between the end user devices, the other devices, and the network system. *See, e.g.*, EX1006, ¶¶34, 36; EX1020, Abstract, 3:51-4:21, 6:1-16, 7:61-8:15, 9:54-63, 11:26-44, Figs. 1-2..

259. *Pandya* is also analogous art and in the same field of endeavor as the '451 patent. *Pandya* is directed to a distributed network, including servers and client devices. EX1009, ¶31. For example, as reflected in Figures 2 and 4 below, *Pandya* discloses control points 72 (an “end-user device”) and agent computers 70 associated with client computers deployed throughout distributed network 74.

Fig. 2

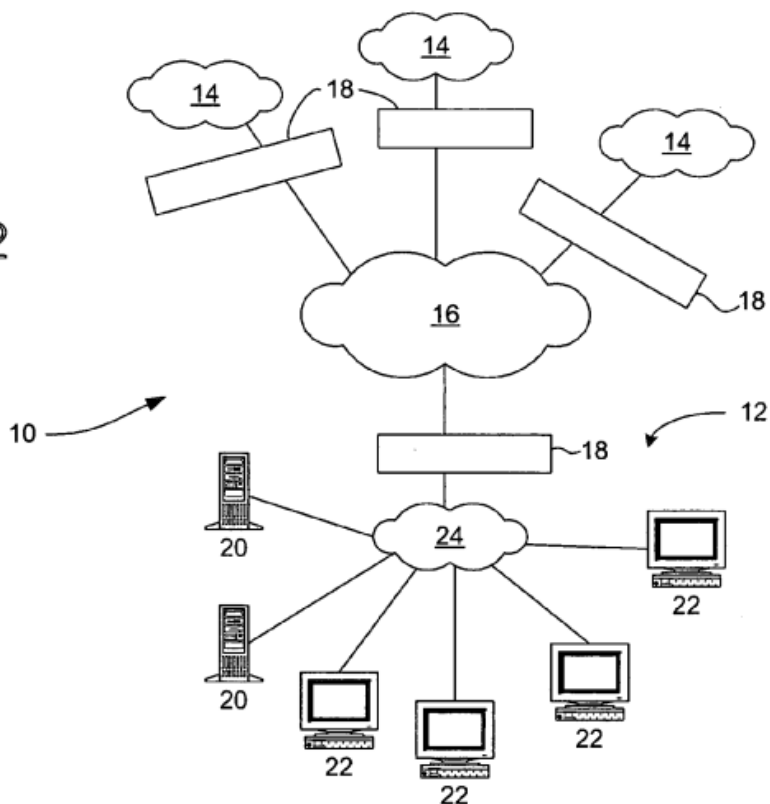
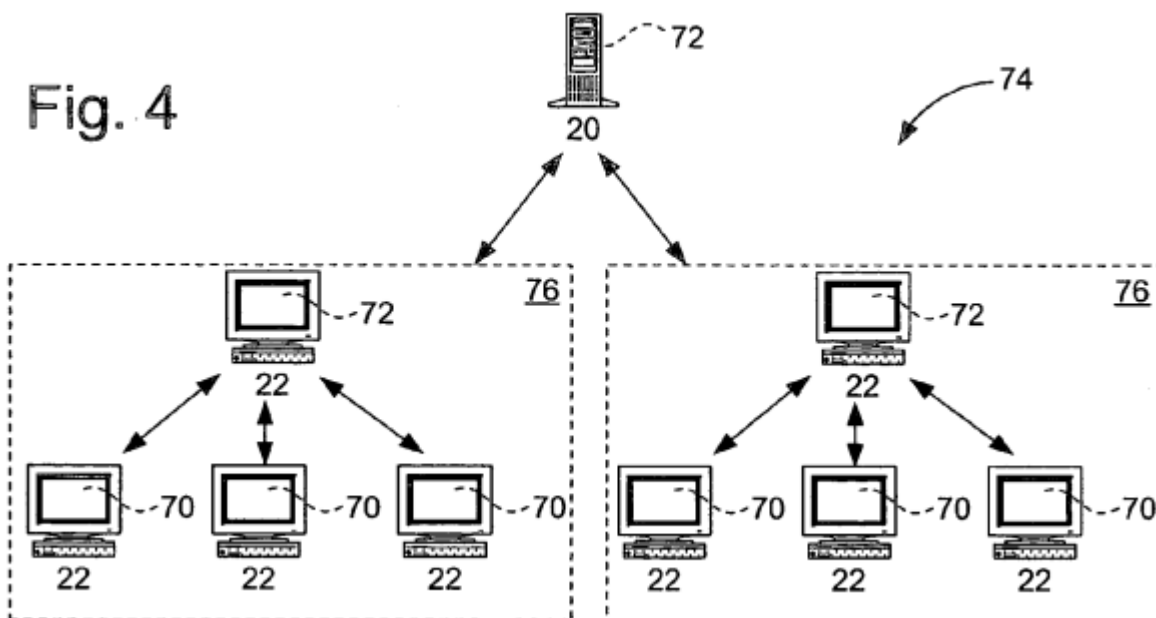


Fig. 4



EX1009, ¶¶40, 42-44, Fig. 2, 4. The control points of *Pandya*, which may be cellular phones, provide traffic controls to optimize distribution of network resources, including re-allocating bandwidth and blocking or restricting various activities within the network, including at the packet and QoS level. EX1009, ¶¶44, 47-51, 77-78.

260. A skilled artisan would have been motivated to use *Pandya*'s traffic control features implemented on the end-user devices of *Sewall* and *Krishnaswamy*. Combining these disclosures was within a POSITA's skill and would predictably apply known techniques, such as controlling traffic within a distributed network, as disclosed by *Pandya*, to known mobile client-server communications, as disclosed by *Sewall* and *Krishnaswamy*. Such a combination would optimize use of network resources for *Sewall*'s and *Krishnaswamy*'s end-user devices and hotspot users, for example, by dynamically adjusting bandwidth allocations based on changing network conditions to improve network services. In my opinion, it would have been compatible and conventional to use the traffic control methods of *Pandya* to manage network access through *Sewall*'s and *Krishnaswamy*'s end-user devices to improve bandwidth management and maximize network performance.

2. Claim 25: “wherein, when executed by the at least one processor, the one or more instructions further cause the at least one

processor to: identify one or more applications for which the first end-user device is authorized to provide the forwarding service.”

261. Claim 25 depends from claim 1, which would have been obvious as discussed above. *Supra* § XI.1. In my opinion, claim 25 would have been obvious to one of skill based on *Sewall*, *Krishnaswamy*, and *Pandya*.

262. As detailed above, *Sewall*'s mobile hotspot has a processor that is configured to execute one or more instructions that, when executed by the processor, cause the processor to identify one or more network destinations for which its mobile hotspot is authorized to provide the forwarding service. EX1006, ¶¶7, 58. Specifically, *Sewall* discloses when an anonymous user first attempts to access the internet via *Sewall*'s mobile hotspot, the access engine 48 will block the communication except as to reaching a payment page on the internet. *Id.*, ¶¶28, 51; *supra* §XI.8.

263. *Krishnaswamy* discloses achieving additional security for its ad hoc service provider by establishing a Secure Sockets Layer Virtual Private Network (SSL VPN) tunnel between a mobile client 108 and the server 110 to encrypt traffic routed through the ad hoc service provider. EX1020, 5:52-56. Once established, the SSL VPN supports specific services such as audio, video, or advertising services to the mobile client. EX1020, 5:59-63.

264. *Pandya* discloses traffic control mechanisms for reallocating traffic on

its distributed network, including by limiting or prioritizing amongst the applications used on the network. To facilitate this, the client-computing devices 22 that connect to *Pandya*'s distributed network each include an agent 70.

EX1009, ¶45. "The agents monitor the activity of their associated client-computing devices and communicate with [a] control point 72." *Id.*; see also *id.*, ¶¶42-44. The control point 72 accesses centrally-defined system policies containing "rules about how network resources are to be used" and provides policy data to the agent 70. *Id.*, ¶¶46-48. "The agents and control points monitor the network and devices connected to the network to determine when various rules apply and whether the conditions accompanying those rules are satisfied," and further "take the necessary action(s) to enforce the system policies." *Id.*, ¶46.

265. The system policies applied in *Pandya* "may be centrally defined and tailored to most efficiently achieve underlying goals." *Id.* *Pandya* provides an example of a successful business striving to provide excellent customer service with a system policy to "prevent or limit access to non-business critical applications when performance of business critical applications is degraded beyond a threshold point." *Id.*, ¶47. *Pandya* also discloses methods for prioritizing amongst multiple applications being run, including on a single networked device. *Id.*, ¶79 (weighing priority based on the relative degree of activity for each application).

266. In my opinion, one of skill would have been motivated to extend *Sewall*'s access rules authorizing specific network destinations to also authorize specific services and applications, as disclosed by *Krishnaswamy* and *Pandya*. One of skill would have understood that services and applications vary in terms of the amount of network resources they require to run, and that certain services and applications are more essential than others. As such, one of skill would have been motivated to modify the access rules for *Sewall*'s mobile hotspot to incorporate additional access rules prioritizing amongst services and applications and authorizing only those deemed to be more critical in order to more effectively manage and allocate network resources. *Supra* §XV.1.

3. Claim 28: “wherein, when executed by the at least one processor, the one or more instructions further cause the at least one processor to: identify a traffic type, an application type, a service type, or a content type for which the first end-user device is authorized to provide the forwarding service.”

267. Claim 28 depends from claim 1, which would have been obvious as discussed above. *Supra* § XI.1. In my opinion, claim 28 would have been obvious to one of skill based on *Sewall*, *Krishnaswamy*, and *Pandya*.

268. *Sewall*, *Krishnaswamy*, and *Pandya* render claim 28 obvious for the reasons discussed above regarding claim 25. *Supra* §XV.2. Based on the disclosures of *Krishnaswamy* and *Pandya*, one of skill would have been motivated

to modify the access rules for *Sewall*'s mobile hotspot to authorize not only specific network destinations but also specific types of traffic, applications, services, and content. One of skill would have been motivated to more effectively manage network resources by implementing access rules that would ensure more critical types of traffic, applications, services, and content are prioritized by authorizing network access to such types of traffic, applications, services, and content over types deemed as less critical.

**XVI. GROUND 6: CLAIMS 50 AND 67 ARE OBVIOUS OVER *SEWALL*,
THOMAS, AND *PANDYA***

1. Motivation to Combine

269. As detailed above, one of skill in the art would recognize that *Sewall* and *Thomas* are analogous art to the '451 patent because they are in the same field of endeavor: mobile devices and wireless access points for computer networking. *Supra* § XII.1. *Sewall* and *Thomas* each disclose using end-user devices for bridging or routing traffic from other devices to a network system, such as the internet, which includes controlling traffic between the end user devices, the other devices, and the network system. See, e.g., EX1005, ¶¶49, 54; EX1006, ¶¶34, 36.

270. As detailed above, *Pandya* is also analogous art and in the same field of endeavor as the '451 patent. *Supra* § XV.1. Among other things, *Pandya* discloses traffic controls for its distributed network to optimize distribution of network resources, including re-allocating bandwidth and blocking or restricting various activities within the network, including at the packet and QoS level. EX1009, ¶¶44, 47-51, 77-78.

271. A skilled artisan would have been motivated to use *Pandya*'s traffic control features implemented on the end-user devices of *Sewall* and *Thomas*. Combining these disclosures was within a POSITA's skill and would predictably apply known techniques, such as controlling traffic within a distributed network, as

disclosed by *Pandya*, to known mobile client-server communications, as disclosed by *Sewall* and *Thomas*. Such a combination would optimize use of network resources for *Sewall*'s and *Thomas*'s end-user devices and hotspot users, for example, by dynamically adjusting bandwidth allocations based on changing network conditions to improve network services. In my opinion, it would have been compatible and conventional to use the traffic control methods of *Pandya* to manage network access through *Sewall*'s and *Thomas*'s end-user devices to improve bandwidth management and maximize network performance.

2. Claim 50: “wherein an aspect of the second service policy differs from the aspect of the first service policy when the first network comprises a roaming network.”

272. Claim 50 depends from claim 1, which would have been obvious as discussed above. *Supra* § XI.1. In my opinion, claim 50 would have been obvious to one of skill based on *Sewall*, *Thomas*, and *Pandya*.

273. As detailed above, *Sewall* discloses (1) user profiles with first access rules to assist with controlling first traffic between the downstream client devices and the internet and (2) a device profile with second access rules to assist with controlling the second traffic between the mobile hotspot itself and the internet. EX1006, ¶¶34, 36; *supra* §§ XI.1.e, XI.1.f. *Sewall* further discloses that “different access rules can be associated with different users such as an owner, a user

authorized by the owner, and an anonymous user.” EX1006, ¶23. For example, *Sewall* states that the first access rules that apply to downstream client devices used by authorized or anonymous users are typically “more limiting” than the access rules that apply to the mobile hotspot itself (and its owner). EX1006, ¶36. Accordingly, in view of *Sewall*’s disclosure that the first access rules may vary user-to-user (and device-to-device), one of skill would have understood that the first and second access rules may also differ.

274. *Thomas* discloses security features for its wireless device, including “roaming awareness and management.” EX1005, ¶¶70-71. *Thomas* also discloses that “data plans may be provided by which a user may include roaming within the plan coverage.” *Id.*, ¶71. In my opinion, one of skill would have been motivated to modify *Sewall*’s access rules to accommodate a roaming network in view of *Thomas*’s disclosure of roaming awareness, management, and data plans so that *Sewall*’s mobile hotspot (and certain client devices) could maintain access to the internet and continue to provide forwarding services when the mobile hotspot is roaming. *Supra* §XII.1.

275. Although *Sewall* does not expressly identify differences between the first and second access rules that apply specifically when the first network is a roaming network, it would have been obvious to modify *Sewall*’s access rules to

incorporate such differences in view of *Thomas* and *Pandya*. Based on the knowledge in the art including *Thomas*, one of skill would have understood that, while connected to a roaming network, data transfers are typically slower due to lower bandwidth and also typically involve higher costs. In this regard, *Pandya* discloses policy rules and conditions that control network traffic by “adjusting service levels and/or bandwidth allocations for networking devices” or potentially “blocking network access” based on, *inter alia*, available bandwidth on the network. EX1009, ¶¶51-52; *see id.*, ¶83 (disclosing a traffic control mechanism to allocate available bandwidth).

276. Given that *Sewall*’s access rules are “more limiting” for users other than the owner of its mobile hotspot (EX1006, ¶36), and in light of the fact that less bandwidth would be available over first network while roaming as well as *Thomas*’s disclosure of roaming awareness and management, it is my opinion that one of skill would have been motivated to modify *Sewall*’s first access rules to reallocate available bandwidth (as disclosed in *Pandya*) when the mobile hotspot is roaming. Specifically, a skilled artisan would have been motivated to introduce differences between the first access rules and second access rules for *Sewall*’s mobile hotspot so that, when the mobile hotspot is roaming, the networking limits for client devices of users other than the owner are reduced. This would help to

ensure that the mobile hotspot itself can minimize any reduction in upload/download bandwidth and the amount of data transfer available to the owner due to roaming, so that the owner of the mobile can maintain uninterrupted and reliable internet access while roaming.

277. Accordingly, in my opinion, it would have been obvious, in view of the combination of *Sewall*, *Thomas*, and *Pandya*, to modify the access rules for *Sewall*'s mobile hotspot so that "an aspect of the second service policy differs from the aspect of the first service policy when the first network comprises a roaming network," as recited in claim 50.

3. Claim 67: "wherein the user input comprises a directive to change at least an aspect of the first service policy independently of the second service policy."

278. Claim 67 depends from claim 62, which depends from claim 1. Claims 1 and 62 would have been obvious as discussed above. *Supra* §§ XI.1, XII.23. In my opinion, claim 67 would have been obvious to one of skill based on *Sewall*, *Thomas*, and *Pandya*.

279. *Sewall* and *Pandya* disclose complementary policies for managing network resources. As detailed above, *Sewall* discloses controlling the first traffic between the client devices and the internet with first access rules that "specify upload and download bandwidth limits" or "limit the amount of data transfer

allowed in a given time period.” EX1006, ¶36; *supra* § XI.1.e. *Pandya* discloses methods for managing the allocation of network resources by “defin[ing] an optimum specification of network resources or service levels for particular types of network tasks” and implementing policies to “ensure that the desired level of resources was provided to accomplish [a particular] task,” if permitted. EX1009, ¶¶49-50. If the optimum resources are not available, “the applicable policies could . . . specify that the requested task be blocked” or “specify that the user be provided with various options, such as proceeding with the requested task, but with sub-optimal resources, or waiting to perform the task until a later time.” *Id.*

280. In my opinion, one of skill would have been motivated to modify *Sewall*’s mobile hotspot to incorporate *Pandya*’s network management features through a user interface on the mobile hotspot, as disclosed in *Thomas*. Modifying *Sewall*’s mobile hotspot in this manner would allow its owner to more readily modify the first access rules—independently of the second access rules—through user input prioritizing amongst requested network tasks and specifying the preferred course of action for tasks for which suboptimal resources are available. For example, the owner of the mobile hotspot may be willing to proceed with suboptimal resources. However, given that other users are charged for use of the forwarding service, it would be desirable for the owner of the mobile hotspot to

avoid potentially jeopardizing the reputation and future business prospects of their forwarding service by allowing other users to struggle performing tasks with suboptimal resources. *See, e.g.*, EX1020, 6:9-16 (describing the use of quality metrics to assist mobile clients 108 with choosing among ad hoc service providers 106).

281. Accordingly, in my opinion, it would have been obvious, in view of the combination of *Sewall*, *Thomas*, and *Pandya*, to modify *Sewall*'s mobile hotspot to include a user interface that could receive user input directing a modification of the first service policy independent of the second service policy.

XVII.GROUND 7: CLAIMS 66 AND 68 ARE OBVIOUS OVER *SEWALL*, *THOMAS*, AND *POLSON*

1. Motivation to Combine

282. As detailed above, one of skill in the art would recognize that *Sewall* and *Thomas* are analogous art to the '451 patent because they are in the same field of endeavor: mobile devices and wireless access points for computer networking. *Supra* § XII.1. *Sewall* and *Thomas* each disclose using end-user devices for bridging or routing traffic from other devices to a network system, such as the internet, which includes controlling traffic between the end user devices, the other devices, and the network system. *See, e.g.*, EX1005, ¶¶49, 54; EX1006, ¶¶34, 36.

283. As detailed above, *Polson* is also analogous art and in the same field

of endeavor as the '451 patent. *Supra* § XIII.1. Among other things, *Polson* discloses WWAN access-management features, including accessing or switching between multiple WWANs via different service providers and modifying the service agreement in place with a service provider providing WWAN access.

EX1015, ¶¶20, 31, 38-39, 51-53.

284. A skilled artisan would have been motivated to use *Polson*'s WWAN access-management features implemented on the end-user devices of *Sewall* and *Thomas*. Combining these disclosures was within a POSITA's skill and would predictably apply known techniques, such as basic programming to enable modifying service agreements with service providers, as disclosed by *Polson*, in order to make changes to the limits on data transfer or user access. Such a combination would allow the owner of the mobile hotspot to more readily manage available network resources, for example, by adjusting the service plan to match demand for the forwarding service.

2. Claim 66: “wherein the user input comprises a directive to change at least an aspect of the first service policy or the second service policy.”

285. Claim 66 depends from claim 62, which depends from claim 1.

Claims 1 and 62 would have been obvious as discussed above. *Supra* §§ XI.1, XII.23. In my opinion, claim 66 would have been obvious to one of skill based on *Sewall*, *Thomas*, and *Polson*.

286. *Sewall* and *Thomas* each disclose modifying an aspect of the first service policy assisting in the control of first traffic between the client devices and the network system through user input. *Sewall* discloses a user interface for the mobile hotspot with controls that the owner can use to update configuration data, including access rules for the personal hotspot. EX1006, ¶¶ 23-24. As discussed above, *Thomas* discloses that its wireless device 110 can be configured to display a request from a client computing device to access the forwarding service on the user interface for the user of the wireless device to accept or deny through the user interface. EX1005, ¶¶ 44, 46; *supra* §XII.13.

287. *Polson* discloses modifying an aspect of the second service policy assisting in the control of second traffic between the mobile hotspot and the first network through user input. In certain embodiments, the subscriber determination logic of *Polson*’s gateway 108 “may facilitate a subscriber in altering their existing

WWAN 112 access ability.” EX1015, ¶31. Specifically, “the subscriber may be able change their service agreement to one that allows for WWAN 112 access via gateway 108, or to purchase WWAN 112 access on another basis, e.g., a certain period of time, a certain quantity of bytes downloaded, etc.” *Id.*

288. As discussed above, one of skill would have been motivated to modify *Sewall*’s mobile hotspot in view of *Thomas* to provide a user interface on the mobile hotspot so that the owner of the mobile hotspot could more conveniently authorize, control, and monitor traffic from client devices as well as other information regarding the status of the mobile hotspot itself. *Supra* § XII.13. In my opinion, one of skill would have been motivated to further modify the *Sewall-Thomas* combination to allow the owner of the mobile hotspot to modify their service agreement as set forth in *Polson*, through the user interface on the mobile hotspot, in order to more readily obtain access for additional client devices or additional data beyond that provided in the original service agreement.

3. Claim 68: “wherein the user input comprises a directive to change at least an aspect of the second service policy independently of the first service policy.”

289. Claim 68 depends from claim 62, which depends from claim 1. Claims 1 and 62 would have been obvious as discussed above. *Supra* §§ XI.1, XII.23. In my opinion, claim 66 would have been obvious to one of skill based on

Sewall, Thomas, and Polson.

290. *Sewall, Thomas, and Polson* render claim 68 obvious for the reasons discussed above regarding claim 66. *Supra* §XVII.2. As discussed above, one of skill would have been motivated to modify *Sewall*'s mobile hotspot in view of *Thomas* to provide a user interface on the mobile hotspot so that the owner of the mobile hotspot could more conveniently authorize, control, and monitor traffic from client devices as well as other information regarding the status of the mobile hotspot itself. *Supra* § XII.13. In my opinion, one of skill would have been motivated to further modify the *Sewall-Thomas* combination to allow the owner of the mobile hotspot to modify their service agreement as set forth in *Polson*, through the user interface on the mobile hotspot, in order to more readily obtain access for additional client devices or additional data beyond that provided in the original service agreement.

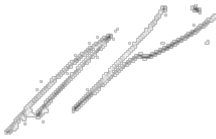
XVIII. CONCLUSION

291. For the reasons set forth above, it is my opinion that claims 1-9, 11-16, 20, 22-28, 33, 36, 43-44, 50, and 52-69 of the '451 patent are unpatentable in view of the prior art. In signing this declaration, I understand that the declaration

will be filed as evidence in a contested case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I acknowledge that I may be subject to cross-examination in this case and that cross-examination will take place within the United States. If cross-examination is required of me, I will appear for cross-examination within the United States during the time allotted for cross-examination.

292. I declare that all statements made herein of my knowledge are true, that all statements made on information and belief are believed to be true, and that these statements were made with the 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.

Dated: August 28, 2026

By: 
Bill Lin, Ph.D