

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GOOGLE LLC, CELLCO PARTNERSHIP D/B/A VERIZON WIRELESS,
VERIZON CORPORATE SERVICES GROUP INC.,
T-MOBILE USA, INC., SPRINT LLC F/K/A SPRINT CORP.,
AND AT&T SERVICES, INC.,
Petitioners,

v.

HEADWATER RESEARCH LLC,
Patent Owner.

U.S. Patent No. 9,215,613
Title: WIRELESS END-USER DEVICE WITH DIFFERENTIAL TRAFFIC
CONTROL POLICY LIST HAVING LIMITED USER CONTROL

Inter Partes Review No.: IPR2024-00945

**DECLARATION OF HENRY HOUH, Ph.D., UNDER 37 C.F.R. § 1.68 IN
SUPPORT OF PETITION FOR *INTER PARTES* REVIEW OF U.S.
PATENT NO. 9,215,613**

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c. [1.3] a non-transient memory to store	53
d. [1.3.1] a differential traffic control policy list distinguishing between a first one or more applications resident on the device and a second one or more applications and/or services resident on the device, and	55
[1.3.2] a differential traffic control policy applicable to at least some Internet service activities by or on behalf of the first one or more applications;	55
e. [1.4] an interface to allow a user to augment the differential traffic control policy for the first one or more applications but not for the second one or more applications and/or services; and	60
f. [1.5] one or more processors configured to	64
g. [1.5.1] classify a wireless network to which the device currently connects in order to communicate data for Internet service activities as at least one of a plurality of network types that the device can connect with, ...	65
h. [1.5.2] classify whether a particular application capable of both interacting with the user in a user interface foreground of the	

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i. [1.6] selectively allow or deny one or more Internet service activities by or on behalf of the particular application based on whether or not the particular application is one of the first one or more applications, the differential traffic control policy, including any applicable user augmentation of the differential traffic control policy, and the classifications performed by the one or more processors. 71

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I, Henry Houh, Ph.D. hereby declare as follows:

I. INTRODUCTION

1. I have been retained as an expert witness on behalf of Petitioners for the above-captioned Petition for Inter Partes Review (“IPR”) of claims 1-24 of U.S. Patent No. 9,215,613 (“the ’613 patent”). I am being compensated for my time in connection with this IPR at my standard consulting rate of \$820 per hour. My compensation is in no way dependent on the outcome of this matter, and I have no other interest in this proceeding.

2. I have been asked to provide my opinions regarding the patentability of the claims of the ’613 patent. In preparing this declaration, I have reviewed the ’613 patent, the file history of the ’613 patent, and numerous prior art references from the time of the alleged invention.

3. In forming the opinions expressed in this declaration, I relied upon my education and experience in the relevant field of the art, and have considered the viewpoint of a person having ordinary skill in the relevant art, as of January 2009.

4. I understand that the ’613 patent claims priority through several applications with the earliest filed on January 28, 2009. I take no position on whether that priority claim is correct. My analysis as set forth below uses that date as the priority date of the ’613 patent and the challenged claims. However, my analysis

and opinions would not change if it were determined that the '613 patent was entitled to a later filing date.

5. It is my opinion that based on the combination of prior art references discussed in this declaration, every claim of the '613 patent is unpatentable for the reasons I explain below.

II. BACKGROUND AND QUALIFICATIONS

6. My background and expertise that qualify me as an expert in the technical issues in this case are as follows:

7. As indicated on my *Curriculum Vitae* attached as EX-1008, I received a Ph.D. in Electrical Engineering and Computer Science from the Massachusetts Institute of Technology ("MIT") in 1998. I also received a Master of Science degree in Electrical Engineering and Computer Science in 1991, a Bachelor of Science Degree in Electrical Engineering and Computer Science in 1989, and a Bachelor of Science Degree in Physics in 1990, all from MIT.

8. During my college studies, I focused on communications and data networking. I took specialized courses including graduate courses in telecommunications networks, optical communications, and data networking. I, along with other graduate students in a networking research group, maintained both the computer workstations and the networking devices in the research group.

9. I also served as a teaching assistant for the Computation Structures core course a number of times. At the time, the course involved teaching computer architecture at a low level, and the laboratory component involved building a CPU from discrete components at the gate level and higher. When I was enrolled in this course as an undergraduate student, I redesigned the hardware and software, including microcode and nanocode of this CPU, to achieve an average speed up of roughly thirty times. Based in part on this, I became a laboratory assistant, head laboratory assistant, and then a teaching assistant in my second term senior year, which is unusual in that teaching assistantships at MIT are normally reserved for graduate students. I further became head teaching assistant and also taught some recitation sections.

10. As part of my doctoral research at MIT from 1991-1998, I worked as a research assistant in the Telemedia Network Systems (“TNS”) group at the Laboratory for Computer Science. The TNS group built a high-speed gigabit ATM network and applications which ran over the network, such as remote video capture (including audio), processing and display on computer terminals. In addition to helping design the core network components (such as the ATM switch), designing and building the high-speed ATM links, and designing and writing the device drivers for the interface cards, I also set up the group’s web server, which at the time was one of the first several hundred web servers in existence. I used

programmable logic devices, such as programmable array logic and field programmable gate arrays, and their software development environments, in the design of these components. Our high-speed data network carried multimedia data including video and audio data within ATM cells.

11. The TNS group was the first group to initiate a remote video display over the World Wide Web. Vice President Al Gore visited our group in 1996 and received a demonstration of—and remotely drove—a radio-controlled toy car with a wireless video camera mounted on it; the video was encoded by TNS-designed hardware, streamed over the TNS-designed network and displayed using TNS-designed software. During this time, I also modified a web server to determine the location of client, and present different web pages depending on location.

12. I authored or co-authored twelve papers and conference presentations on our group's research. I also co-edited the final report of the gigabit networking research effort with Professor David Tennenhouse and Senior Research Scientist David Clark. David Clark is generally considered to be one of the fathers of the Internet Protocol and served as Chief Protocol Architect for the Internet. With its focus on networking, the group, including myself, set up and maintained the network and computer systems. These systems included the networking on the workstations and desktops, the distributed file system, desktops and workstations, setting up and maintaining the distributed file system (Network File System) and

the authentication system (Network Information Service, formerly known as Yellow Pages). Our system allowed users to log into any of the group's workstations using their username/password, which allowed that all of the user's files would be virtually mounted on that workstation as a networked home directory.

13. I defended and submitted my Ph.D. thesis, titled "Designing Networks for Tomorrow's Traffic," in January 1998. As part of my thesis research, I analyzed local-area and wide-area flows to show a more efficient method for routing packets in a network, based on traffic patterns at the time. My thesis also addressed real-time streamed audio and video. The network traffic that I analyzed was IP protocol traffic, including UDP and TCP.

14. I have been involved in Voice over Internet Protocol ("VoIP") technologies since 1997 and have specific experience in designing and testing VoIP networks.

15. From 1997 to 1999, I worked at NBX Corporation, which was acquired by 3Com Corporation in 1999. During this time, I was a Senior Scientist and Engineer working in IP Telephony. NBX delivered the world's first fully featured business telephone system to run over a data network, the NBX100. NBX was one of the first business phone systems to be configurable via a web interface.

Users and administrators had access to varying levels of configuration for the phone system.

16. As part of my work at NBX, I designed the core audio reconstruction algorithms for the telephones which depacketized the voice data and reconstructed the audio. In addition, I designed the voice data packet transmission algorithms. I created a system to capture and analyze network packets sent by devices in the NBX system for aid in testing and debugging. I also designed and validated the core packet transport protocol used by the phone system. In addition, I designed and oversaw the development of the underlying transport protocol used by the NBX100 phone system for reliable packet transport. That transport protocol is still used by the NBX100 system and its successors and is estimated to be used hundreds of millions of times daily. I wrote NBX's first demonstration IP software stack, which added the capability for utilizing the NBX100 phone system on an IP network. NBX first demonstrated a phone in the NBX100 system working over the Internet in 1998 at a trade show in Las Vegas. I was later the lead architect in designing NBX's next-generation highly scalable system, and, after NBX was acquired by 3Com, I did some work with 3Com's cable equipment division, including demonstrating a working NBX IP phone system over 3Com's cable equipment infrastructure using an early version of DOCSIS at a trade show in 1999. The NBX100 was the market's leading business phone system to run on a

data network for several years following its introduction. During that time, I became more familiar with the various standards relevant to Internet telephony as well as the problems which designers of commercial telephony operations were faced with in implementing VoIP.

17. I, along with two of NBX's founders, obtained U.S. Patent No. 6,697,963 titled "Telecommunication method for ensuring on-time delivery of packets containing time-sensitive data," for some of the work we did while at NBX.

18. After NBX, I worked at Teradyne, a test tool company primarily focused on semiconductors. Teradyne had recently acquired Hammer, a company that specialized in load and functional testing for telecommunications systems. The Hammer product is well known as a telecom test tool. Teradyne spun out Hammer and several other internal divisions into an independent company called Empirix. I became Chief Technologist of the Hammer division of Empirix. Empirix was a leader in VoIP network testing and monitoring.

19. At Empirix, I laid out a new multi-year product vision for data network testing, secured internal funding for the effort, and led a team to deliver a new technology platform to the market in February 2001. This new product, PacketSphere, initially emulated network behavior so that wide-area VoIP connections could be tested in a lab. A later release allowed PacketSphere to

generate high volumes of VoIP calls, including media streams, and to monitor the quality of VoIP voice streams. Later, the core technology was added to other Empirix products such as Empirix's Hammer XMS to monitor thousands of VoIP media streams in real time to determine their quality. PacketSphere was Empirix's most successful new platform introduction. Companies purchased the PacketSphere product to emulate an Internet Protocol network to see the effects of deploying their product on the Internet prior to launch. PacketSphere received several industry awards.

20. During my time at Empirix, I presented lectures on VoIP and data network testing to companies including Lucent Labs (formerly AT&T Bell Labs). I was also invited to present several guest lectures in a software engineering course at MIT. Since then, I have also participated twice as a unit lecturer (two weeks) in an experimental course that was taught by an Institute Professor (the highest award that a MIT Professor can achieve) and sponsored by the Chairman of the MIT Corporation (MIT's board of trustees).

21. From 2004 to 2008, I was employed by BBN Technologies Corp., a technology research and development company located in Cambridge, Massachusetts. BBN Technologies is a world-renowned company with expertise in acoustics, speech recognition, and communications technology. BBN Technologies

staff have pioneered many internetworking technologies and Internet applications, and built some of the world's largest government and commercial data networks.

22. My duties and responsibilities at BBN Technologies generally included commercialization of the technologies developed by BBN Technologies, which included spinning off companies and growing commercial businesses in-house. More particularly, I was involved in utilizing the award-winning AVOKE STX speech recognition technology to create the public audio/video search engine EveryZing (formerly known as PodZinger) which was spun out into a stand-alone company now known as RAMP, Inc. PodZinger won the 2006 MITX Technology Award for best Web 2.0 Application and was also named the 2006 Forbes Favorite Video & Audio Search Engine, beating out Google, Yahoo, and other companies. After managing the creation of the initial prototype system, PodZinger built out a full streaming audio and video search solution when I was the Vice President of Operations and Technology there. I was also involved in the Boomerang Mobile Shooter Detection project as the Vice President of Engineering for the program. The Boomerang system was deployed to Iraq and Afghanistan, and was credited with saving many lives.

23. From 1989 to 1990, I worked at AT&T Bell Laboratories on optical computers. This work generated six peer-reviewed papers, and multiple U.S. and European patent applications in which I was named as a co-author or inventor. I

also interned at AT&T Bell Laboratories in 1987 and 1988. Additional relevant experience in the field of optical computers is listed in my *Curriculum Vitae*.

24. I am a named inventor on several patents and published patent applications that are related to the VoIP technology including: U.S. Patent No. 6,967,963, entitled “Telecommunication Method for Ensuring On-time Delivery of Packets Containing Time- Sensitive Data”; U.S. Patent Application Publication No. 2002/0015387, entitled “Voice Traffic Packet Capture and Analysis Tool for a Data Network”; U.S. Patent Application Publication No. 2002/0016708, entitled “Method and Apparatus for Utilizing a Network Processor as Part of a Test System”; U.S. Patent Application Publication No. 2002/0016937, entitled “Method and Apparatus for Utilizing a Network Processor as Part of a Test System”; and U.S. Patent No. 7,590,542, entitled “Method of Generating Test Scripts Using a Voice-Capable Markup Language.”

III. MATERIALS CONSIDERED

25. In addition to my general knowledge, education, and experience, I have considered all of the materials referenced in my declaration as well as the materials listed below in forming my opinions:

<i>Exhibit #</i>	<i>Description</i>
1001	U.S. Patent No. 9,215,613 (“’613 Patent”)
1002	Select portions of prosecution history of the ’613 Patent (“’613 File History”)
1004	U.S. Patent Publication No. 2006/0039354 A1 (“Rao”)

<i>Exhibit #</i>	<i>Description</i>
1005	U.S. Patent Publication No. 2009/0207817 A1 (“Montemurro”)
1006	U.S. Patent Publication No. 2009/0217065 A1 (“Araujo”)
1007	U.S. Patent No. 5,987,611 (“Freund”)
1009	<i>Mobile Network Evolution: GSM to UMTS</i> , CONNINGTECH (May 8, 2008, 12:26 pm), https://conningtech.wordpress.com/2008/05/08/mobile-network-evolution-gsm-to-umts/ (last visited May 23, 2024)
1010	Patent Owner’s Preliminary Response, Samsung Electronics Co., Ltd. v. Headwater Research LLC, No. IPR2023-01462, Paper 6 (PTAB Jan. 4, 2024)
1011	U.S. Patent No. 8,000,715 (“Melpignano”)
1012	Elizabeth Woyke, <i>World’s most wired airports</i> , NBC News (Mar. 11, 2008, 10:02 am), https://www.nbcnews.com/id/wbna23391922 (last visited May 15, 2024)
1014	U.S. Publication No. 2004/0123153 (“Wright”)
1015	U.S. Publication No. 2006/0183461 (“Pearce”)
1019	U.S. Pat. No. 7,881,267 (“Crosswy”)

IV. SUMMARY OF OPINIONS

26. Based on my review of the ’613 patent and its prosecution history, the other materials I have considered, and my knowledge and experience, my opinions are as follows. The prior art renders the claims obvious for the ’613 patent as identified below.

27. In my analysis herein, I have considered the various disclosures (*e.g.*, the ’613 patent, the prior art, etc.) from the view of a person of ordinary skill in the art (“POSA”) at the time of the alleged invention.

28. I have presented my opinion below regarding the challenged claims based on the following grounds:

<i>Ground</i>	<i>Claims</i>	<i>Basis</i>	<i>Reference</i>
1	1-14, 16, 18-23	§ 103	Rao in view of Montemurro and Freund
2	15, 17, 24	§ 103	Rao in view of Montemurro, Freund, and Araujo

V. UNDERSTANDING OF THE LAW

29. In expressing my opinions and considering the subject matter of the claims of the '613 patent, I am relying upon certain basic legal principles that have been explained to me. My understanding of these concepts is summarized below.

30. I understand that an unpatentability analysis begins with claim construction.

31. I understand that claim construction at the USPTO proceeds under the same standard used in federal courts. I understand that the meaning of claim terms is considered from the point of view of a person of ordinary skill (POSA) at the time of the alleged invention and that claim terms are generally given their ordinary and customary meaning as understood by a POSA 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. And I further understand that evidence other than the claims, specification, and prosecution history may be considered to ascertain the meaning of claim terms. I understand such evidence may include, for example, textbooks, encyclopedias, articles, and dictionaries, but that this evidence is often less reliable

and/or less significant than the patent's specification, claims, and prosecution history.

32. I have been informed by counsel that a patent claim is unpatentable as anticipated under 35 U.S.C. § 102 if each element of that claim is present either expressly or inherently in a single prior art reference. I have also been informed that, to be an inherent disclosure, the prior art reference must necessarily disclose the limitation, and the fact that the reference might possibly practice or contain a claimed limitation is insufficient to establish that the reference inherently teaches the limitation.

33. I have been informed that a claimed invention is unpatentable under 35 U.S.C. § 103, if the differences between the invention and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a POSA to which the subject matter pertains, even if all the limitation of a claim cannot be found in a single reference.

34. I have also been informed by counsel that the obviousness analysis takes into account factual inquiries including the level of ordinary skill in the art, the scope and content of the prior art, and the differences between the prior art and the claimed subject matter. I also understand that for an obviousness analysis, a POSA is presumed to have knowledge of all material prior art.

35. In considering obviousness, I understand that one must determine the scope and content of the prior art. I understand that, in order to be considered prior art to a patent, a reference must be reasonably related to the claimed invention of that patent. A reference is reasonably related if it is in the same field as the claimed invention or is from another field to which a person of ordinary skill in the art would look to solve a known problem.

36. I understand that one must determine what differences, if any, existed between the claimed invention and the prior art.

37. I understand that a patent claim composed of several limitations is not proved obvious merely by demonstrating that each of its limitations 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.

38. I have been informed by counsel that the Supreme Court has recognized several rationales for combining references or modifying a reference to show obviousness of claimed subject matter. Some of these rationales include the following: (a) combining prior art elements according to known methods to yield predictable results; (b) simple substitution of one known element for another to obtain predictable results; (c) use of a known technique to improve a similar device (method, or product) in the same way; (d) applying a known technique to a known device (method, or product) ready for improvement to yield predictable results; (e) choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success; and (f) some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention.

39. I understand too that many true inventions may seem obvious after the fact, and that one must be careful not to determine obviousness in hindsight. I understand that, instead, the determination should be made based on what a POSA would have known at the time of the alleged invention, not what one would have known today or learned from the patent.

40. I understand that secondary factors may be considered in an obviousness inquiry. I understand that these are also referred to as secondary

considerations and may include evidence of long-felt need, failure of others, skepticism of those of skill in the art, licensing, commercial success, recognition in the industry, acquiescence, evidence of copying, and unexpected results. I am informed that these secondary considerations must be balanced against the strength of the facial obviousness case, and that where an alleged invention is only the predictable use of known elements per their established functions, secondary considerations do not make an obvious invention non-obvious.

41. I understand that the proponent of secondary considerations evidence must establish a “nexus” between the evidence and the merits of the patent at issue. Specifically, I understand that the secondary consideration must be tied to the merits of the claimed invention of the patent at issue. Where the alleged secondary consideration results from something other than what is both claimed and novel, I understand that there is no nexus to the merits of the claimed invention and the secondary considerations are thus not indicative of nonobviousness. I also understand that it is the patentee’s burden to come forward with evidence that a nexus exists.

42. I understand that if the product’s 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. Similarly, I understand that arguments that there was a long-felt need for the patent invention must be supported by evidence and that 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. And I understand 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. THE '613 PATENT AND ITS PROSECUTION HISTORY

A. Overview of the '613 Patent

43. The application that became the '613 patent (14/685,511) was filed on April 13, 2015. That application claims priority to numerous prior applications and provision applications that are recited on the first two pages of the '613 patent. The earliest of these filings is dated January 28, 2009.

44. The '613 patent includes multiple disclosures. The abstract states that, at a high level, the '613 patent is generally directed to “A wireless end-user device has wireless wide-area network (WWAN) and wireless local-area network (WLAN) modems. One or more processors classify whether an application is interacting with a user in a user interface foreground of the device. At a time when Internet service activities are communicated through a first wireless network type, the processors use a differential traffic control policy list to determine whether or not to apply a differential traffic control policy to Internet service activities for an application. When the policy is applicable, the policy may direct that Internet

service activities by the application are blocked. A user of the device is allowed to augment the policy that will be applied for applications specified as controlled by the list, but not for other applications and/or services.” EX-1001, Abstract.

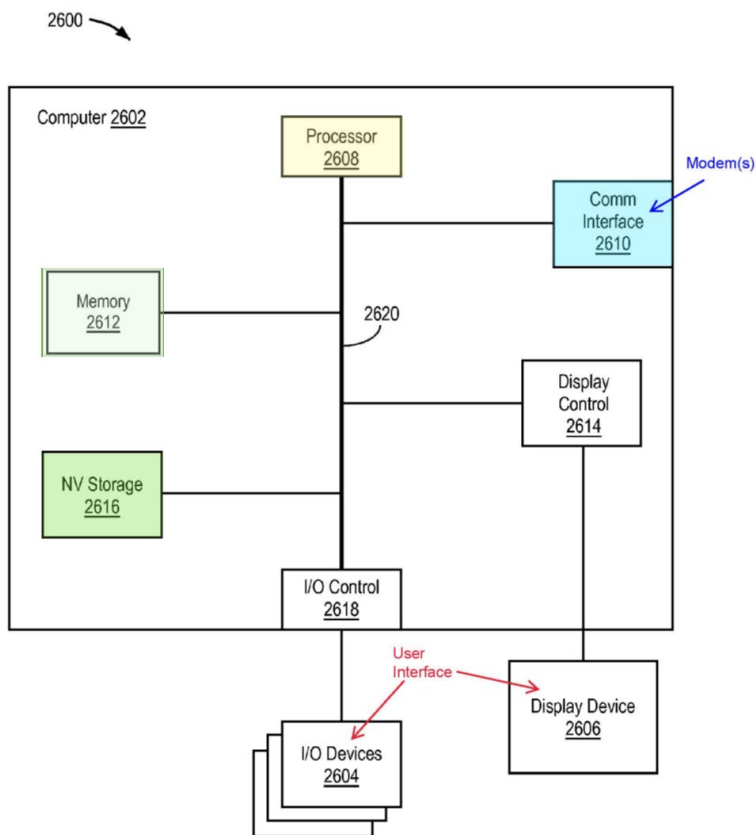
45. The “Background of The Invention” states: “With the advent of mass market digital communications, applications and content distribution, many access networks such as wireless networks, cable networks and Digital Subscriber Line (DSL) networks are pressed for user capacity, with, for example Evolution-Data Optimized (EVDO), High Speed Packet Access (HSPA), Long Term Evolution (LTE), Worldwide Interoperability for Microwave Access (WiMax), DOCSIS, DSL, and Wireless Fidelity (Wi-Fi) becoming user capacity constrained. In the wireless case, although network capacity will increase with new higher capacity wireless radio access technologies, such as Multiple-Input Multiple-Output (MIMO), and with more frequency spectrum and cell splitting being deployed in the future, these capacity gains are likely to be less than what is required to meet growing digital networking demand. Similarly, although wire line access networks, such as cable and DSL, can have higher average capacity per user compared to wireless, wire line user service consumption habits are trending toward very high bandwidth applications and content that can quickly consume the available capacity and degrade overall network service experience. Because some

components of service provider costs go up with increasing bandwidth, this trend will also negatively impact service provider profits.” EX-1001, 1:8-31.

46. The '613 patent's Title is “Wireless end-user device with differential traffic control policy list having limited user control.”

47. As issued, the '613 patent includes 24 claims. I have been asked to opine on all 24 claims in my analysis.

48. The claims recite a “wireless end-user device.” As shown in the annotated figure below, the device includes well-known structures, including a processor (yellow), storage/memory (green), a user interface (red arrows), and modems for WWAN and WLAN communication (blue). EX-1001, 99:11-32, 105:51-106:25.



EX-1001, Fig. 26.

49. The claimed processor: 1) classifies a network with which the device is communicating (WWAN or WLAN); (2) classifies whether applications are running in the device foreground; (3) controls the device's internet activities using a differential traffic control policy (rules); and (4) allows user augmentation of the policy. EX-1001, Claim 1. The claimed policy evaluates and applies criteria (*e.g.*, the network used, whether an application is in the foreground) to allow or deny internet activity. EX-1001, 100:28-102:56, Fig. 27.

B. Overview of the Prosecution History of the '613 Patent

50. I have reviewed the prosecution history of the '613 patent in forming my opinions for purposes of this declaration.

51. As filed on April 13, 2015, the initially filed claim was different from those that issued. EX-1002, 166. On April 14, 2015 (the next day), the applicant canceled claim 1 and added claims 2-25. *Id.*, 208-12.

52. On August 21, 2015, the Examiner issued an Office Action that “objected to” the claims on a number of grounds that appear to reflect typographic changes related to specific formatting of claims (such as changing “a user” to “the user”). *Id.*, 360-62.

53. The Examiner did not cite to any prior art or analyze any prior art. *Id.*

54. The applicant responded on August 24, 2015 with an amendment that largely tracked the formatting changes requested by the Examiner. *Id.*, 490-96.

55. On October 26, 2015, claims 1-24 received an allowance with no prior art applied. *Id.*, 545-48. The Examiner merely regurgitated claim 1 in total and stated that “[t]he closest prior art, either singularly or in combination, fail to anticipate or render the above limitations obvious.” *Id.*, 546-47 (October 26, 2015 Notice of Allowance, 2-3).

56. I am unable to identify in the prosecution history any passage in which the Examiner identified the “closest prior art” for the '613 proposed claims.

I am also unable to identify any passage in which the Examiner discussed any prior art.

57. After the claims had been allowed on October 26, 2015, the applicant submitted additional prior art (at least 64 additional references) including sets of prior art on November 2, 2015. *Id.*, 570-80. In total, more than 1200 references were submitted during prosecution. *Generally* EX-1002. I am unable to locate any discussion of any of these references by either the Examiner or the applicant in the prosecution history.

C. Claim Construction

58. As discussed above, I understand the district court has not yet construed any claim terms for the '613 patent, and as noted above, I have been informed that, for purposes of *inter partes* review, the standard for construction of terms in a patent's claims is the same as that applied in federal district court litigation.

59. At this time, I do not see the need to construe any terms of the challenged claims for the purposes of this proceeding. Accordingly, in preparing my analysis I have applied the ordinary and customary meaning that each claim term would have to a person of ordinary skill in the art in light of the '613 patent's specification and prosecution history. If any claim terms are differently construed, I reserve the right to reassess my opinions under said constructions.

VII. LEVEL OF ORDINARY SKILL IN THE ART

60. I have been advised that there are multiple factors relevant to determining the level of ordinary skill in the pertinent art, including the educational level of active workers in the field at the time of the invention, the sophistication of the technology, the type of problems encountered in the art, and the prior art solutions to those problems.

61. It is my opinion that a person having ordinary skill in the relevant art (a “POSA,” as I note above) at the time of the alleged invention would have had at least a bachelor’s degree in computer science, computer engineering, or a similar field, and approximately two years of industry or academic experience in a field related to computer software development and/or computer networking. A POSA might substitute more education for less experience, or vice versa.

62. I am familiar with the knowledge of a POSA as of the priority date, and I am able to opine of how a POSA would have understood the claims and disclosures of the ’613 patent, the disclosures of the prior art, the motivations to combine the prior art, and what combinations would have been obvious to a POSA. For example, a POSA at the time of the invention would have been familiar with the enforcement of policies on end-user devices to control network traffic as well as various criteria for such policies.

VIII. THE PRIOR ART

A. Background and State of the Art

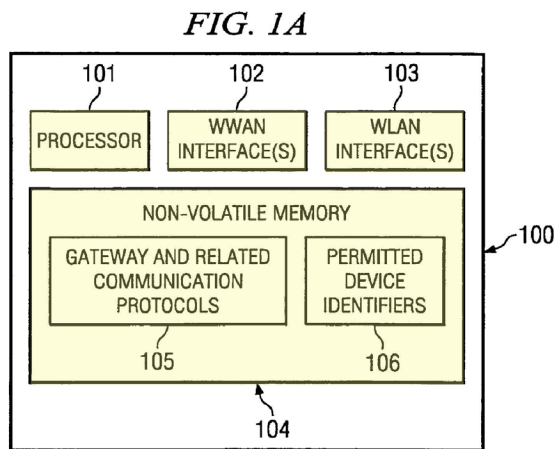
63. The structural hardware components recited in the claims were well-known prior to the '613 priority date. For example, in addition to Rao, Montemurro, Freund, and Araujo, each of which I discuss in greater detail below, U.S. Patent Publication No. 2004/0123153 (“Wright,” EX-1014), which published on June 24, 2004 from an application filed on April 11, 2003, teaches that user devices may have standard structures such as processors and memory. *E.g.*, Wright ¶¶46, 176. Wright teaches that “[u]sers with laptops and mobile devices want to take advantage of wireless technologies, to connect wherever they are—at work, at home, in the conference room of another company, at the airport, a hotel, a highway or at the coffee shop on the corner,” *id.* ¶7, and it explains their devices may accordingly have multiple different network adapters, *id.* ¶274 (explaining the policy engine 832 may also determine 906 from the operating system the class (*e.g.* 802.11b, 802.3, 802.11a, 802.11 g, GSM, GPRS, 3G) *of the network adapters on the mobile device*).¹

64. U.S. Patent Publication No. 2006/0183461 (“Pearce,” EX-1015), filed on February 11, 2005 and published on August 17, 2006, similarly teaches a

¹ Unless otherwise noted, I have added all annotations and emphases.

wireless device having well-known structures, including a processor, memory, and wireless network interfaces. Pearce, Fig. 3, ¶¶36-37. It explains that its device can use multiple different WLAN (802.11) and WWAN (CDMA, AMPS, GSM, GPRS) connections. *Id.* ¶¶ 13, 35, 67.

65. And likewise, U.S. Patent No. 7,881,267 (“Crosswy,” EX-1019), issued on February 1, 2011 from an application filed on June 4, 2004 and published as U.S. Patent Publication No. 2005/0286576 on December 29, 2005, teaches a PDA that includes processor 101, non-volatile memory 104, WWAN modem 102, and WLAN modem 103:



Crosswy, Fig. 1A.

66. The use of policies or rules to selectively allow or deny network communications was also well known. In addition to the disclosures of Rao, Montemurro, Freund, and Araujo, Wright teaches classifying networks based on the network class “e.g., 802.3, 802.11a, 802.11b, GPRS, GSM” (which are

different type of network connection, including cellular and WiFi connections) or based on for example, on whether the network type is categorized as “home,” “work,” or “mobile.” Wright ¶¶42-44, 66, 4B (“roaming”). Wright applies different security policies based on those classifications, *id.*, ¶¶42-44, 66, and allows or “drop[s] all network traffic using th[e] application” based on the policy. *Id.*, Figs. 10A-10B; *see also id.* ¶¶278-85.

67. Pearce also teaches controlling the ability of the wireless device to access various types of networks based on a variety of different policy considerations, including: type of service, whether the communication link is secure, financial cost, and the type of network communication (e.g., voice calls, web browsing, e-mails, etc). Pearce, ¶¶8-12, 60. Pearce notes that based on its disclosures “[o]ther criteria for setting policies that reside in device 58a which define access stations 34a that are accessible to device 58a will now occur to those of skill in the art.” *Id.* And Pearce states that it is “apparent that a combination of policies can also be used.” *Id.* ¶62.

68. Pearce details the benefits of such policies, including reduced costs and improved security: “policies can be designed, for example, to take advantage of periods during which certain services are offered at reduced costs by wireless carriers” and “policies could be designed to select more secure, less expensive, or otherwise more desirable wireless carrier over those carriers that are less secure,

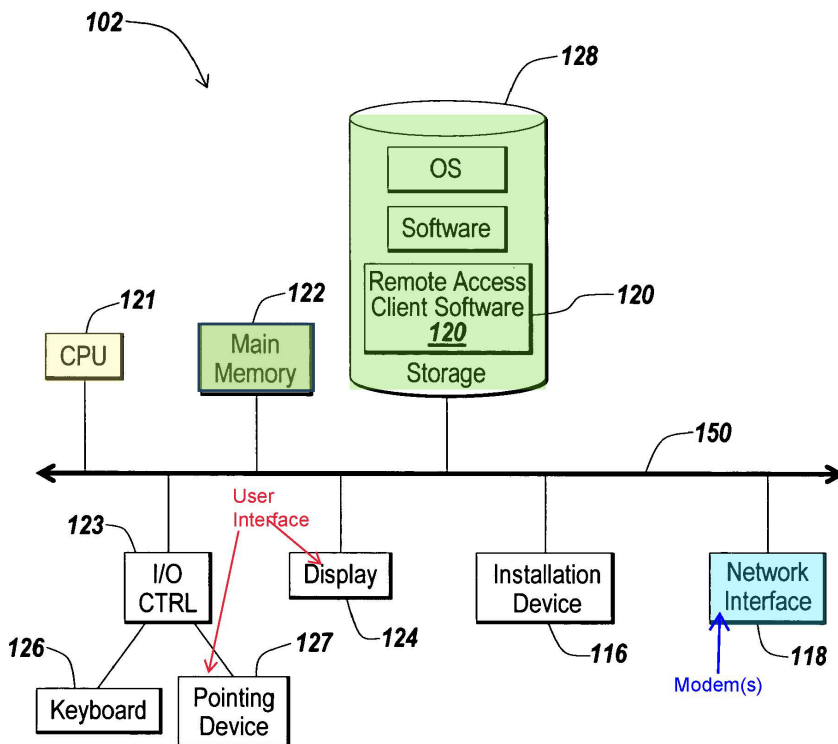
more expensive or otherwise less desirable.” *Id.* ¶68; *see also id.* ¶¶5, 12. And Pearce explains that those policies may be application-specific, so that “certain applications performing on device 58, such as e-mail, could be allowed to communicate during certain periods of time such as daytime, and certain other applications, such as voice calls, could be able to communicate during other time periods such as night time.” *Id.* ¶68. Pearce provides a number of specific examples of policies that limit communications, and explains that these “could be desired for a number of reasons, such as reducing or controlling roaming charges, such that a particular device 58a can only perform communications in a home region.” *Id.* ¶55. Pearce also explains that through application of a policy, the decision may be made to either “Allow Communication,” or “Disallow Communication.” *Id.* ¶62; *see also id.* Table VIII.

B. Rao (EX-1004)

69. Rao published on February 23, 2006 from an application filed on July 22, 2005. It teaches “Systems and methods for client-side application-aware prioritization of network communications.” Rao, Title. Rao teaches that “application-aware prioritization of client-side network communications.” *Id.*, Abstract.

70. Rao discloses a mobile device using well-known structures such as a processor, memory, and network interfaces (modems) to control network traffic for

applications executing on the mobile device. I have annotated Fig. 1D of Rao below to show its a processor (CPU, yellow), memory/storage (green), user interface (red arrows), and network interface (blue):



Id., Fig. 1D.

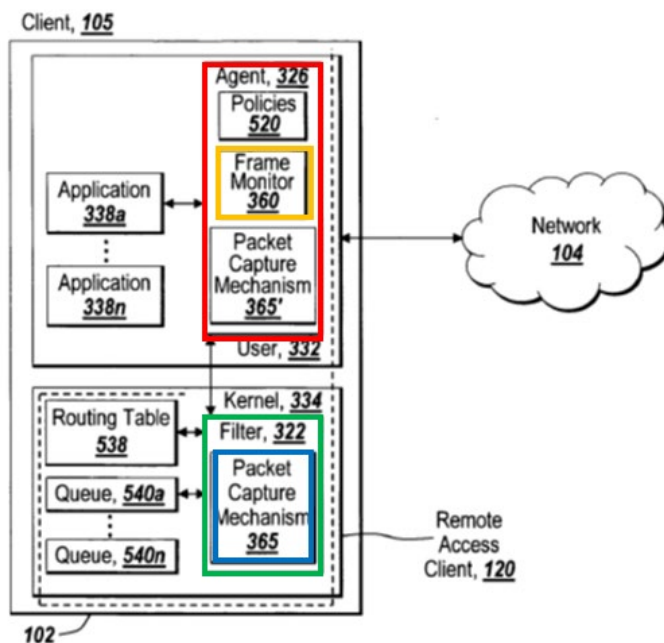
71. Rao's device "execute[s] one or more applications ... which access the network 104" through one or more "LAN or WAN links" and/or "wireless connections." *Id.* ¶125, Fig. 1A. Thus, Rao's applications communicate over, for example, the internet, with sources of data such as servers that provide web pages, email, and other services.

72. Rao explains that the applications resident on the mobile device may be a "web browser, web-based client, client-server application, a thin-client

computing client, an ActiveX control, or a Java applet, or any other type and/or form of executable instructions capable of executing on client 105 or communicating via a network 104,” which may access data and retrieve data maintained by network computers / servers. *Id.* ¶¶86-89. The applications may “provide one or more real-time data communications, such as VoIP,” and “one or more of the applications 338a-338n may provide email, collaboration, online meeting, and/or desktop sharing related services or functionality.” *Id.* ¶179.

73. Rao uses “application-aware” policies enforced at the mobile device to control the applications’ network access. *Id.* Remote access client 120, Rao teaches, “provides for the intelligent and client centric prioritization of application network communications on a client based on the type and/or priority of an application.” *Id.*

74. As I show in the annotated Figure 5A below, Rao explains that the remote access client may include an agent (**red**), filter (including filtering table) (**green**), packet capture mechanism (**blue**), frame monitor (**gold**), and network driver. Rao explain that these aspects may be combined in any fashion and that the “the operations and functionality of the remote access client 120 described herein may be practiced in a single mechanism or single component.” *Id.* ¶¶99-101, 114.-16.



Id., Fig. 5A (annotated).

75. Rao's remote access client intercepts inbound and outbound network packets and prioritizes those packets based on Rao's policies. *Id.* ¶¶101-05; *see also id.* ¶¶ 57, 108-10.

76. Rao broadly discloses components enforcing policies at different processing locations and levels within the network packet processing and device. *Id.* ¶¶100, 115, 197-98; Fig. 6A.

77. Rao discloses exemplary policy criteria defined in a "multitude" of ways, including "based on whether an application is running in the foreground or the background of the client 105," "the destination network address, such as host name or IP address, and/or destination port number," "size, memory usage, total

execution time, and/or frequency of use.” *Id.* ¶¶182, 188-93. Rao discloses that policies may be application specific and can be specified by “the name of the application,” the “type of the application, “protocols used by the applications” and/or “the size of the payload of the network packet.” *Id.* ¶182.

78. Rao embraces broad, flexible policy applied through “any suitable means,” noting that a POSA “will recognize and appreciate the multitude of ways to define” the policies. *Id.* Rao expressly discloses combining multiple policy criteria, noting “the policies 520 may be specified hierarchically to account for multiple applications 338a-338n and/or multiple protocols” and that “the policies 520 may be specified conditionally, such as if one application 338a is running, a second application 338b may have a higher or lower priority. *Id.*; *see also id.* ¶189 (“the agent 326 may use any combination of the policies 520 and characteristics of the application 338a-338n to indicate a priority for the network packets of the application 338a-338n”).

79. Rao teaches a number of advantages to its disclosures and invites a POSA to implement its teachings (some of which it calls embodiments) together. *E.g., id.* ¶¶74, 131, 218-19. In my opinion, a POSA would have viewed Rao as disclosing aspects of a single system. But even if these were separate, a POSA would have been motivated to combine them (and would have found it obvious to do so) based on Rao’s invitation and its teachings regarding the benefits of its

inventions, including, for example, properly controlling packets to decrease latency and increase the quality of voice communications, particularly for real-time communications. *E.g., id.* ¶¶3, 218.

C. Montemurro (EX-1005)

80. Montemurro published on August 20, 2009, from an application filed on February 15, 2008. It teaches “Policy-Based Data Routing For A Multi-Mode Device.” Montemurro, Title.

81. Montemurro provides application-specific policy control to allow or deny network activities for mobile devices, such as a PDA or smartphone, using WWAN and WLAN interfaces. *Id.*, Abstract, ¶29.

82. Montemurro’s device includes Wi-Fi and cellular transceivers, “non-volatile memory,” and a “microprocessor.” *Id.* ¶¶50-59. These standard components are shown in, *e.g.*, Fig. 6, below:

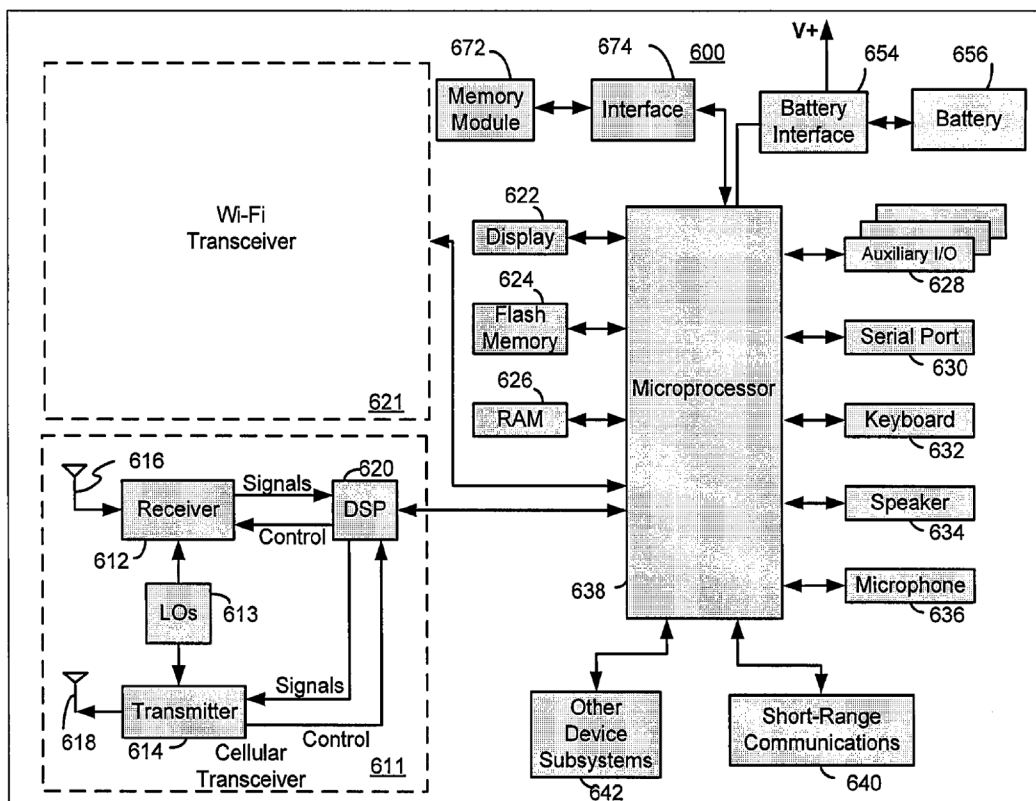


Figure 6

Id., Fig. 6.

83. As mentioned above, Montemurro's mobile device runs applications that communicate over the internet through multiple network interfaces, which may include WLAN and WWAN interfaces, as I show in the annotated figure below:

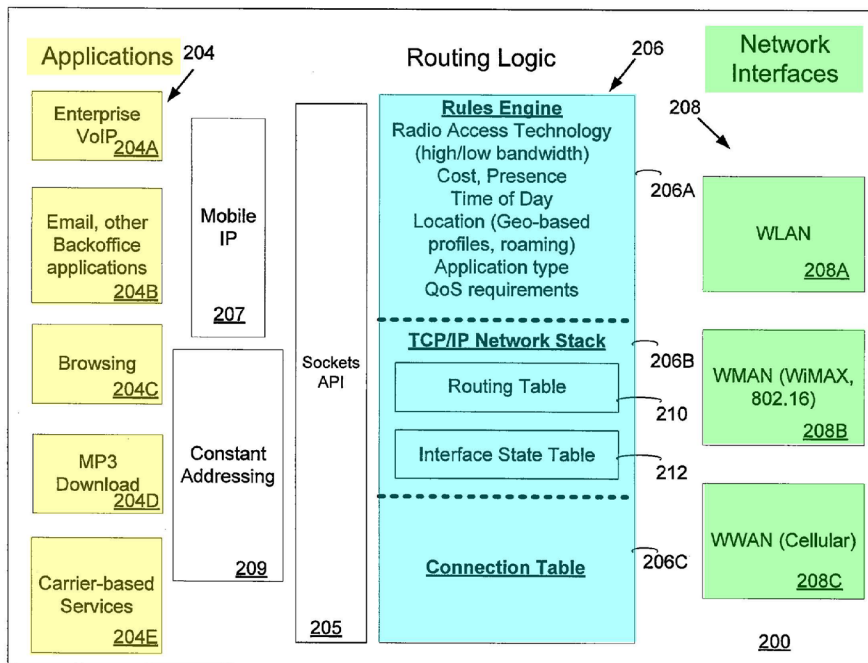


Figure 2

Id., Fig. 2 (annotated).

84. A POSA would have understood the “WLAN network interface” described in Montemurro would ordinarily include a WLAN modem and that the “WWAN network interface” would ordinarily include a WWAN modem.

85. Montemurro explains that to “optimize” communications in its multi-mode device, *id.* ¶4, its rules engine evaluates policies based on “network availability” to “provide an appropriate connection to an application for its respective communications” by “configur[ing] a routing table,” *id.*, Abstract; *see also id.* ¶¶11, 29-30. Montemurro explains that the selection may be updated as “real-time conditions” (e.g., network availability) change and may be based on interactions with “connection API’s.” *Id.*, Abstract, ¶¶3, 35, 45, 49.

86. Montemurro's policy is application specific. *Id.* ¶29. It gives exemplary policies, including that "the CRM application . . . only synchronizes the sales contact database . . . over a WLAN network" and that "the MP3 download application . . . runs on the lowest cost network." *Id.*

87. The policy can consider a wide variety of factors related to the networks available, including its type (e.g., WLAN or WWAN) bandwidth, range, cost, and power consumption. *Id.* ¶¶3, 29 *see also id.* ¶4 (discussing "costs associated with application access from these different networks [WLAN, WMAN or WWAN (e.g. GPRS or EDGE) networks]" and noting that "[t]here are also quality considerations such as the speed at which content can be delivered, or in the case of streaming media, the quality of service at which the content is delivered"). And may also consider "time of day," "location," "network roaming," "destination IP address," and "application type . . . among others." *Id.* ¶29.

88. Montemurro teaches that by adopting network-specific policies, users may decrease costs (by choosing lower cost options where available) and increase quality (by selecting the correct network for a particular application in view of its requirements, e.g., bandwidth requirements). *See, e.g., id.* ¶¶3-4, 11, 29.

D. Freund (EX-1007)

89. Freund issued November 16, 1999 from an application filed on May 6, 1997.

90. Freund teaches that the mobile computers its policies control include a processor, mass storage (non-transient memory), and network access cards, which I have highlighted below. *See, e.g.*, Freund, 6:31-32, 7:32-61.

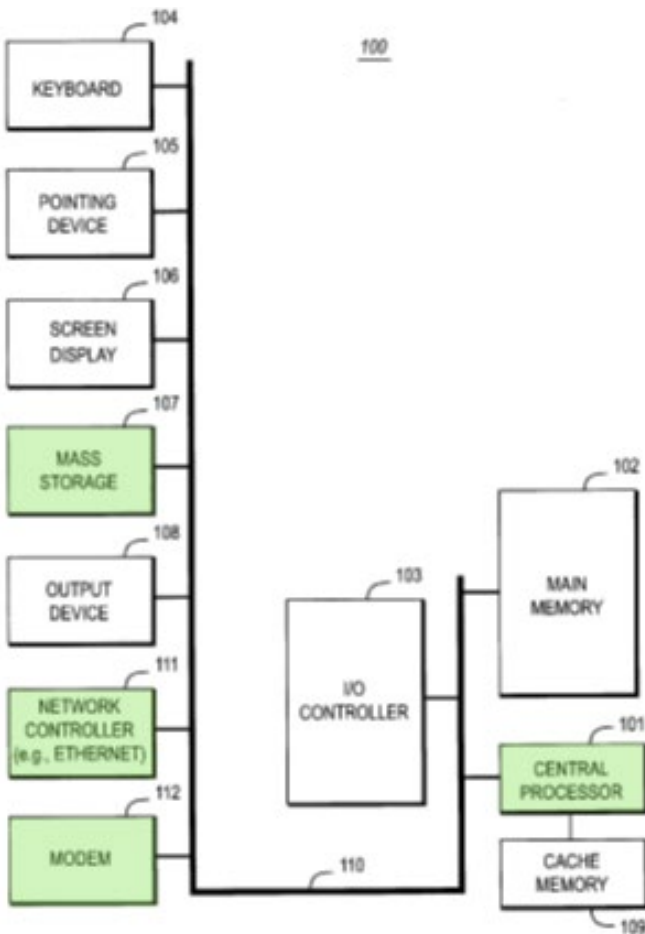
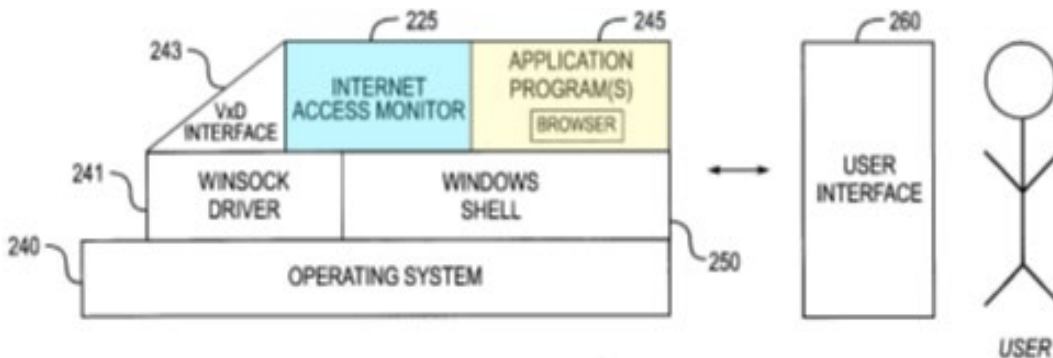


FIG. 1

Id., Fig. 1 (annotated).

91. Freund's mobile computer (client) includes "application programs" and a "client" or "internet access monitor" to enforce the application-specific traffic control policies, as shown below in Figure 2. Freund discloses that "a computer software system 220 is provided for directing the operation of the

computer system 100. Software system 220, which is stored in system memory 102 and on storage (e.g., disk memory) 107, includes a kernel or operating system (OS) 240 and a windows shell 250. One or more application programs, such as client application software or “programs” 245 may be “loaded” (i.e., transferred from storage 107 into memory 102) for execution by the system 100.” *Id.*, 7:64-8:39.



Id., Fig. 2 (annotated).

92. Freund explains that through a “user interface” users can configure application-specific policies using criteria (“foreground”/“background” status, protocols, time-of-day) to perform actions (allow/deny Internet activities). *Id.* Abstract, 5:12-15, 10:16-43; Figs. 7A-7K, 12A-12C, 13A-13B. The policies are flexible, using many different criteria, including “total time a user can be connected to the Internet,” “a list of applications or application versions that a user can or cannot use in order to access the Internet,” “a list of URLs (or WAN addresses) that a user application can (or cannot) access,” and “a list of protocols

or protocol components (such as Java Script™) that a user application can or cannot use.” *Id.*, Abstract.

93. Freund explains that the client monitor enforces the application specific policies to “determine if a particular process in question should have access to the Internet and what kind of access (i.e., protocols, Internet addresses, time limitations, and the like) is permissible.” *Id.*; *see also id.*, 5:44-64, 13:23-43.

E. Araujo (EX-1006)

94. Araujo published on August 27, 2009, from an application filed on February 26, 2008.

95. It teaches application-specific policies that manage power consumption on mobile devices including “wireless telephones.” Araujo, Abstract, ¶¶1-4, 14.

96. Araujo’s policies address the known problem of power and battery management. Araujo teaches that components (including network cards, *e.g.*, modems) expend power, a limited resource, and discloses policies to manage power consumption. *Id.* ¶¶1-4. Araujo states that “[b]attery-powered machines have a finite amount of energy stored between charges,” and notes that “[e]lectricity is expensive, so even machines that are connected to power sources manage their use of energy in order to reduce the cost of operation.” *Id.* ¶1.

97. As shown in Fig. 7, below, Araujo's device includes multiple components, such as network cards:

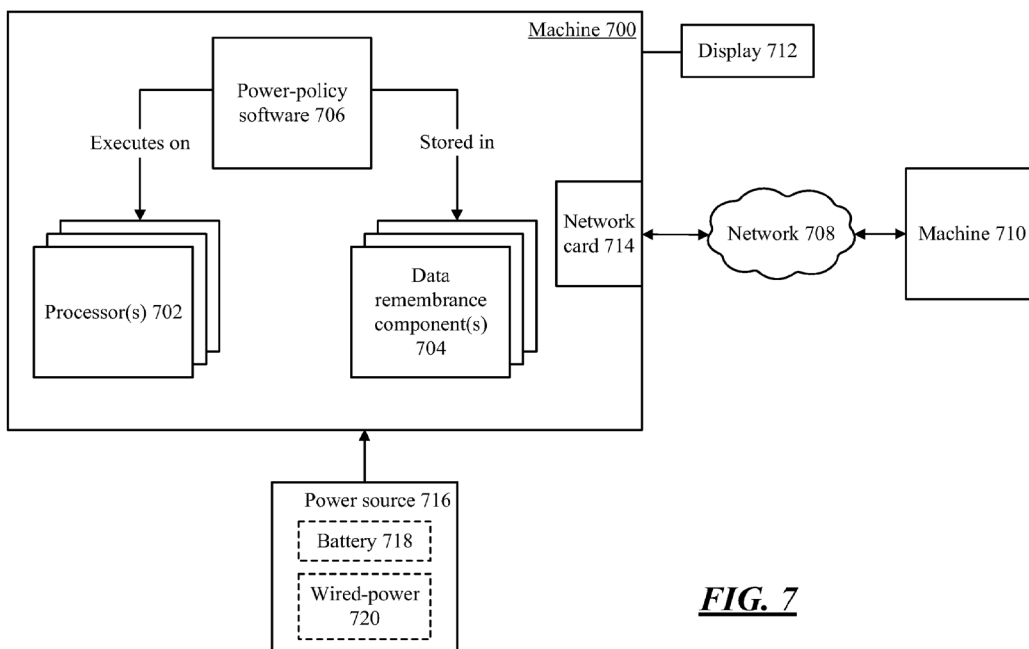


FIG. 7

Id., Fig. 7, ¶¶4, 20, 52-57.

98. Araujo emphasizes that these components, and particular its network cards, use power. *Id.* ¶¶2-3, 20-22, 33, 39, 41-43. Araujo teaches that the “network card” is “an example component that may be used to facilitate machine 700’s communication through network 708,” *id.* ¶55, and in view of this description, a POSA would have understood the “network card” to encompass a modem, which a POSA would have recognized as a device that connects a computer to the internet.

99. To better manage power expenditure, including that caused by the network card, Araujo discloses “rich policies” that “may take into account a variety

of factors when determining whether to change the power state of a device. *Id.* ¶3.

A power management runtime may enforce the policy, and may determine whether a particular change of power state for a device is allowed under a policy.” *Id.*

100. Araujo teaches that its “policy may take into account any factors” and that [o]ne example factor is the identity and status of the program [application] that is requesting action from a device.” *Id.* ¶4; *see also id.* ¶¶20 (“Program 112 is software that runs on machine 102, or hardware that implements some process on machine 102. Program 112 may be application software, system software, or any other type of software or hardware.”), 26, 32-33. Araujo gives as a specific example that “if a device such as a disk or network card is powered off and a program makes a request to use that device, the policy may specify that certain programs have sufficient status to justify turning on the device and that others do not.” *Id.* Araujo further teaches that its “policy may also take other factors into account, such as current power consumption, the amount of energy stored in a battery, predictions about future power usage, or any other factor.” *Id.* ¶4.

101. Araujo’s policies may be implemented at various places in the processing – including a “deflector” which sits before the “driver” for a device (network card). A request (including one to send information over the network card) may be “permanently or temporarily” deflected if the application making the

request is not allowed to power on the network card (modem) under the policy.

Id. ¶¶50-51, Figs. 3-4, 6.

IX. OPINIONS ON UNPATENTABILITY

102. For the '613 patent, I have been asked to provide an opinion as to whether claims 1-14, 16, 18-23 would have been obvious over Rao combined with Montemurro and Freund (Ground 1) and whether claims 15, 17 and 24 would have been obvious over Rao combined with Montemurro, Freund and Araujo (Ground 2). I have considered both combinations in light of the knowledge of a POSA.

103. As part of my obviousness analysis, I have considered the scope and content of the prior art, described above and below. Additionally, I considered whether any differences between the alleged invention and the prior art are such that the subject matter, as a whole, would have been obvious to a person having ordinary skill in the art at the time of the alleged invention. I have also considered the level of ordinary skill in the pertinent art in performing my analyses.

A. Ground 1: Rao-Montemurro-Freund Renders Obvious Claims 1-14, 16, 18-23

104. As detailed below, in my opinion, Rao in combination with Freund and Montemurro renders claims 1-14, 16, 18-23 obvious.

1. Motivation to Combine

105. A POSA would have found it obvious to combine Rao, Montemurro, and Freund as detailed below.

106. As I explained, *supra* §§VIII.B-D, these references all teach controlling network communications to and from applications on an end-user computing device. *See, e.g.*, Rao, Fig. 1D, ¶¶86 (disclosing computing devices 102a-102c, also referred to as clients 105a-105c), 93 (describing access control policies to control network traffic to and/or from client 105), 118-30; Montemurro ¶¶4 (discussing a mechanism to optimize device communications based on network access), 29, 50-59 (“handheld wireless communication device 600 that may be configured as a mobile device 102”); Freund, Fig. 1, Abstract, (“A computing environment with methods for monitoring access to an open network”), 5:12-15 (describing internet access by “mobile computer on the road”), 7:32-61.

107. The references disclose similar systems running applications/programs, and they teach complementary techniques for better managing those applications’ internet access. *See supra* §§VIII.B-D. Given their similarities, in my opinion, a POSA would have looked to Montemurro and Freund to improve Rao.

108. As I explained above, *supra* §VIII.B, Rao discloses that a mobile device may “switch[] between networks” and that it may connect to “one or more

networks,” including a local area network (LAN), wide area network (WAN), and the internet. Rao ¶¶81, 92, 95, 125. Rao teaches that its device may have a “modem or any other device” suitable for interfacing with these networks. *Id.* ¶125.

109. Rao further discloses that its remote access client can prioritize network packets communicated over its networks according to any policy considerations and directly invites a POSA to “recognize and appreciate” criteria that may be used. *Id.* ¶¶188-89 (“One ordinarily skilled in the art will recognize and appreciate the various characteristics of an application the present technique may use for providing client-side application-aware network communication prioritization.”). Rao proposes prioritizing packets based on one or more of “whether the application 338a-338n associated with the network packet is running in the foreground or the background” of the user device, “process task priority,” type of associated application, protocol used by the associated application, the size of the network packet, or time, among other criteria, and in my view a POSA would have appreciated and valued the flexibility of Rao’s disclosures, which allow tailored policies for different applications and different situations. *Id.* ¶¶188-92.

110. Montemurro builds on Rao’s disclosures. As I note above, *supra* §VIII.C, like Rao, Montemurro teaches “[w]ireless communication devices capable of communicating in at least two network communication modes (*e.g.*, WLAN

such as Wi-Fi . . . and WWAN such as GSM/GPRS cellular and wired modes.”).

Montemurro ¶11. Montemurro describes that, to facilitate these network connection modes, the devices include “an interface for each of WLAN 208A” and “WWAN 208C network communications.” *Id.* ¶28.

111. Montemurro further teaches classifying the network type the device is using with a routing table. *Id.* ¶30. Using the routing table information, Montemurro the device can selectively allow or deny network communications based on the type of network to which the device is connected. *Id.* ¶4. It gives as an example, an application allowed only to “synchronize the sales contact database” over “a WLAN network.” *Id.* ¶11.

112. Montemurro explains that it is “desirable to have a mechanism that seeks to optimize communications for multi-mode capable devices, that is, that seeks to improve communications for multi-mode capable devices.” *Id.* As I describe above, Montemurro emphasizes that, by implementing network-specific network control policies, e.g., selectively allowing or denying network communications based on the type of network the device is using, the user can save costs and improve communication quality. *Id.*

113. In view at least of the benefits disclosed by Montemurro, a POSA would have been motivated to include Montemurro’s teachings related to network interfaces, network classification, and network-based policies in Rao.

114. Importantly, Rao, like Montemurro, suggests multi-mode connections, Rao ¶¶81, 92, 95, 125, and invites POSAs to control network communications based on multiple criteria, as noted above. *Id.* ¶¶188-92; *supra* §VIII.B.

115. A POSA would have understood the cost- and quality- benefits of combining Rao and Montemurro in this way. Particularly at the time of the invention, different networks may vary in cost and quality (and even a single network might vary in these respects at different times or in different locations). *See, e.g., supra* §VIII.A; Pearce ¶¶5, 12, 55, 68. Montemurro notes these benefits, including cost savings and improved communication quality, Montemurro, ¶4, and they were well-known in the art. *See, e.g.,* Pearce ¶¶4-5, 54, 68, claim 6 (collectively explaining that optimizing connections can provide cost savings); Wright ¶¶48, 252, 279-85, Figs. 10A-10B (collectively teaching policies that determine whether to allow or prohibit use of certain network services); *supra* §VIII.A. A POSA would accordingly have been motivated to apply Montemurro's teachings to Rao, and would have reasonably expected to succeed in doing so given the references' teachings.

116. A POSA at the time of the alleged invention would have been further motivated to implement the teachings of Freund in the Rao-Montemurro system.

117. It is my opinion that, like Montemurro, Freund expands on Rao's teachings. Rao teaches that its policies may "be configurable by a user by any

suitable means and/or mechanism.” Rao ¶183. Freund details how a user may configure policies, offering exemplary interfaces to do so:

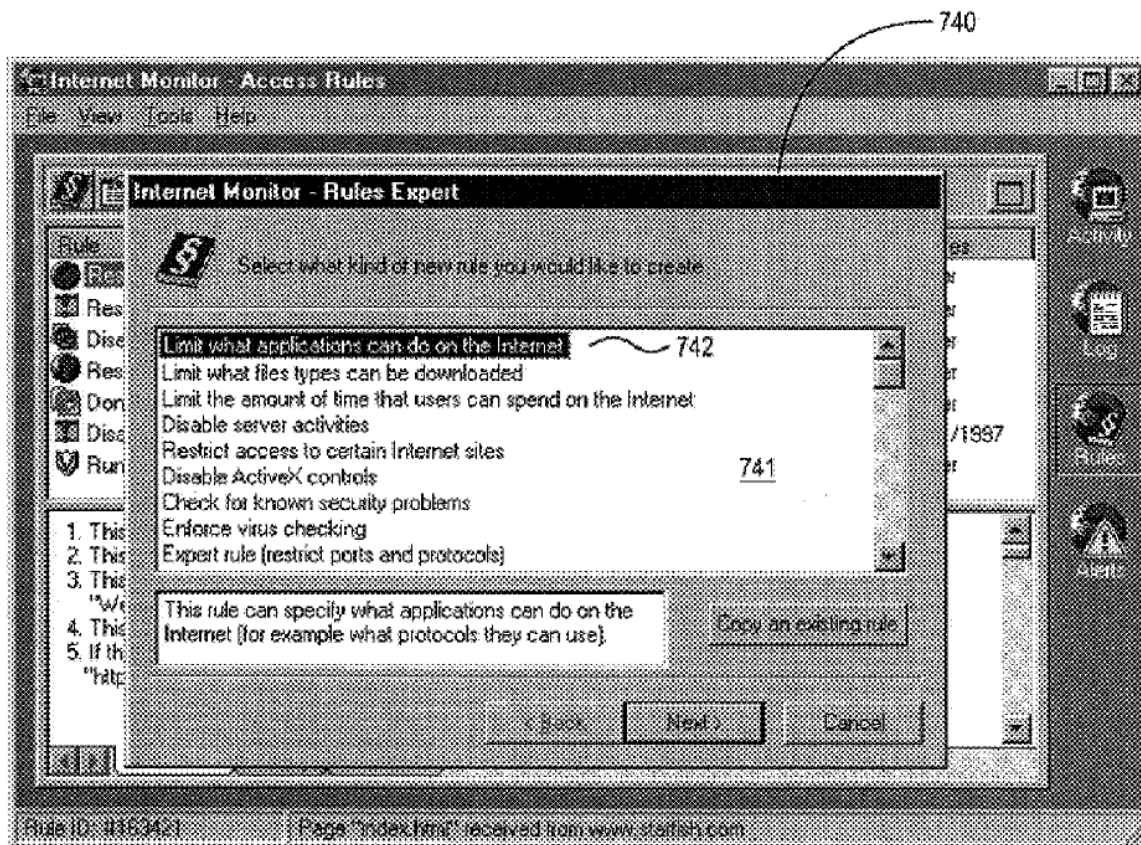


FIG. 7B

Id., Fig. 7B; Freund further discusses various policy augmentations, *id.*, 4:5-5:5, 12:54-13:20, and explains that policies may direct the system to deny a user internet access, warn users of issues, or redirect access, *id.*, 13:20-23; *see also e.g.*, *id.*, 23:65-27:50, Figs. 7A-7K.

118. Rao teaches controlling network traffic in part by distinguishing between foreground and background activity, *see, e.g.*, Rao ¶182, and Freund likewise monitors inbound and outbound network communications and distinguishes between network activity based on whether it is foreground or background activity, Freund, 8:63-9:3 (regulating network access based on active foreground versus passive background use); *see also id.*, 10:16-43, 14:51-21:50. Freund identifies foreground and background activity based on “whether the application receives ‘focus’ and/or receives user input (*e.g.*, mouse clicks or key strokes).” *Id.*, 10:40-43. And Freund maintains a list of actively used processes to “determine if [a] process . . . should have access to the Internet and what kind of access . . . is permissible.” *Id.*, 4:5-5:5.

119. As with Montemurro, given Freund’s and Rao’s similarities, in my opinion, a POSA would have been motivated to implement Freund’s teachings in Rao. Freund expands on Rao’s disclosures, offering, for example, detailed user interfaces and specific criteria for determining whether a device is operating in the foreground, a criterion Rao discloses considering.

120. And, in my opinion, because Freund enhances different aspects of the Rao system than Montemurro, a POSA would have been likewise motivated to apply Freund’s teachings to the Rao-Montemurro system. Freund describes its approach as “advantageous,” and a POSA would have been motivated to

incorporate Freund's teachings to improve the combined system's user friendliness (*e.g.*, in view of Freund's detailed "rules wizard" for policy configuration and its policy options) and to implement the background/foreground prioritization expressly suggested by Rao. Freund, 10:55-11:28.

121. A POSA at the time of the alleged invention would have recognized that the proposed combination would have had particular benefits in corporate settings where an employer may wish to monitor (and impose limits on) employees' device use, as Freund teaches. *See* Freund, 8:63-9:3, 10:16-43 ("[I]t is desirable to monitor the time an employee spends 'actively' interacting with the Internet," as opposed to background email and other process, to "control[] counterproductive Web browsing."). Such settings were common at the time (and remain common today). For example, Montemurro notes that in addition to the user a "device administrator" may set policy. *See, e.g.*, Montemurro ¶36. And other art likewise considered "policy administered from [an] office." Pearce ¶46; Wright ¶46 ("The server or server-side system 200 allows an administrator to manage and distribute policies and software upgrades. . . ."). A POSA would have accordingly perceived value in allowing a central administrator to participate in the management of device applications' network access.

122. A POSA would have had a reasonable expectation of success in combining Rao, Montemurro, and Freund. The proposed combination combines

known hardware and software components (including, *e.g.*, standard device components and policy modules) operating according to their known use for their known, commonly intended purpose (*e.g.*, to monitor network communications and take actions according to set policies), to achieve known benefits (*e.g.*, control of network communications).

2. Claim 1

a. [1.0] A wireless end-user device, comprising:

123. Rao-Montemurro-Freund teaches a “wireless end-user device.”

124. Rao discloses a “mobile client, such as a notebook, personal digital assistant (PDA), a smart phone, or any type of mobile computing or telecommunication device.” Rao ¶198. A POSA would have understood that Rao’s client may connect wirelessly to a network given Rao’s disclosure that “the computing device 102 may include a network interface 118 to interface . . . to the Internet through a variety of connections including, but not limited to . . . wireless connections.” *Id.* ¶¶81, 100, 125, 217.

125. Montemurro and Freund teach similar end-user devices, *e.g.*, Montemurro ¶50 (describing “handheld wireless communication device”); Freund, 5:12-15 (describing internet access by “mobile computer on the road”), and a POSA would have been motivated to implement the combined system as a wireless end-user device. These were well known at the time of the alleged invention, and a

POSA, in my opinion, would have had a reasonable expectation of success of doing so.

b. **[1.1] a wireless wide area network (WWAN) modem to communicate data for Internet service activities between the device and at least one WWAN, when configured for and connected to the WWAN;**

[1.2] a wireless local area network (WLAN) modem to communicate data for Internet service activities between the device and at least one WLAN, when configured for and connected to the WLAN;

126. Rao-Montemurro-Freund teaches these limitations.

127. Rao discloses that its device communicates network packets over network 104. *E.g.*, Rao ¶¶99, 110, 179-80, 185 (“obtain inbound and/or outbound packets of the client 105, such as the network traffic associated with application 338”); *id.* ¶¶125, 195 (describing wireless interfaces/connections).

128. Likewise, Montemurro and Freund describe similar network communications. *E.g.*, Montemurro ¶31 (discussing IP packet transmission over network); Freund, 11:30-12:42 (same).

129. In my opinion, a POSA would have understood these communications to be “data for Internet service activities” and would have understood the device in the combined system communicates such data between the device and the network when it is configured for and connected to such a network. For example, Rao describes communicating “payload[s] of packets.” *See, e.g.*, Rao, ¶¶166-72.

130. Rao further teaches that its device may access networks, including WAN and LAN networks, by wired or wireless connection, and that its device may include a “network interface” to interface with a network, which may be a “modem or any other device suitable for interfacing the computing device 102 to any type of network capable of communication and performing the operations described herein.” Rao ¶¶95, 125.

131. Montemurro similarly teaches that a device may connect to multiple networks, including a WWAN and WLAN networks, using a network interface for each network type. Montemurro, Abstract, ¶¶3, 11-13, 50-54, Fig. 2. Montemurro teaches that such “multi-mode” devices, those “capable of communicating in at least two communication modes (*e.g.*, WLAN such as Wi-Fi . . . and WWAN),” allow “optimize[d] communications,” reduce costs (*e.g.*, by avoiding networks with an associated costs), and improve communication quality. *Id.* ¶¶3-4, 11-13. Such multi-mode devices help reduce costs by enabling the device to switch communication modes in a cost-effective manner. For example, the multi-mode device could switch from a cost-inducing communication mode (*e.g.*, a WWAN cellular network that has data limits or charges for data usage) to a free or less costly communication mode (*e.g.*, a home WLAN (*e.g.*, Wi-Fi) network) when the latter becomes available. The same mode-switching functionality can provide increased communication quality, as the multi-mode device may switch to the best

available network based on signal strength, bandwidth, and latency, thus providing continuous, high-quality communications. As I discuss above, these benefits were well known, and a POSA would have been familiar with them. *See, e.g.*, Pearce ¶¶4-5, 54, 68, claim 6; Wright ¶¶48, 252, 279-285, Figs. 10A-10B; *supra* §VIII.

132. Given the benefits Montemurro discloses, a POSA would have been motivated to include both a WLAN and a WWAN network interface in the Rao-Montemurro-Freund wireless network device to facilitate internet access over multiple network types. *Supra* §IX.A.1. A POSA would have implemented the network interfaces as modems in view of Rao's suggestion to do so. Rao ¶125 ("The network interface 118 may comprise a ... modem or any other device suitable for interfacing the computing device 102 to any type of network capable of communication and performing the operations described herein."). "WLAN" and "WWAN" modems communicate packets (e.g., data for internet service activities) when they are configured for their respective network types (allowing them to operate as disclosed) and connected to those networks (e.g., when the networks are available). *See, e.g.*, Montemurro, Abstract (noting that network availability may change), ¶49 (same).

133. Freund's disclosures are not contrary. Freund contemplates mobile access for its user device, referencing "e.g., a mobile computer on the road," Freund, 5:12-15. A POSA would have understood that, as Wright explains, by the

time of the alleged invention, “[u]sers with laptops and mobile devices want to take advantage of wireless technologies, to connect wherever they are—at work, at home, in the conference room of another company, at the airport, a hotel, a highway or at the coffee shop on the corner.” Wright ¶7.

134. A POSA would have had a reasonable expectation of success in implementing this aspect of Rao-Montemurro-Freund given the references’ suggestions. Rao discloses that its device may use multiple networks, Rao ¶¶95, 125, and Montemurro’s multi-mode structure, including both its WLAN and WWAN network interfaces, details a concrete implementation. *E.g.*, Montemurro, Abstract, ¶¶3, 11-13, 50-54, Fig. 2.

c. [1.3] a non-transient memory to store

135. Rao-Montemurro-Freund teaches this limitation.

136. Each reference relies on non-transient memory to store policy-related information. *E.g.*, Rao ¶¶116 (describing stored “executable instructions”), 119 (explaining processor “responds to and processes instructions fetched from the main memory unit”), 124 (describing memory for storing application software and programs such as the remote access client software”); Montemurro ¶¶53-56 (disclosing memory for storing configuration data and applications); Freund, 7:46-8:10 (describing software stored in memory), Fig. 1.

137. A POSA would have understood the disclosed memory includes “non-transient memory,” *e.g.*, Rao’s “hard disk drive[]” and Freund’s “mass storage”—both of which store data in a persistent manner—and a POSA would have been motivated to store information needed in the long-term (*e.g.*, information related to the traffic control policy) in non-transient memory in Rao-Montemurro-Freund to ensure that the device preserves this information.

138. Storing information in non-transient memory was well-known, *e.g.*, Pearce ¶¶36-37 (disclosing a computing “device 58” that includes “persistent storage device 102 which is responsible for various non-volatile storage functions of device 58”); Crosswy, Fig. 1A (depicting “computing device 100” that includes WWAN and WLAN interfaces, as well as “non-volatile memory 104” that includes “gateway and related communication protocols,” among other data). A POSA would have had a reasonable expectation of success in implementing non-transient memory in Rao-Montemurro-Freund in view of the references’ disclosures and given the conventional nature of such memory in computing devices.

- d. **[1.3.1] a differential traffic control policy list distinguishing between a first one or more applications resident on the device and a second one or more applications and/or services resident on the device, and**
- [1.3.2] a differential traffic control policy applicable to at least some Internet service activities by or on behalf of the first one or more applications;**

139. Rao-Montemurro-Freund teaches these limitations.

140. Rao discloses that its “remote access client 120” is stored on a hard disk drive (non-transient memory). Rao ¶124; *see supra* [1.3]. Remote access client 120 has “one or more policies 520” that specify transmission priority for network packets associated with certain of the device’s applications. Rao ¶182. Remote access client 120, which is stored in Rao’s non-transient memory, *supra* [1.3], discloses both a “differential traffic control policy” and a “differential traffic control policy list.”

141. First, a POSA would have understood that Rao’s prioritization policy is a “differential traffic control policy” as claimed in Limitation [1.3.2] because it applies differently to different packets and is therefore “differential.” For example, based on its assigned prioritization, a packet is placed in a different transmission queue and communicated more or less quickly (or is even discarded). Rao ¶¶191-94, 207.

142. A POSA would have also recognized that the policy is a “traffic control” policy because it controls how network packets (which a POSA would have recognized are network traffic because they are transmitted over the network) are sent and received by the device over the network. *Id.* ¶¶191-94, 207.

143. A POSA would also have understood that Rao’s policy is “applicable to at least some Internet service activities.” Rao explains that its policy is “for specifying client-side prioritization of network communications related to applications 338a-338n;” thus, a POSA would have understood that the policy prioritizes (and thus applies to) internet service activities (the network communications) of Rao’s applications. *Id.* ¶182.

144. A POSA would have also understood that the policy is “applicable to at least some Internet service activities (network communications)” “by or on behalf of” a particular application or group of applications, which a POSA would have understood to be a “first one or more applications.”

145. For example, Rao teaches that its policies may be specified for a particular application by “name,” for a particular application “type,” or based on other characteristics of the application, such as “whether an application is running in the foreground or the background.” Rao ¶182; *id.* ¶¶188, 192. And Rao also gives an example of a policy prioritizing one group of applications (real-time data communications of an application) ahead of other applications’ non-real-time data

communications. *Id.* ¶184; *see also id.* ¶192. Thus, Rao would have suggested to a POSA that its policies may distinguish between applications, including a “first one or more applications” and a “second one or more applications.”

146. Second, Rao also teaches a differential traffic control policy list as claimed in Limitation [1.3.1]. Rao includes applications “resident” on the device. *E.g.*, Rao ¶¶3 (discussing “[o]ne or more other applications on the client” device), 87-88, 124. Rao teaches that to prioritize packets associated with particular applications (*e.g.*, a first one or more of these applications or a second one or more applications), it uses remote access client 120’s filter 322. Rao ¶¶99, 114-17, 179, Figs. 1C, 5A.

147. According to Rao, filter 322 receives the “indicated priorities” established under Rao’s policy and applies them to packets associated with particular applications. *Id.* ¶190. A POSA would have understood that the “indicated priorities” are a differential traffic control list as recited in Limitation [1.3.1].

148. A POSA would have also recognized that the indicated priorities distinguish between (*e.g.*, a first one or more and a second one or more applications) because, as I explained, they dictate different application of the traffic control (prioritization) policy for packets associated with different applications or

types of applications resident on the device. Rao ¶¶182, 184, 188, 192; *see also id.* ¶¶3, 87-88, 124. They are therefore “differential.”

149. And, in my view, a POSA would have also understood the “indicated priorities” to be a list. This is at least because Rao elsewhere explains that filter 322 stores information used to route the packets (*e.g.*, the priorities) in a “filtering table,” which filter 322 uses to determine if a packet “satisfies a condition *listed* in the filtering table.” Rao ¶¶102-06. Rao’s use of “listed” would have suggested a list to a POSA.

150. A POSA would have been motivated to use a differential traffic control policy and list, as taught by Rao, in Rao-Montemurro-Freund. A POSA would have been aware of the benefits of implementing an application-specific traffic control policy, including improving communication quality and regulating bandwidth. *E.g.*, Pearce, ¶¶4-5, 54, 68, claim 6 (collectively describing policies that “more secure, less expensive or otherwise more desirable” communication methods); Montemurro ¶¶29 (describing selectively allowing specific application activities over a particular type of network), 56-59 (describing benefits of allowing “preferred” applications internet access). A POSA would have understood that as, *e.g.*, Montemurro, *id.* ¶¶4, 29, explains, different networks have different quality but also different costs. Tailoring policy to specific applications allows for a rich

policy in which each the system can prefer the minimum quality network at the minimum cost to complete the application's internet service activities.

151. Rao explains that its prioritization can be used for any of a “multitude” of defined priorities, and a POSA would have appreciated the flexibility of Rao's traffic control policy. Rao ¶182; *see also id.* ¶3 (explaining benefits of applying different prioritization to, e.g., prevent background activity from being processed ahead of foreground activity); *supra* §§ VIII.B; IX.A.1.

152. Montemurro and Freund similarly teach application-specific policies and the use of lists to implement those policies, confirming the appeal of Rao's approach and that a POSA would have had a likelihood of success in implementing this aspect of Rao-Montemurro-Freund. *E.g.*, Montemurro ¶¶27, 29, 32-34 (describing rules and “connection table”); Freund, 12:66-13:43 (describing “database of access rules” identifying “a list of applications or application versions that a user can or cannot use in order to access the internet”).

153. Further, to the extent it is argued that Rao does not disclose the claimed policy or list, Montemurro and Freund do, as I describe above, and a POSA would have been motivated to implement these features in Rao-Montemurro-Freund for the same reasons a POSA would have been motivated to implement Rao's similar features.

- e. **[1.4] an interface to allow a user to augment the differential traffic control policy for the first one or more applications but not for the second one or more applications and/or services; and**

154. Rao-Montemurro-Freund teaches this limitation.

155. Rao explains that a user may “configur[e]” an aspect of a policy through “a user interface, graphical or otherwise, design[ed] and constructed for configuring or specifying the policies 520.” Rao ¶183.

156. Similarly, Montemurro and Freund teach that a user may use a user interface to allow the user to configure rules (e.g., aspects of the larger policy). *E.g.*, Montemurro ¶36 (describing interface for “configur[ing] rules”); Freund, 8:10-12, 23:65-27:50 (describing interface for “modify[ing]” rule), Fig. 7A (button 712). A POSA would have understood that allowing a user to do so is beneficial in that it increases the policy’s flexibility. Freund, for example, emphasizes that allowing users to modify some policies may improve a system, e.g., by preventing the need for a user/manager to repeatedly have to request administrator assistance to adjust a policy. Freund, 4:24-26, 8:48-52, 9:54-63.

157. A POSA would have understood that by configuring or modifying the policy, *e.g.*, by adding a criterion, the user is “augmenting” the differential traffic control policy. And a POSA would have been motivated to include this option in Rao-Montemurro-Freund, as the references all suggest and as I discuss above, to

give the user increased control and flexibility. A POSA would have understood that this implementation would have required only routine skill as demonstrated by all the references' teachings (including Freund's suggestion). *See, e.g.,* Freund, 4:24-26, 8:48-52, 9:54-63.

158. Freund further suggests that only certain aspects of the policy (*e.g.*, aspects applicable to the first one or more applications but not for the second one or more applications) may be augmented.

159. For example, Freund explains that when a rule is created the user can “selectively include or exclude applications” (or groups of applications) “which are to be affected by the new rule.” *See, e.g.,* Freund, 24:17-27:36, Fig. 7A, 7D. In Freund's system, a specific “first one” application (*e.g.*, a web browser) may have only limited internet access, as illustrated in Fig. 7A:

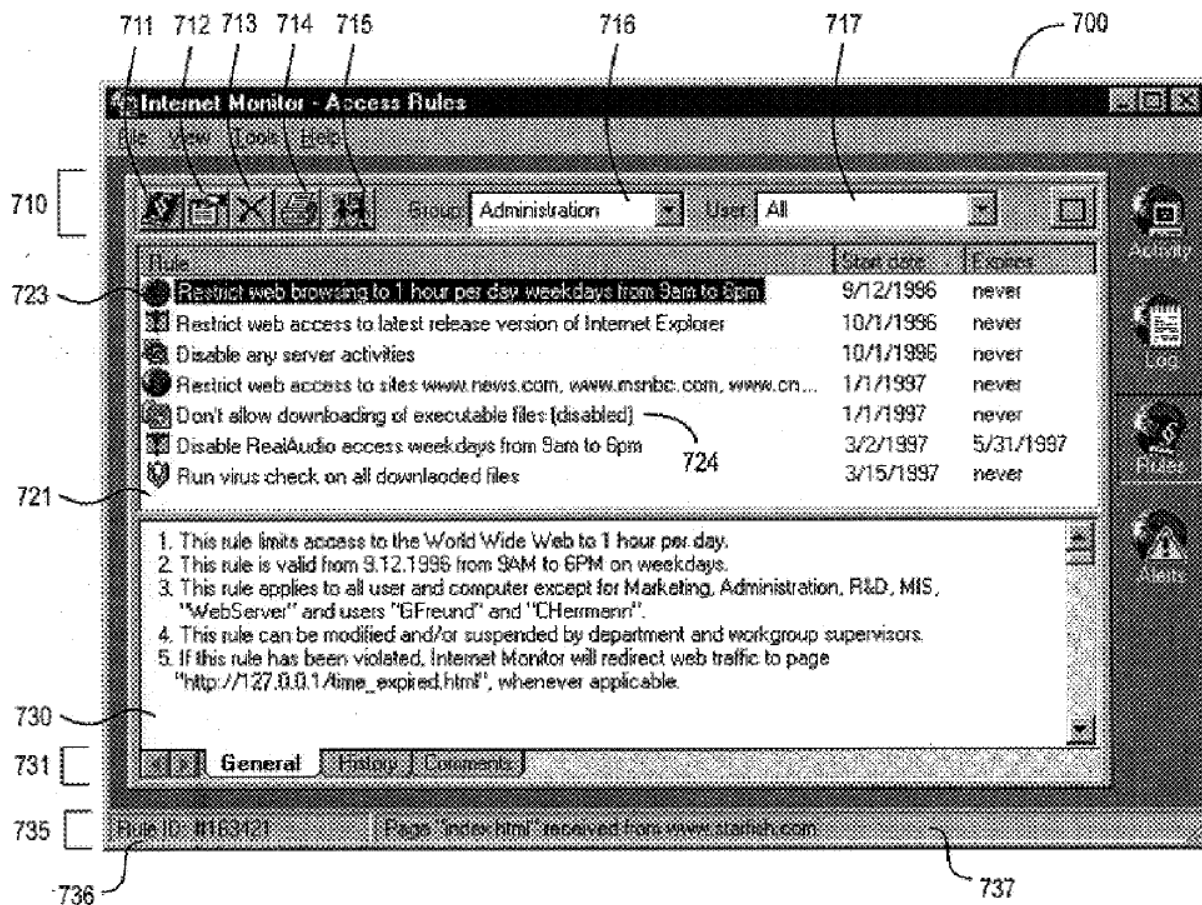


FIG. 7A

Id., Fig. 7A. A POSA would have understood that subsequent modifications to the policy, *e.g.*, to add a time constraint, augment the policy for the first one or more applications but not the second one or more applications (which are already excluded from the rule). *Id.*, Fig. 7H-7K; 27:4-50.

160. To the extent this limitation requires that the interface prevent augmentation of the second one or more applications, Freund teaches that its rules may be restricted so that end-users may *not* modify particular rules. *E.g.*, *id.*,

27:18-35 (describing limitations on who may modify). Freund explains that organizations may wish to impose rules that individual users cannot modify—for example, the policy may block internet access for specified applications, such as “a rule blocking FTP (file transfer protocol) by web browsers, for preventing users from tying up the network with large FTP file transfers,” *id.*, 16:25-29, or may restrict all but one internet browser, *id.* 27:21-25.

161. A POSA would have understood that it may be desirable to prevent users from modifying this type of administrator- or supervisor-set rules. *Id.*, 27:29-36; *see also id.*, 26:31-27:21. And a POSA would have understood that, although users could not modify the policy as applied to those restricted applications (*e.g.*, a second one or more applications), users could potentially modify the access policy applicable to similar allowed applications. For example, a user might modify the policy allowing access to non-restricted browser applications to set a time window when the browser has internet access to increase his or her productivity or take advantage of a “low cost” time for internet user. *Id.*; *see also* Pearce ¶68.

162. A POSA would have been motivated to include Freund’s teachings related to modifications and permissions in Rao-Montemurro-Freund because Freund describes benefits to allowing a central authority (*e.g.*, an employer) to regulate users’ activities to protect against various security threats and “abuse . . . for unauthorized personal activities” without the user disabling/modifying

important aspects of the policy. Freund, 9:22-11:27; *see id.*, 2:2-14; *see also* Wright ¶¶78, 229. As I explained above, *supra* §IX.A.1, a POSA at the time would have been familiar with corporate settings that monitor and imposed limits on employee device use and would have accordingly perceived value in allowing a central administrator to participate in the management of device applications' network access.

163. In addition to Freund's disclosure, Montemurro similarly contemplates that an "administrator" may configure rules, Montemurro ¶36, confirming the benefits described in Freund and the routine nature of incorporating such structure. And in view of Freund's detailed teachings, a POSA would have had a reasonable expectation of success.

f. [1.5] one or more processors configured to

164. Rao-Montemurro-Freund discloses this limitation.

165. Each reference relies on processors to execute policy-related software. *E.g.*, Rao ¶¶118-20, Figs. 1D, 1E; Montemurro ¶¶34, 55-59; Freund, 7:32-61, Fig. 1. As I noted, *supra* §VIII, processors were well known, and a POSA would have accordingly been motivated to rely on such a well-known processor for the functions described in Limitations [1.5.1], [1.5.2], and [1.6] in Rao-Montemurro-Freund.

- g. [1.5.1] classify a wireless network to which the device currently connects in order to communicate data for Internet service activities as at least one of a plurality of network types that the device can connect with,**

166. Rao-Montemurro-Freund teaches this limitation.

167. Montemurro describes a “routing table” that “updates according to which interfaces 208 are available.” Montemurro ¶30. As I explained, a POSA would have understood Montemurro to disclose and would implement these interfaces as modems. *Supra* §VIII.C; [1.1], [1.2] (explaining Rao-Montemurro-Freund includes both WLAN and a WWAN modems to facilitate internet access over multiple network types).

168. A POSITA would have understood Montemurro’s “routing table” updates based on which networks (e.g., WLAN and a WWAN) are available in view of “real-time conditions” (e.g., network availability). Montemurro, Abstract, ¶¶3, 30, 35, 45, 49. Montemurro teaches that the routing table “updates according to which interfaces 208 [e.g., WWAN and WLAN modems] are available,” *id.* ¶30, and that “if both the WLAN and WWAN radios . . . of device 102 are connected to their respective networks 104 and 106, there will be a route associated with each network 104 and 106 that would look like:”

Source IP	Destination IP	Device Interface (208)
192.168.1.20	0.0.0.0	WLAN (208A)
67.69.20.142	0.0.0.0	WWAN (208C)

Id. ¶30; *see also id.* ¶¶40-42, Figs. 2, 3. Montemurro teaches that the table “has a respective entry corresponding to each application connection.” *Id.* ¶31.

169. The routing table accordingly provides information regarding each wireless network to which the device currently connects—the device is actively connected to the network(s) through its interface(s) (modem). *Id.* ¶¶30-31. And because the table reflects the source and destination IP address and Montemurro discloses that there is an active communication route associated with each network listed in the table, a POSA would have understood each network is available to communicate data for internet service activities. *Id.* ¶¶30-32.

170. Further, because Montemurro identifies the specific available networks in the routing table by type (e.g., as WLAN or WWAN based on the specific interface used to connect to that network), a POSA would have understood Montemurro to classify the wireless network as at least one of a plurality of network types that the device can connect with.

171. Accordingly, a POSA would have understood that when Montemurro’s interfaces are “connected to their respective networks” (e.g.,

WWAN and WLAN), the wireless network is one to which the device currently connects in order to communicate data (*e.g.*, packets) for internet service activities. And by classifying the network based on the interface it uses (*e.g.*, WLAN modem or WWAN modem), Montemurro classifies the network as “at least one of the plurality of types that the device can connect with,” as the device is a multi-mode device capable of connecting to one of a multiple networks, as explained in [1.1], [1.2].

172. A POSA would have been motivated to incorporate these teachings into Rao-Montemurro-Freund. Montemurro teaches the benefits of a multimode operation that applies a policy specific to a network type (*e.g.*, permitting certain activities on some network types and not others). *E.g.*, Montemurro, Abstract, ¶¶4, 11, 14, 29; *supra* §§VIII.C, IX.A.1.

173. A POSA would have understood that classifying the available wireless networks to which the device currently connects by type, as Montemurro suggests, is a predicate to implementing the multimode functionality Montemurro touts, as Montemurro explains. *E.g.*, Montemurro ¶¶11, 30-35. Implementing this classification, as taught by Montemurro, in Rao-Montemurro-Freund would have required only ordinary skill.

- h. [1.5.2] classify whether a particular application capable of both interacting with the user in a user interface foreground of the device, and at least some Internet service activities when not interacting with the user in the device user interface foreground, is interacting with the user in the device user interface foreground, and**

174. Rao-Montemurro-Freund teaches this limitation.

175. Rao and Freund both explain that an application may operate in the foreground or the background of a user device.

176. For example, Rao describes “foreground” applications currently in active use by the user” and those providing “interactive user session[s] ... such as video, voice, chat.” Rao, ¶¶3, 133, 140; *see also id.* ¶¶88, 91-92. As Rao teaches, these applications are thus capable of “interacting with the user in a user foreground of the device,” as the claim recites.

177. These applications are also capable of internet service activities (e.g., sending and receiving network packets) when not interacting in the device display with the user. Rao, for example, considers whether these applications are currently “running in the foreground or the background” as part of applying its policy. *E.g., id.* ¶¶182, 188. That Rao considers this factor, a POSA would have understood, shows that its applications may be operating in either the foreground or the background, because Rao considers the current application operation.

178. Freund likewise teaches that an application may be interacting in the user interface foreground of the device or the same application may be engaging in internet activity when not interacting with the user in the device foreground. Freund, 10:16-43. For example, an email application may be “active” and interacting with the user in the user interface foreground when the user is typing an email but may also be “intermittently poll[ing] an Internet-based mail server,” a background activity, as Freund explains. *Id.*

179. Both Rao and Freund also teach that it is advantageous to classify whether a particular application (and its associated internet use) is interacting with the user in the device interface foreground. Rao teaches that its remote access client may “determine whether the application 338a-338n associated with [a] network packet is running in the foreground or the background of the client” and suggests applying the differential policy based on “whether an application is running in the foreground or the background of the client.” Rao ¶¶182, 188. For example, Rao may deprioritize background activity compared to real-time (e.g., VoIP) communication to avoid “increasing the latency and reducing the quality of the voice communication.” *See e.g., id.* ¶3. Freund similarly teaches examining each application to “determin[e] whether it is ‘active’ by determining whether the application receives ‘focus’ and/or receives user input (e.g., mouse clicks or key

strokes).” Freund, 10:16-43. Freund discloses that making this determination facilitates rules limiting an employee’s “counterproductive Web browsing.” *Id.*

180. In my opinion, in view of Rao’s and Freund’s teachings, a POSA would have been motivated to classify whether a particular application was interacting in the device user interface foreground in Rao-Montemurro-Freund to facilitate the background/foreground-specific rules allowing or denying particular packets’ transmission as the references suggest. *Supra* §IX.A.1.

181. Montemurro’s disclosures are not contrary. Its policies are expressly nonexclusive, *see, e.g.*, Montemurro ¶29 (listing possible policy considerations “among others”), and Montemurro aims to optimize communications using a policy-based mechanism, a goal furthered by incorporating Rao’s and Freund’s teachings, *see, e.g., id.*, abstract. Facilitating background/foreground-specific rules helps to optimize network communications by allocating bandwidth (which may be scarce), *supra* §§ VIII, IX.A.1, to in-use applications where appropriate and by allowing the system to limit unproductive active use where appropriate (which likewise helps to minimize costs and allocate bandwidth effectively). Moreover, a POSA would have reasonably expected success in implementing this aspect of the combined system, as both Rao and Freund teach systems implementing this aspect.

- i. **[1.6] selectively allow or deny one or more Internet service activities by or on behalf of the particular application based on whether or not the particular application is one of the first one or more applications, the differential traffic control policy, including any applicable user augmentation of the differential traffic control policy, and the classifications performed by the one or more processors.**

182. Rao-Montemurro-Freund teaches this limitation.

- a. **First, Rao-Montemurro-Freund teaches “selectively allow[ing] or deny[ing] one or more internet activities by or on behalf of [a] particular application.”**

183. As I discuss above, each of the references suggests allowing/denying internet activities by particular applications. *Supra* §VIII.

184. Rao, for example, teaches that based on its policy, the system may “discard network packets” (internet service activities), particularly during a network disruption, while queueing other packets to be transmitted. Rao ¶207; *id.* ¶¶102-05 (describing decision to “drop” or “accept” packets).

185. A POSA would have understood that discarded packets are “denied” (e.g., because they are never sent) and packets queued and transmitted are “allowed” (e.g., because they are sent). Rao “selectively” denies and allows because the policies “determine which network packets to queue and/or discard. For example, a network packet of a first application 338a may be queued while a network packet of a second application 338n is discarded.” Rao ¶207; *see also*

EX-1010, 1 (conceding Rao may discard packets after establishment of internet service).

186. In addition, Rao further teaches deprioritizing some packets while immediately allowing others, *e.g.*, Rao ¶¶38-40, 43, 180-88, and a POSA would have understood this de-prioritization is at least a temporary denial because packets are prevented from accessing network resources while higher-priority packets are being transmitted. While temporarily denying the lower-priority packets, Rao is selectively allowing the transmission of the higher-priority packets.

187. Montemurro similarly teaches denying internet service activities if a particular network is not available. Montemurro ¶29. Montemurro gives an example in which its rules engine “configures the communication operations with a set of rules/policies,” and under the policies a “CRM application” “*only* synchronizes a sales contact database *over a WLAN network 106.*” *Id.*

188. Similarly, Freund teaches that when its rules are violated (*e.g.*, through overuse of an application), its system “den[ies] internet access.” *E.g.*, Freund, 13:13-22. Freund further teaches that denying access (blocking) may be advantageous “when network traffic is already congested.” *Id.*, 27:9-14, Fig. 14.

189. In view of the references’ teachings, a POSA would have been motivated to selectively deny and allow internet service activities. As the references teach, including the option to selectively deny is beneficial at least when

there is congestion (as disclosed by Rao and Freund) or when no option to complete the activity in compliance with the applicable policy currently exists (as suggested by Montemurro and Freund).

190. A POSA would have similarly recognized that selectively allowing internet service activities in conformance with the policy facilitates high-quality communications in Rao-Montemurro-Freund by allocating resources, which a POSA would have recognized are not unlimited, to the selectively allowed activities under the policy and not the selectively denied activities. *Supra* §§VIII, IX.A.1. This implementation would have required only routine skill as reflected by the references' teachings, discussed above. *See, e.g.*, Rao ¶¶ 38-40, 43, 180-88, 207; Montemurro ¶29; Freund, 13:13-22, 27:9-14, Fig. 14.

b. Second, Rao-Montemurro-Freund teaches that the decision to selectively allow or deny is based on whether the particular application is one of the first one or more applications.

191. As explained, *supra* [1.4], the combined system applies an application-specific differential traffic control policy and allows augmentation of the differential traffic control policy for the first one or more applications, *see e.g.*, Rao ¶183; Montemurro ¶36; Freund, 2:2-14, 4:24-26, 8:10-12, 8:48-52, 9:54-63, 16:25-29, 23:65-27:50, Figs. 7A, 7D, 7H-7K; *see generally* Freund, 9:22-11:27; Pearce ¶68; Wright ¶¶78, 229. A POSA would have understood that the decision to

selectively allow or deny internet service activity is based in part on any augmentations and is accordingly based in part on whether the particular application is one of the first one or more applications. The augmentations are user-based modifications to the traffic control policy, and basing the decision to allow or deny Internet service activities would ensure it matches the user's instructions on how the policy should be implemented.

c. Third, Rao-Montemurro-Freund teaches that the decision to selectively allow or deny is further based on the differential traffic control policy, including any applicable user augmentation of the differential traffic control policy.

192. As explained, *supra* [1.3.2], [1.4], Rao-Montemurro-Freund describes a differential traffic control policy that acts to prioritize/allow/deny particular packets based on the policy, which a user may augment in some circumstances, *see e.g.*, Rao ¶¶3, 87-88, 99, 102-06, 114-17, 124, 179, 182-84, 188, 190-93, 207, Figs. 1C, 5A; Montemurro ¶¶4, 27, 29, 32-34, 36; Freund, 2:2-14, 4:24-26, 8:10-12, 8:48-52, 9:54-63, 12:66-13:43, 16:25-29, 23:65-27:50, Figs. 7A, 7D, 7H-7K; *see generally* Freund, 9:22-11:27; Pearce ¶¶4-5, 54, 68, claim 6; Wright ¶¶78, 229. For the reasons I explain above in my discussion of these limitations and of the “selectively allow or deny” aspect of the instant limitation, the policy underpins the decision to selectively allow or deny an activity.

d. And fourth, Rao-Montemurro-Freund teaches that the decision to selectively allow or deny is further based on the classifications of [1.5.1] and [1.5.2] (e.g., the network type and whether an application is interacting with the user in the device user interface foreground).

193. As explained, *supra* [1.5.1], Rao-Montemurro-Freund teaches multimode operation, in which particular internet service activities are allowed or denied based on what network the device is using. For example, as explained above, Rao-Montemurro-Freund may selectively deny internet service activities if a particular network is not available. *See, e.g., supra* [1.5.1]; *see also* Montemurro ¶¶11, 29.

194. A POSA would have understood that allowing or denying an internet service activity based on the network type is selectively allowing or denying that activity based on the network classification, as this prohibits certain communications from occurring when certain networks are unavailable. *Supra* [1.5.1]; Montemurro ¶29.

195. Similarly, as explained, *supra* [1.5.2], Rao-Montemurro-Freund teaches selectively allowing or denying an internet service activity based on whether the associated application is interacting with the user in the user interface foreground, which a POSA would have understood is selectively allowing or denying that activity based on the classification because internet service activities

associated with certain applications are selectively denied based on the application's foreground status. *Supra* [1.5.2].

196. A POSA would have been motivated to base the selective allowance or denial of an internet service activity on both these considerations. All three references invite a POSA to apply a multi-faceted policy. *E.g.*, Rao ¶¶182-84 (describing “one or more policies 520 for specifying client-side prioritization of network communications related to applications 338a-338n running on application”), 187-94; Montemurro ¶29 (describing configuring “the communication operations with a set of rules/policies that could include various factors”); Freund, 4:8-28 (describing numerous criteria and qualifications for the “access rules”), 13:2-22, 23:65-27:49; *supra* §VIII. And as explained above, a POSA would have been motivated to do so in order to offer a rich policy with improved performance, lower cost, and customizability. *Supra* §IX.A.1. And in view of the references' disclosures, a POSA would have reasonably expected success in implementing this aspect of Rao-Montemurro-Freund.

197. A POSA would have understood that these criteria could be implemented as part of a logic triggering different policies based on, e.g., the network type to which the device is connected, or could be implemented as a single multi-faceted policy. For example, the network type can be a criterion in a policy using the following logic rules:

- (1) If network_type=WWAN (and optionally more criteria), then [action];
- (2) If network_type=WLAN (and optionally more criteria), then [action].

198. Alternatively, policy rules can be grouped conditionally, such that once a first classification is made, a different “policy” applies:

- (1) If network_type=WLAN then
 - (1A) if (additional criteria) then [action]
- (2) If network_type=WLAN then
 - (2A) if (additional criteria) then [action]

199. Either approach would have been straightforward and routine for a POSA to have implemented using only ordinary skill in the art and would have achieved the desired ability to selectively allow or deny based on multiple considerations. *See e.g.*, Rao ¶182 (noting “hierarchical” and “conditional” policies). For example, under either logic certain communications may only be allowed when the “network_type “is WLAN, *see e.g.*, Montemurro ¶29, whether based on that factor alone or based on both that criteria and additional criteria.

3. Claims 2-5

200. As I explain above, claim 1 requires that the decision to allow or deny an internet service activity be based on (1) whether its associated application is one of the first one or more applications, (2) the differential traffic control policy (and any applicable augmentation), (3) the classification of the wireless network, and

(4) the classification of whether the application is interacting with the user in the device user interface foreground. *Supra* [1.6].

201. A POSA would have understood that claims 2-5 recite permutations of these elements. I have been advised and understand that selecting one particular example from the limited number of different known permutations does not impart patentability.

202. In my opinion, a POSA would have found these permutations obvious for at the least the reasons discussed in connection with claim 1. I note that, based on my review of the '613 patent, the patent does not describe any particular advantage of using the four claimed criteria recited in claim 1 to make the decision to allow or deny internet service activity, much less any benefits to using any specific permutations of those criteria, including those specifically recited in claims 2-5.

a. Claim 2: The wireless end-user device of claim 1, wherein based on the differential traffic control policy the one or more processors selectively deny one or more Internet service activities by or on behalf of the particular application when the particular application is one of the first one or more applications, the classified wireless network is a WWAN type, and the particular application is classified as not interacting with the user in the device user interface foreground.

203. Rao-Montemurro-Freund teaches this limitation.

204. As I explained above, the proposed combination discloses selectively denying internet service activities, *supra* [1.6], and thus renders obvious the specific implementation of claim 2.

205. In addition, in my opinion, a POSA would have been motivated to include the ability to deny internet activity for applications based on criteria including, e.g., whether or not the application is one of the first one or more applications, the classified wireless network type, and whether or not the application is classified as interacting with the user in the device user interface foreground in Rao-Montemurro-Freund. *Supra* [1.6]; §IX.A.1.

206. For example, limiting certain applications' (e.g., those not interacting with the user in the device foreground) activities to non-WWAN networks (e.g., selectively denying their internet service activities on WWAN networks), such as cost-effective Wi-Fi networks, would have saved costs without degrading user experience, as suggested by Montemurro and Rao. *See, e.g.*, Montemurro ¶¶4; Pearce ¶¶4-5, 54, 68, claim 6; Wright ¶¶48, 252, 279-285, Figs. 10A-10B; Rao ¶¶3, 80, 184; *supra* §§VIII, IX.A.1. The applications not interacting with the user in the device foreground are background activities (e.g., non-real-time communications) that may be less important to a user and, thus, restricting these applications would have little impact on user experience and would allow reallocation of network resources to improve performance of other, real-time

activities that a user is actively engaging in. Given the general lower immediacy of internet service activities stemming from applications engaged in background activity, a POSA would have recognized the benefits of limiting those applications to more cost-effective networks, such as Wi-Fi networks (e.g., non-WWAN networks), as compared to WWAN networks (e.g., cellular), which a POSA would have recognized as often more costly. *See, e.g.,* Pearce ¶68 (noting costs associated with carrier, e.g., WWAN networks).

207. Freund also discloses that a user can change various criteria of “access rules,” which a POSA would have understood may include adding time-based criteria to permit access over any connection for a period. *See, e.g.,* Freund, 9:54-63 (describing modifying policy to “grant access” for a limited period); *see also id.*, 4:19-28; *see id.*, 8:40-53, 13:13-22, 23:65-27:50. In view of these disclosures, a POSA would have recognized the advantages of allowing the user to augment the rule for applications important to the user’s work or general experience (the “first one or more applications”) as suggested by Freund, so that the user could modify the rule and override the selective denial if needed (e.g., adding a time-based criterion to permit access over any connection for a period). This would increase user control and improve user experience, as it ensures that rules can be modified or overridden for important applications or unusual needs.

208. Based on the references' teachings, a POSA would have reasonably expected success in making the combination. Indeed, Montemurro gives an example of a rule that discloses selectively denying an application's ability to sync with a database when it is connected to a non-WLAN network. Montemurro teaches that a "CRM application" may "*only* synchronize the sales contact database . . . over a WLAN network." Montemurro ¶29.

209. A POSA would have understood that in the combined system, the CRM application may be a first one or more applications that is subject to user augmentation. Freund instructs that users may modify rules relevant to their areas of responsibility at work, *see, e.g.*, Freund, 4:19-28, 8:40-53, 13:13-22, and a POSA would have recognized that access to a contact database is the type of rule the user should be permitted to modify so that the user can access or update the database if needed (overriding the rule).

210. A POSA would have understood that Montemurro's suggested rule selectively denies synchronization when the CRM application is not connected to a WLAN network (e.g., when the classified network is instead a WWAN type network). Montemurro ¶29. And based on Rao and Freund's teachings, a POSA would have understood that synchronization is a background process like "poll[ing] an Internet-based mail server" that occurs passively, when the application is not interacting with the user in the device user interface foreground.

E.g., Rao ¶3; Freund, 10:16-27. A POSA would have recognized that synchronization occurs in the background, as no active user input is generally needed to synchronize and update databases.

- b. **Claim 3: The wireless end-user device of claim 2, wherein the one or more processors are further configured to override the selective denial of one or more Internet service activities by or on behalf of the particular application when the user has augmented the differential traffic control policy so as to indicate that Internet service activities are allowable when the classified wireless network is the WWAN type, and the particular application is classified as not interacting with the user in the device user interface foreground.**

211. Rao-Montemurro-Freund teaches this limitation.

212. As I discuss in connection with claim 2, a POSA would have understood the benefits of allowing the user to augment (*e.g.*, modify to add criteria) the selective denial for certain applications, *e.g.*, by allowing the user to override a selective denial by adding a time-based criteria to permit access over any connection, including a WWAN, for a period. *Supra* claim 2.

213. And as I explain above, a POSA would have understood that Rao-Montemurro-Freund's processors would be configured to apply the augmentation. *Supra* [1.5], [1.6]. Montemurro, as detailed in my claim 2 analysis, provides an example of such a rule, and a POSA would have implemented this limitation in Rao-Montemurro-Freund for the reasons I explained above. *Supra* claim 2.

- c. **Claim 4: The wireless end-user device of claim 2, wherein based on the differential traffic control policy the one or more processors selectively allow one or more Internet service activities by or on behalf of the particular application when the particular application is one of the first one or more applications, the classified wireless network is the WWAN type, and the particular application is classified as interacting with the user in the device user interface foreground.**

214. Rao-Montemurro-Freund teaches this limitation.

215. As I explain above, the proposed combination discloses selectively allowing internet service activities, *supra* [1.6], and thus, in my opinion, renders obvious the specific implementation of claim 4.

216. In addition, in my view, a POSA would have been motivated to include the ability to allow internet activity for applications based on criteria including, e.g., whether or not the application is one of the first one or more applications, the classified wireless network type, and whether or not the application is classified as interacting with the user in the device user interface foreground in Rao-Montemurro-Freund. *Supra* [1.6]; §IX.A.1. It would have benefitted users to allow internet service activities by applications in the set of “first one or more applications” (e.g., those for which the user may augment rules) that are actively interacting with the user in the foreground to occur even on WWAN networks.

217. For example, a POSA would have understood that, as disclosed by Freund, the system allows augmentation for those applications important to the user's work, and, Rao and Freund teach, applications interacting with the user in the device user interface foreground are those with which the user is actively engaged. *E.g.*, Rao ¶¶3, 188-89; Freund, 4:19-28, 8:40-53, 13:13-22.

218. Given those teachings, a POSA would have implemented Rao-Montemurro-Freund to allow internet service activities associated with, *e.g.*, applications important to the user with which the user is actively engaged in order to improve the quality of the user experience by allowing the user's selected activity to go forward. And in view of the references' teachings, a POSA would have reasonably expected success in this implementation. *Supra* [1.6], claim 2.

d. Claim 5: The wireless end-user device of claim 1, wherein based on the differential traffic control policy the one or more processors selectively allow one or more Internet service activities by or on behalf of a second particular application and/or service when the second particular application and/or service is one of the second one or more applications and/or services and the classified wireless network is the WWAN type.

219. Rao-Montemurro-Freund teaches this limitation.

220. As I explain above, the proposed combination discloses selectively allowing internet service activities as discussed, *supra* [1.6], and thus renders obvious the specific implementation of claim 5.

221. In addition, in my opinion, a POSA would have been motivated to include the ability to allow internet activity for applications based on criteria including, e.g., whether or not the application is one of a second one or more applications and the classified wireless network type in Rao-Montemurro-Freund. *Supra* [1.6]; §IX.A.1. Freund teaches that there are applications (e.g., second particular applications) for which internet access should be controlled only at the administrator level. Freund, 27:17-36 (permitting the new rule to be modified “by ... a workgroup ... [or] department supervisor”), Fig. 7I.

222. A POSA would have understood that applications that detect security issues is one example of applications for which control might desirably be limited to an administrator level because allowing any individual user the ability disable such an application’s network access through modification of the policy might jeopardize other users’ or company security.

223. Accordingly, a POSA would have understood that Internet service activities by or on behalf of an application that detects security issues should be allowed under the differential traffic control policy irrespective of the network type, including, e.g., when the classified wireless network is the WWAN type (and not the generally more cost-effective WLAN type). This is consistent with Freund, which emphasizes the importance of network security. Freund, 1:24-30 (noting issue), 12:38-40 (disclosing applications that “detect security or other problems”).

224. In view of these disclosures, in my opinion a POSA would have been motivated to implement this limitation in Rao-Montemurro-Freund and would have reasonably expected success.

- 4. Claim 6: The wireless end-user device of claim 1, wherein the one or more processors are configured to classify that the particular application is interacting with the user in the device user interface foreground when the user of the device is directly interacting with that application or perceiving any benefit from that application.**

225. Rao-Montemurro-Freund teaches this limitation.

226. As I explain above, the processors classify an application based on whether they are interacting with the user in the device user interface foreground or whether they are not interacting with the user in the device user interface foreground. *Supra* [1.5.2]; *see also supra* [1.5], [1.6].

227. Freund teaches making this classification by examining an application and “determin[ing] whether the application receives ‘focus’ and/or receives user input (*e.g.*, mouse clicks or key strokes),” *e.g.*, whether the user is “directly interacting” with the application. Freund, 10:16-43.

228. A POSA would have been motivated to implement Freund’s method in Rao-Montemurro-Freund to facilitate the foreground/background specific policies taught by Rao-Montemurro-Freund. *Supra* [1.6], §IX.A.1. In fact, a POSA would have recognized Freund’s teachings as a conventional way to determine

whether an application is interacting with the user in the device user interface foreground. I note that Freund's teachings are consistent with Rao's, which similarly classify as "foreground" applications those "currently in active use by the user," e.g., "interactive user session[s] ... such as video, voice, chat." Rao ¶¶3, 133, 140, 189. Montemurro's teachings are not contrary. As I explain above, Montemurro encourages additional policy criteria, and facilitating foreground-specific rules supports its goal of optimizing network communications. *Supra* [1.5.2], §§VIII, IX.A.1.

229. Moreover, in view of Rao's and Freund's disclosures, a POSA would have achieved this implementation through routine skill.

5. Claim 7: The wireless end-user device of claim 1, wherein the user interface is further to provide the user of the device with information regarding why the differential traffic control policy is applied to the particular application.

230. Rao-Montemurro-Freund teaches this limitation.

231. As I explain above, Rao-Montemurro-Freund includes a "user interface" to allow a user to augment a policy. *Supra* [1.4].

232. Freund, for example, teaches that the user interface may provide the user with information regarding *why* the differential traffic control policy is applied to an application. As illustrated below, Freund teaches a "warning" or "error dialog" with rule-specific text that appears in the user interface and explains to the

user that “<<appname>> has accessed the Internet . . . in violation of the access policies. The connection . . . will be terminated. Please contact your system administrator if you have any questions.” Freund, Fig. 7G.

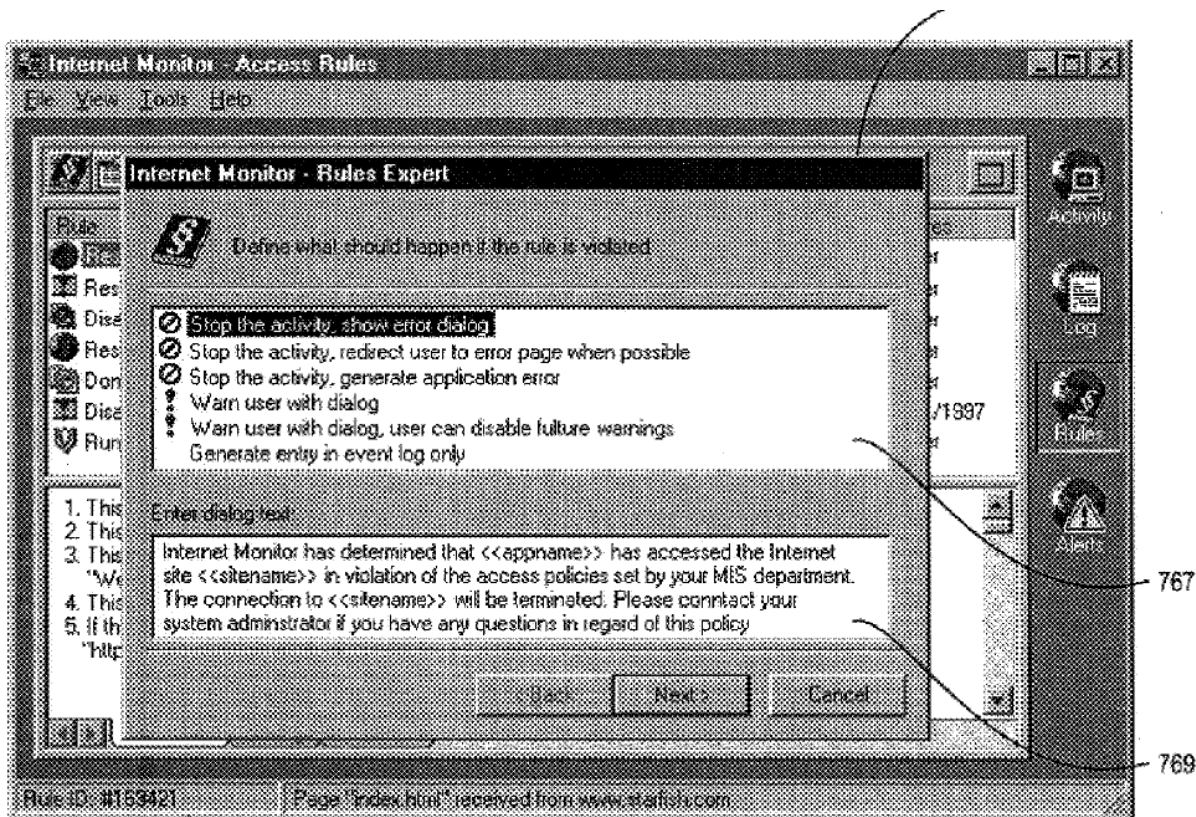


FIG. 7G

Id.; see *id.*, 4:25-27, 12:65-13:23, 26:51-27:3, 29:18-23, 30:12-49, Figs. 13A, 13B.

233. A POSA would have been motivated to include these error messages, as suggested by Freund, in Rao-Montemurro-Freund to make the user aware of why an internet service activity was denied and provide a point of contact for

questions. This would inform the user and enable them to take subsequent action, as desired and allowed (e.g., modify the policy, etc.).

234. A POSA would have understood that absent such a notification, a user might not know why their activity was not working, resulting in unneeded service calls to the network administrator or support team. Freund suggested this was undesirable, *see, e.g., id.*, 9:54-62 (noting intervention of “IS department” to assist with internet access can be time-consuming), and a POSA would have understood this type of uncertainty to be unproductive. A POSA would have recognized that these problems can be mitigated by clearly informing the user of the policy why it has been applied to a particular application. In view of Freund’s suggestion, a POSA at the time of the alleged invention would have reasonably expected success.

6. Claim 8: The wireless end-user device of claim 1, wherein the differential traffic control policy is part of a multimode profile having different policies for different ones of the network types.

235. Rao-Montemurro-Freund teaches this limitation.

236. As I have explained, the combined Rao-Montemurro-Freund system includes modems for different network types and may apply different policies depending on the type of network the device is using. *Supra* [1.1], [1.2], [1.5.1], [1.6].

237. For the reasons I discuss above, a POSA would have understood the traffic control policy of Rao-Montemurro-Freund may be part of a multimode profile having different policies for different ones of the network types.

238. Montemurro describes its device as “multi-mode capable,” noting that “website content can be accessed from a WLAN, WMAN or WWAN ... network[s].” Montemurro, ¶4. Montemurro also explains that it is “desirable to have a mechanism that seeks to optimize communications for multi-mode capable devices” by applying network- and application-specific policies. *Id.* ¶¶4, 11, 34. Montemurro teaches the benefits of varying policy based on the network type to manage quality and cost, *e.g.*, *id.* ¶¶27-29, and gives specific examples, including that prohibiting certain communications from particular applications over non-WLAN networks, *id.* ¶29.

239. Montemurro discloses policy profiles for particular network types (e.g., a “WLAN network profile”). *Id.* ¶27. It explains that an administrator “can create a policy to add a WLAN network profile to a device,” and that the profile may be configured with “security credentials” and other related information. *Id.* It further teaches that the IT Administrator “can also create a policy to disable or enable an application for a user.” *Id.* Montemurro teaches that this profile/policy information is part of its “routing logic,” and a POSA would have understood that the network profile and related policies applicable to each network type can be

considered a “multimode profile.” For example, the non-WLAN network profiles may include rules that restrict “the CRM application” and prevent it from “synchronizing the sales contact database” over a non-WLAN network. *See, e.g., id.* ¶29.

240. In view of these disclosures, a POSA exercising routine skill could and would have included these features in Rao-Montemurro-Freund, including for the reasons discussed above. *See supra* §IX.A.I.

7. Claim 9: The wireless end-user device of claim 8, wherein the one or more processors are further configured to select a traffic control policy from the multimode profile based at least in part on the classified wireless network type.

241. Rao-Montemurro-Freund teaches this limitation.

242. As I discuss above *supra* [1.6], claim 8, Rao-Montemurro-Freund may include different traffic control policies for different network types as part of a multimode profile. And as I explain above, the differential control policy of Rao-Montemurro-Freund can be implemented as part of a logic triggering different policies based on, *e.g.*, the network type to which the device is connected, which traffic control policies would together comprise a multimode profile, or could be implemented as a single multi-faceted policy that simply includes network type as a criterion. *See supra* [1.6].

243. Either implementation would have been well within a POSA's skill and would have achieved the desired solution, and in a multi-policy configuration, Rao-Montemurro-Freund's processor would select an applicable traffic control policy based at least in part on the classified wireless network type.

244. For example, as I explain, policy rules can be grouped conditionally, such that a different traffic control policy (e.g., 1A or 2A below) applies once a first classification is made, here of network type:

(1) If network_type=WLAN then

(1A) if (additional criteria) then [action]

(2) If network_type=WLAN then

(2A) if (additional criteria) then [action]

See also supra [1.5], [1.6].

245. I note that implementing policy selection using Rao-Montemurro-Freund's processor to select from the available policies is consistent with the references' disclosure of processors used to classify and execute policy-related software/rules, *supra* [1.5], [1.6], and a POSA would have had a reasonable expectation of success in light of these disclosures. A POSA would have been motivated to implement Rao-Montemurro-Freund in this way for the reasons discussed in connection with limitation [1.6] and claim 8.

8. **Claim 10: The wireless end-user device of claim 9, wherein the one or more processors are further configured to, when the classified wireless network type is at least one type of WLAN, select the traffic control policy from the multimode profile based at least in part on a type of network connection from the WLAN to the Internet.**

246. Rao-Montemurro-Freund teaches this limitation.

247. Montemurro teaches that there are cost differences between different network connection types. Montemurro, ¶¶3-4. And it was well-known that WLANs could either be free (e.g., a corporate WLAN) or have a cost (e.g., a commercial WLAN hotspot). *See, e.g., supra* §VIII; *see also* EX-1012 (noting free and paid WLAN (Wi-Fi) networks of varying costs at airports). A POSA would have understood that free/paid WLANs are “types” of WLANs. Users access these WLANs in different ways. For example, a free WLAN may be open access, generally available for a user to connect to without payment or authentication (or minimal authentication), and limited bandwidth. By contrast, paid WLANs may have restricted access, are cost-based, and may have higher bandwidth and security features. *See, e.g.,* EX-1012 (ranking airport options and noting variations in cost, bandwidth, and security features in paid and public Wi-Fi networks). Accordingly, a POSA would have understood that free/paid WLANs are “type[s] of network connection[s] from the WLAN to the Internet.”

248. Montemurro suggests selecting a specific traffic control policy based at least in part on whether the WLAN was free or paid, and a POSA would have been motivated to configure the processors to make this selection (in accordance with a processor's normal function) based on these teachings. Montemurro gives examples of varying policy based on network cost. For example, an "MP3 download application . . . runs on the lowest cost network 104 and 106 available." Montemurro ¶29; *see also supra* [1.5], [1.6]. Selecting between free and paid WLAN types also finds support in Montemurro's suggestion to vary policies based on "high/low bandwidth properties," Montemurro ¶29, given the common differences in bandwidth capacity between these network types.

249. In view of Montemurro's suggestions, a POSA would have been motivated to implement these teachings in Rao-Montemurro-Freund to select between free and paid WLANs and would have had a reasonable expectation of success in doing so.

9. Claim 11: The wireless end-user device of claim 1, wherein the plurality of network types include three or more of 2G, 3G, 4G, home, roaming, and WiFi.

250. Rao-Montemurro-Freund teaches this limitation. It implements the ability to connect to multiple network types, including, e.g., WLAN and WWAN networks. *Supra* [1.1], [1.2].

251. Montemurro discloses that using the WLAN interface a device may connect to WiFi. Montemurro ¶11. It further teaches that the WWAN interface includes “GSM/GPRS cellular” as well as “EDGE, UMTS, HSPA, CDMA, WCDMA, etc.” *Id.* ¶¶3-4, 11. A POSA would have understood that e.g., GSM is a “2G” standard. *See* EX-1009 (“GSM: the 2G mobile network Global System for Mobile communications (GSM) is the most popular standard for mobile communications in the world”). And a POSA would have understood that, e.g., UMTS and WCDMA are “3G” standards. EX-1009; EX-1011 at 3:64-4:1 (“3G systems and their evolutions (UMTS/WCDMA with HSDPA enhancements”).

252. Based on Montemurro’s disclosures, a POSA would have understood that Rao-Montemurro-Freund may connect to a plurality of network types, including at least 2G, 3G, and WiFi, and a POSA would have been motivated to implement Rao-Montemurro-Freund to permit (and classify and select among) those connections in order to increase the available network options and corresponding policy options, which would offer further avenues to decrease costs and improve quality, achieving Montemurro’s goals. *E.g.*, Montemurro ¶¶3-4; *supra* §VIII.C. The addition is consistent with Rao and Freund, which contemplate the use of different internet connection types, *e.g.*, Rao ¶95 (contemplating various network connections, including LAN, MAN, WAN); Freund, 1:24-30 (noting

LANs and WANs), and given Montemurro's express suggestion, a POSA would have expected success in this implementation of Rao-Montemurro-Freund.

10. Claim 12: The wireless end-user device of claim 1, the one or more processors further configured to receive an update to at least a portion of the differential traffic control policy list from a network element.

253. Rao-Montemurro-Freund teaches this limitation.

254. It relies on a differential traffic control policy and associated list. *Supra* [1.3.1], [1.3.2]. In view of the references' teachings, it would have been obvious to implement Rao-Montemurro-Freund such that its processor, *supra* [1.5], is configured to receive an update to at least a portion of the list from a network element.

255. As explained, the combined system relies on a processor to retrieve and execute instructions. *Supra* [1.5], [1.6]; *see also, e.g.*, Rao ¶119 (noting that the processor includes "logic circuitry that responds to and processes instructions fetched from the" storage), Montemurro ¶¶56-57 (noting that the processor executes software applications on the device). A POSA would accordingly have been motivated to, and expected success in, using the processor to receive updates, including updates to the differential traffic control policy list as I discuss below.

256. A POSA would have understood that Rao-Montemurro-Freund teaches that its policies, and accordingly, the policy list, may be updated. For

example, Freund teaches a local “rules database” (a policy list) used to “intelligently determine” the action to take with respect to a particular internet service activity. Freund, 21:26-40; *see also id.*, 13:66-14:12, 16:8-29.

257. Freund teaches modifications to its rules as I previously explained, *supra* [1.4], and it considers whether the system rules have “changed since last download,” Freund, 21:26-40. A POSA implementing Rao-Montemurro-Freund would therefore have understood that to effectively manage internet access, the differential control policy and list would need to be kept up to date, and receiving “updates” was known at the alleged time of the invention. *See, e.g.*, Wright ¶61 (describing receipt of security policy updates over a network connection); Pearce ¶¶41-42 (describing policy updates received from central source over network); Montemurro ¶36 (describing provisioning of policies on device “upon an update”).

258. A POSA therefore would have been motivated to apply Freund’s teachings to configure the system processor to receive periodic (or on-demand) updates to the differential traffic control policy list (or at least a portion thereof, for example, related to high-priority changes). As already noted, this implementation is consistent with, e.g., Montemurro, which explains that rules may be transferred to the device “upon an update,” Montemurro ¶36. Rao’s disclosures are not contrary. It teaches that policies may be “downloaded via the gateway 340,” and further teaches that its policies are configurable. Rao ¶183. A POSA would

therefore have understood Rao to contemplate changes in policies and thus updates to policies, including over the network via the gateway. In my opinion, given these disclosures, a POSA would accordingly have had a reasonable expectation of success as evidenced by the references' disclosures.

259. For similar reasons, Rao-Montemurro-Freund also renders obvious providing the update via a network element. All three references instruct that policy information may be provided by a network element. As noted, Rao describes that “policies 520 may be provided by or downloaded via the gateway 340,” a network element. Rao ¶¶97, 183. And Montemurro similarly teaches that rules (policy) may be “configured off-device” and “transferred to the device via a communications interface” including “upon an update or other event.” Montemurro ¶36. A POSA would have understood this type of off-device update to be from a network element (e.g., via a server, which is consistent with the '613 patent's discussion of network elements, *e.g.*, EX-1001, 11:38-42, 21:63-67). Freund similarly teaches downloading policy rules from the supervisor module (which, a POSA would have recognized, is a network element, *e.g.*, based on Freund's discussion of downloading applicable rules from this element in its “internet-based” system). Freund, 21:21-40.

260. A POSA accordingly would have been motivated to provide updates to the differential control policy list via a network element, in view of the

references' disclosures. A POSA would have understood that doing so would have been efficient, for example, in updating policies applicable to multiple devices, as suggested by Freund. *See, e.g.,* Freund, 4:19-29 (explaining rules may be applicable to multiple users or workgroups), 9:4-9 (same), 10:5-15 (same), 12:54-61 (describing rules for "one or more workgroups, or individual users"), 21:28-40 (noting that each client downloads policies applicable to it). The references' endorsement of providing policy information via the network element confirms that a POSA would have needed only ordinary skill for this implementation.

11. Claim 13: The wireless end-user device of claim 1, wherein the plurality of network types include a roaming WWAN type and a home WWAN type, and the one or more processors are to apply the differential traffic control policy to one of but not both of the roaming WWAN type and the home WWAN type.

261. Rao-Montemurro-Freund teaches this limitation.

262. For example, Montemurro teaches that a device may choose among "multiple available cellular networks from different cellular service providers." Montemurro, ¶62. Montemurro, a POSA would have understood, uses "cellular" and "WWAN" synonymously, *e.g., id.*, Fig. 2.

263. A POSA at the time of the alleged invention would have understood that when using cellular networks, the user may use their "home" network (*e.g.,* the network provided by the user's cellular carrier) or a "roaming" network (*e.g.,* a

network not provided by the carrier). At the time of the alleged invention, cellular carriers regularly imposed additional charges for “roaming,” and Montemurro teaches that different rules (e.g., differential traffic control policy) may apply based on whether the network is “roaming,” which, a POSA would have understood, would help to minimize the costs associated with roaming. Montemurro ¶29; (“Rules engine 206A configures the communication operations with a set of rules/policies that could include various factors such as ... network roaming”); Pearce ¶¶4-5 (noting that a mobile electronic device (MED) “has a designated “home” region served by a “home” wireless carrier. All other regions are roaming regions”), 54 (describing policy and noting “a policy that limits communications according to carrier could be desired for a number of reasons, such as reducing or controlling roaming charges”), 68 (noting differences in costs between wireless carriers and across different times of day); Wright, Fig. 4B, ¶175.

264. Montemurro therefore suggests applying differential traffic control policy to, for example, the roaming WWAN and not the home WWAN, which would have resulted in cost savings by minimizing roaming charges. Montemurro ¶4 (“There are costs associated with application access from these different networks.”).

265. A POSA would have been motivated to apply Montemurro’s teachings in Rao-Montemurro-Freund to achieve these cost savings and avoid

roaming charges. A POSA would have recognized that, consistent with the references' teachings, the processor would apply the differential traffic control policy, *supra* [1.5], [1.6], and a POSA would have had a reasonable expectation of success in view of Montemurro's suggestions to do so.

12. Claim 14: The wireless end-user device of claim 1, wherein the plurality of network types include the WWAN type and a WLAN type, and the one or more processors are to apply the differential traffic control policy to one of but not both of the WWAN type and the WLAN type.

266. Rao-Montemurro-Freund teaches this limitation.

267. As I described above, Rao-Montemurro-Freund teaches connections to a plurality of network types, including WWAN and WLAN. *Supra* [1.1], [1.2]. It likewise includes a processor, which would apply the differential traffic control policy, *supra* [1.5], [1.6].

268. A POSA would have understood that Rao-Montemurro-Freund further teaches applying the differential control policy to WWAN type networks and not WLAN type networks. As explained, Montemurro gives an express example of selectively denying internet service activities (through application of the differential traffic control policy) of an application on a WWAN network. *Supra* [1.6], claim 2; *see* Montemurro ¶29 (denying internet service activities if the WLAN network is not available). And as explained, a POSA would have been motivated to implement these teachings in Rao-Montemurro-Freund to avoid costs

associated with WWAN (e.g., cellular) networks. *Supra* [1.6], claim 2; *see* Montemurro ¶4.

269. A POSA would have understood that Montemurro's teachings could readily be implemented by applying the differential traffic control policy to WWAN type and not WLAN type networks, as Montemurro provides an express example of doing this. *See* Montemurro ¶29. I note that this implementation is consistent with the teachings of Rao, which contemplates filtering (e.g., applying differential control policy) some networks but not others. *See, e.g.,* Rao ¶104 ("The configuration settings may include information regarding which networks, protocols, or types of packets to filter."). The references' teachings evidence that a POSA would have expected success in implementing Rao-Montemurro-Freund in this way. *See also supra* claim 2.

13. Claim 16: The wireless end-user device of claim 1, wherein the one or more processors are further configured to dynamically change the application of the differential traffic control policy based on a device usage state.

270. Rao-Montemurro-Freund teaches this limitation.

271. As I described above, its processor, *supra* [1.5], [1.6], applies the differential traffic control policy. And, it is my opinion that a POSA would have understood that Rao-Montemurro-Freund teaches dynamically changing application of the differential control policy based on a device usage state.

272. As I discussed above, *supra* [1.3.2], [1.6], the Rao-Montemurro-Freund traffic control policy may be based on a “multitude” of defined priorities.

273. Rao-Montemurro-Freund discloses that the policy may be based on a network type accessed. *Supra* [1.6]. In my view, a POSA would have understood the type of network accessed is a device usage state. Whether a device is connected to a network, and the particular network to which the device connects, influences the device’s capabilities. For example, if the device has *no* network connection, its applications cannot conduct internet service activities and if the device has only a limited network connection (e.g., because it is connected to a low-quality “roaming” network), it may only be able to conduct a restricted set of internet service activities. *See, e.g.*, Montemurro ¶29 (accounting for roaming); Pearce ¶4 (“The characteristics of services provided when a MED accesses a network through its home region, as opposed to through a roaming region. Such service differences can include reduced connection security, reduced availability of certain types of communications such as bandwidth for data communications, and increased connection fees known as roaming charges.”).

274. A POSA would accordingly have understood the type of network to which the device is connected (e.g., WLAN, WWAN, roaming, etc.) to be a device usage state, and as I explained above, Rao-Montemurro-Freund discloses changing

the application of the policy based on network type. *See supra* [1.6]; *see also supra*, e.g., claims 8-10, 13, 14.

275. Rao also, in my opinion, discloses this limitation, and a POSA would have been motivated to implement these teachings in Rao-Montemurro-Freund. Rao discloses that the policy may be based on whether the application is running in the foreground or other characteristics of the application, including “total execution time,” which a POSA would have understood to mean the total time an application takes to execute a process or task (sometimes referred to as the application “run time”). Rao ¶¶188-89.

276. Thus, a POSA would have understood that these criteria reflect the “device usage state” because they reflect device use. For example, as Rao explains, an application in the interface foreground is in active use, meaning that the user is interacting with the application and the device is in active use. Rao ¶3; *see also* Freund, 3:12-16. And the application’s execution time reflects whether the application (and accordingly the device) is in active use by providing data on whether an application is completing a task (which may be coupled with other criteria, such as whether that application is acting in the device foreground).

277. A POSA would have understood that the device’s usage state would change, and the Rao-Montemurro-Freund traffic control policy would obviously change with it. For example, where the policy prioritized “real-time” data

communications in the device foreground (a policy criteria based on the device usage state), application of the policy would change dynamically as a user held a VOIP conversation (where the packets associated with the application would receive high priority) and then completed the call and left her device idle and was no longer giving the VOIP app focus (when the same application's packets might receive lowest priority behind other background activities). Thus, application of the policy would dynamically change as the device usage state changes (e.g., from engaging in a VOIP conversation to terminating the conversation). A POSA would have been motivated to implement the Rao-Montemurro-Freund policy in this way to flexibly respond to “change[s] to real-time conditions” and facilitate optimization of communications, as suggested by the references. Montemurro, Abstract, ¶2. A POSA would have been able to implement this feature of Rao-Montemurro-Freund through routine skill.

14. Claim 18: The wireless end-user device of claim 1, wherein the differential traffic control policy defines that the first one or more applications can only access a first one of the network types during particular time windows.

278. Rao-Montemurro-Freund teaches this limitation.

279. As I explained above, *e.g.*, *supra* claim 2, it teaches generally denying access to a WWAN type network by the first one or more applications but permitting the user to override the selective denial. For example, a user may

augment the applicable denial rule to allow internet access during a particular time window.

280. Further, as I explained above, *supra* claim 2, and also below in connection with claim 23, in my opinion, a POSA would have understood that it would have been beneficial to permit the user to augment the policy to permit access during particular time windows, and would have had a reasonable expectation of success. *See* claims 2, 23; *see also* Pearce ¶¶68 (“In another variation, different criteria other than location of device 58 can be used for enabling, disabling or otherwise varying the communication capabilities of device 58. For example, time can be used as a determinant of communication capabilities. Accordingly, device 58 and certain applications performing on device 58, such as e-mail, could be allowed to communicate during certain periods of time such as daytime, and certain other applications, such as voice calls, could be able to communicate during other time periods such as night time. These policies can be designed, for example, to take advantage of periods during which certain services are offered at reduced costs by wireless carriers. Thus, office 62 can set up a policy database 118 which allows voice calls only during evenings and weekends when voice calls are cheaper.”); Montemurro ¶¶11 (“Policies may be responsive to various factors such as ... time of day”), 29 (“policies could include various factors such as . . . time of day”), 35 (“On a state change (for example, based on a time of

day . . .) rules engineer 206A executes and modifies, as applicable, the routing table 210 to ensure that the data goes out [to] the most appropriate network (via respective interfaces 208)”), 39-42 (describing application of “time-based rule”), Figs. 3-4.

15. Claim 19: The wireless end-user device of claim 1, wherein the one or more processors are configured to classify that the particular application is interacting with the user in the device user interface foreground based on a state of user interface priority for the application.

281. Rao-Montemurro-Freund teaches this limitation.

282. As I described above, its processor classifies whether a particular application is interacting with the user in the device user interface foreground. *Supra* [1.5], [1.5.2], [1.6]. Freund’s classification is based on “whether the application receives ‘focus’ and/or receives user input (e.g., mouse clicks or key strokes).” Freund, 10:16-43.

283. A POSA would have known that users interact with foreground applications and would further have known that the application in the highest interface priority (e.g., the application the user is viewing) is the application receiving user focus or user input. A POSA would thus have understood, per Freund’s teachings, that the application interacting with the user in the device interface foreground is the application in the highest interface priority, because

such applications are the applications receiving user focus/input. *See, e.g.*, Freund, 10:16-43.

284. Therefore, in my opinion, based on Freund's teachings, a POSA would have been motivated to classify the application as interacting with the user in the device user interface based on a state of user interface priority for the application. Indeed, in my opinion, a POSA would have recognized this approach as one of a finite number of predictable approaches available to classify whether an application is interacting with the user in the device interface foreground as suggested by Rao and Freund, and a POSA would have been motivated to implement this approach and would have reasonably expected success as discussed above. *Supra* [1.5.2].

16. Claim 20: The wireless end-user device of claim 1, wherein the second one or more applications are not subject to a differential network access control that is applicable to the first one or more applications.

285. Rao-Montemurro-Freund teaches this limitation.

286. As I explained above, *supra* [1.3.2], Rao-Montemurro-Freund teaches "application-specific" network traffic control policies including policies applicable to a first one or more application and not a second one or more applications.

287. Where the first one or more applications is subject to different controls than the second one or more applications, that controls applicable to the first application(s) may not be applicable to the second application(s).

288. As discussed, Freund gives examples of such scenarios, teaching that particular applications may be permitted to access the internet while others are blocked. Freund, 24:1-15 (“For instance, an administrator can establish a rule allowing users to only access a limited number of approved sites. On the other hand, the administrator can set a rule blocking user access to particular sites”). As another example, applications approved by a system administrator might be exempt from certain policy controls. *Id.*; *see also id.*, 11:1-9 (describing approved applications and benefits of using approved applications with greater access privileges).

289. Accordingly, in my opinion, a POSA would have been motivated to implement application-specific control policies such that the second one or more applications are not subject to differential network access control applicable to the first one or more applications, and a POSA would have reasonably expected success. *Supra* [1.3.2]. A POSA would have understood that implementing application-specific differential network access control (including by permitting controls applicable to only some, e.g., “first” applications) would beneficially

allow a “rich” control policy in Freund Rao-Montemurro-Freund, which would have been desirable as discussed above. *Supra* §§VIII, IX.A.1.

17. Claim 21: The wireless end-user device of claim 1, wherein the one or more processors are further configured to classify between: user applications; system applications, utilities, functions, or processes; and operating system application, utilities, functions, or processes.

290. Rao-Montemurro-Freund teaches this limitation.

291. A POSA would have recognized that each of Rao, Montemurro, and Freund describes system applications, user applications, and operating systems. *E.g.*, Rao ¶¶99 (describing operating system with “user mode 332, also referred to as an application or user space and kernel-mode 334, which may be also referred to as the kernel or system level space”), 179 (describing applications “provid[ing] email, collaboration, online meeting, and/or desktop sharing related services or functionality”); Montemurro ¶¶56-57 (describing operating system, “predetermined set of applications that control basic device operations,” *e.g.*, system applications, and user applications); Freund, Fig. 2, 7:54-8:38 (describing system including user “client application software,” a “windows shell,” and an operating system).

292. A POSA would have understood that an **operating system** in Rao-Montemurro-Freund executes system and user level applications, as taught and suggested by Freund. *E.g.*, Freund, 7:64-8:10. A POSA would have further

understood that **system applications** would include, for example Freund's "windows shell," as well as basic firmware and software, such as the "predetermined set of applications that control basic device operations, including at least data and voice communications applications," described in Montemurro. *See id.*; Montemurro ¶¶56-57. A POSA would have understood that **user applications** would include applications such as email clients or other user-facing programs. *See, e.g.,* Rao ¶¶86-89, 179; Montemurro ¶¶57-58; Freund, 7:64-8:10, 20:18-42.

293. In view of this architecture, which a POSA would have adopted as part of Rao-Montemurro-Freund given the teachings of Rao, Montemurro, and Freund, a POSA would have been motivated to implement Rao-Montemurro-Freund such that the processor classifies between the user, system, and operating system applications. Doing so, a POSA would have known, would ensure each class received the appropriate access to resources and to apply a hierarchy of applications. *See also, e.g., supra* [1.5], [1.6].

294. For example, operating systems generally have the highest privileges and priorities so as to be able to manage the operation of the device as a whole as well as individual applications under the operating system. *See, e.g.,* Rao, ¶¶99, 128; Freund, 7:64-8:10. System applications generally (but not always) may have more privileges and permissions than user applications to manage specific aspects of the device—such as device drivers, interrupt handlers, or memory management

software. These system applications generally are more “trusted” because they may be integrated with, or provided with, the operating systems. *See, e.g.*, Montemurro ¶¶56-57. And in many situations, user applications have the lowest privileges / permissions (a) to prevent those applications from intentionally or inadvertently using resources, such as memory, allocated to other applications; and (b) because such user applications may be installed by end-users and are therefore often not as “trusted.” *See, e.g.*, Rao ¶¶86-89, 179; Montemurro ¶¶57-58; Freund, 7:64-8:10, 20:18-42.

295. Accordingly, a POSA would have been motivated to and would have expected success in making this classification, which would have required only routine skill.

296. Further, to the extent the claim requires the “selectively allow or deny” be based on this classification, *supra* [1.6], in my opinion, Rao-Montemurro-Freund renders this limitation obvious.

297. For example, Rao teaches both user-mode and kernel-mode (e.g., in connection with user and system applications). Rao ¶99 (“the system includes a computing device 102 (herein also referred to as a client 105) having an operating system that includes a user mode 332, also referred to as an application or user space, and a kernel-mode 334, which may be also referred to as the kernel or

system level space.”). Rao further teaches an operating system and explains its importance.

298. Consistent with my discussion above, Rao explains that an operating system “control[s] scheduling of tasks and access to system resources.” *Id.* ¶128; *see id.* ¶99. Montemurro similarly explains that its device relies on an operating system, *e.g.*, Montemurro ¶55, and includes both user applications and a “predetermined set of applications that control basic device operations, including at least data and voice communications applications,” *id.* ¶¶56-57. A POSA would understand applications that control basic device operations to be system applications. And Freund illustrates an operating system on which user applications (*e.g.*, email clients) and system applications (*e.g.*, a “windows shell”) execute. *See, e.g.*, Freund, 7:62-8:10, Fig. 2.

299. As I discuss above, a POSA would have understood the differing importance of operating systems and system and user applications to the operation of the user device and been motivated to prioritize demand for internet access based on that importance. For example, given the relative importance of an operating system, a POSA would have generally viewed an operating system update to be of greater importance than a network communication by a system application (*e.g.*, a compiler or file management software) or a user application (*e.g.*, a game).

300. In my opinion, a POSA would have been motivated to make the classification and decide to selectively allow or deny the internet service activity based, at least in part, on the classification of the associated application as, e.g., a system or user application or as an operating system application. A POSA would have done so in order to allow the policy to account for the relative importance of the activity to the operation of the device as a whole (rather than only a particular user application), and a POSA would have had a reasonable expectation of success in implementing Rao-Montemurro-Freund in this way based on the references' suggestion of multi-faceted policies, *supra* [1.6].

18. Claim 22: The wireless end-user device of claim 1, wherein the second one or more applications or services comprises foreground services.

301. Rao-Montemurro-Freund teaches this limitation.

302. Its applications, including “second one or more applications,” may run in the device foreground, and as I explained above, may thus comprise foreground services. *Supra* [1.3], [1.5.2].

303. In my opinion, a POSA would have understood that at least some of the second one or more applications (for which the user may not augment a policy) may be foreground services.

304. I note that Freund discloses one such example, explaining that an end-user can be prevented from modifying a policy restricting “counterproductive”

personal web browsing. Freund, 10:16-43 (“Accordingly, it is desirable to monitor the time an employee spends “actively” interacting with the Internet, so that management goals of controlling counterproductive Web browsing can be realized.”); *see also id.*, 8:54-62 (“The system “should preferably prevent users from circumvention Internet access rules”). As a POSA would have understood, personal web browsing is a foreground service—the user is interacting with the browser in the device’s user interface foreground—but Freund nevertheless suggests a non-modifiable differential traffic control policy applicable to this application. *Id.*

305. A POSA would have been motivated to implement this suggestion in Rao-Montemurro-Freund to improve productivity as Freund suggests. As I discuss above, a POSA would have been familiar with corporate settings that monitor and impose limits on employee device use and would have accordingly perceived value in allowing a central administrator to participate in the management of device applications’ network access, including by imposing non-modifiable differential traffic control policies as discussed. *See supra* §IX.A.1. In my opinion, a POSA would have reasonably expected success in this implementation, particularly given Freund’s recommendation so long before the time of the alleged invention.

- 19. Claim 23: The wireless end-user device of claim 1, wherein selectively deny comprises intermittently block when the one or more Internet service activities are requested during selected time windows.**

306. Rao-Montemurro-Freund teaches this limitation.

307. A POSA would have understood that both Freund and Montemurro teach allowing internet service activities only during particular time windows (and thus, denying internet access in “selected” windows other than the time windows in which access is permitted). Montemurro ¶¶11, 29, 35, 39-42 (describing internet access rules based on time of day); Freund, 4:5-28, 13:2-22, 27:4-16, Figs. 7A, 7H, 7K (same).

308. These rules suggest intermittently blocking internet service activities during selected time windows, because during the windows of time where access is not permitted, internet access may be denied, which a POSA would have understood to block requested internet service activities during the window. For example, Freund explains that a rule may be applied “from 9am to 5pm” and that if access is attempted in violation of the rule internet access may be denied. *See, e.g.*, Freund, 13:2-22; *see also supra* [1.6]. The “block” is intermittent because, during periods when the rule does not apply, the access is allowed.

309. A POSA would have been motivated to implement Rao-Montemurro-Freund to intermittently block internet service activities during selected time

windows, because, as discussed, a POSA would have understood that time-based access saves costs because it takes advantage “of periods during which certain services are offered at reduced costs by wireless carriers.” Pearce ¶¶68 (“In another variation, different criteria other than location of device 58 can be used for enabling, disabling or otherwise varying the communication capabilities of device 58. For example, time can be used as a determinant of communication capabilities. Accordingly, device 58 and certain applications performing on device 58, such as e-mail, could be allowed to communicate during certain periods of time such as daytime, and certain other applications, such as voice calls, could be able to communicate during other time periods such as night time. These policies can be designed, for example, to take advantage of periods during which certain services are offered at reduced costs by wireless carriers. Thus, office 62 can set up a policy database 118 which allows voice calls only during evenings and weekends when voice calls are cheaper.”); *see also* Montemurro ¶¶11 (“Policies may be responsive to various factors such as ... time of day”), 29 (“policies could include various factors such as . . . time of day”), 35 (“On a state change (for example, based on a time of day . . .) rules engineer 206A executes and modifies, as applicable, the routing table 210 to ensure that the data goes out [to] the most appropriate network (via respective interfaces 208)”), 39-42 (describing application of “time-based rule”), Figs. 3-4.

310. A POSA would have understood that implementing the system with this feature would have required only ordinary skill, as evidenced by Montemurro's and Freund's suggestions.

B. Ground 2: Rao in View of Montemurro and Freund and in Further View of Araujo Renders Obvious Claims 15, 17, and 24

1. Motivation to Combine

311. Araujo teaches "Power Management Based on Policy." Araujo, Title. As Araujo explains, mobile end-user devices have limited power resources (e.g., battery life); and Araujo accordingly discloses a power management policy that "may take into account a variety of factors" to manage power usage so as to better accommodate those resources. *Id.* ¶¶1, 3. This power management policy may account for, e.g., the device's "current power consumption" and "the amount of energy stored in a battery." *Id.* ¶¶4, 30-31.

312. Araujo's power management policy may also take into account the power state of various components of a device (e.g., whether they are on or off, monitor "brightness levels," processor "clock speeds"). *Id.* ¶¶4, 14, 25. For example, Araujo explains that a device's components, including any network cards that "may be used to facilitate [a] machine 700's communication through network 708," can contribute to power consumption. *Id.* ¶ 56; *see id.* Abstract, ¶¶1, 2, 22. A POSA would have recognized that a network card that permits Internet access in this manner encompasses a modem.

313. Araujo also teaches that, to inform a power management policy, a system may wish to identify program/application requests (e.g., the sending of network packets) that require components (e.g., modems) to change their power states and factor in the priorities of the associated programs/applications in deciding whether to permit the activities associated with the program/application requests. Araujo ¶¶2, 4; *see also id.* ¶20 (“Program 112 may be application software, system software, or any other type of software or hardware. . . . device 104 may be a machine 102’s wireless network card, and request 113 may be a request to send data over a wireless network.”). Araujo explains that by considering the power state of a component and the priority of a program/application, its power management policy avoids wasting power through the unnecessary cycling of component power states (e.g., the switching of components on and off) for low-priority activities. *Id.* ¶¶15-16, 28.

314. A POSA would have been motivated to incorporate Araujo’s power management policy in Rao-Montemurro-Freund. Araujo teaches a policy-based solution, like Rao-Montemurro-Freund, to the problem of limited battery life in wireless end-user devices, a problem that was well known. *E.g.*, Montemurro ¶3 (“Selection among the different radio access technologies may be driven by the different properties of the technologies such as bandwidth, range, cost, and *power consumption*, among other considerations.”). Moreover, like Rao-Montemurro-

Freund, Araujo's policy "strikes a balance between providing functionality and maintaining longevity of the charge." Araujo ¶1. Moreover, this policy relies on components (e.g., processors running software stored in memory) present in the Rao-Montemurro-Freund combination. Araujo ¶¶42, 52-56; *see supra* [1.0]-[1.3], [1.4]-[1.5]. Further, and also similar to Rao-Montemurro-Freund, Araujo uses a policy to decide whether to selectively allow or deny activities performed by or on behalf of applications (including internet service activities). *See supra* [1.6]; Araujo ¶¶37-44 (explaining that a request may be allowed, blocked, or delayed until a later time depending on whether the power state change is allowable or not under the policy); *see also id.* ¶33 (explaining that under Araujo's policy, "[i]f an application with a low status is requesting use [of] a network card that is presently turned off . . . the low-status application's request may be denied or delayed"), Figs. 3-4. And like the Rao-Montemurro-Freund combination, *see supra* [1.3.2], Araujo teaches that "any type of information" may be considered as part of its "rich" multi-factor policy, Araujo ¶¶3, 34. A POSA would accordingly have reasonably expected to succeed in implementing Araujo's teachings in Rao-Montemurro-Freund and would have been motivated to so implement them to better manage power use and preserve, e.g., the battery life of a wireless end-user device.

2. Claim 15: “The wireless end-user device of claim 1, wherein the one or more processors are further configured to dynamically change the application of the differential traffic control policy based on a power state of the device.”

315. Rao-Montemurro-Freund-Araujo teaches this limitation. Araujo teaches that its power management policy may be based on “the amount of energy stored in a battery” of the device. Araujo ¶4, Fig. 2. It explains that this power management policy applies to the end-user device’s “wireless network card . . . [and] a request to send data over a wireless network.” *Id.* ¶20. It also teaches that in deciding whether to power a device or component thereof, such as a wireless network card (e.g., modem), the system may consider “[t]he amount of energy remaining in a battery” of the device. *Id.* ¶30 (“[T]he decision as to whether to power a device may be different depending on whether a battery has already discharged 25% (or 75% or n%) of its energy.”); *see also id.* ¶2.

316. A POSA would have understood that the amount of energy stored in a battery reflects a power state of the wireless end-user device. For example, a POSA would have recognized that 100% battery life may reflect a “full” power state, whereas a 20% or 10% battery life may reflect a “low” power state. And because Araujo discloses that the decision as to whether to allow a component of a device (e.g., a modem) to be turned on “may be different” (e.g., may change) depending on “the amount of energy remaining in a battery” of a device, *id.* ¶30, a POSA

would have understood Araujo to teach *dynamically* changing the application of the differential traffic control policy based on a power state of the device—such that, for example, the modem may be turned on for an application when the battery is “full” (*e.g.*, at 100%), but not when the battery depletes to a “low” level (*e.g.*, 20% or 10%). Araujo’s power management policy dynamically changes application of the differential *traffic control* policy because it impacts whether an Internet service activity can proceed: if application of the policy prevents the modem from being turned on in response to the application’s request to send data over the wireless network (an Internet service activity), the activity is denied, and associated data packets (network traffic) cannot be sent.

317. A POSA would have been motivated to implement Araujo’s power management policy as part of the decision to “selectively allow or deny one or more Internet service activities” made by the system’s processor, *supra* [1.5], [1.6], and a POSA would have reasonably expected success in doing so for the reasons discussed above, *supra* §IX.B.1.

318. Further, as discussed below with respect to claim 17, Araujo teaches that its power management policy is based on the “[c]urrent power state of [the] device” or device component (*e.g.*, modem). Araujo ¶28, Fig. 2. A POSA would have understood that the power state of a device component necessarily reflects the power state of the device of which it is part because all device components draw

power from the same battery. *E.g.*, Araujo ¶¶30-32, Fig. 7. As a result, a POSA would have understood Rao-Montemurro-Freund-Araujo to teach this limitation for the additional reasons discussed below in connection with claim 17.

3. Claim 17: “The wireless end-user device of claim 1, wherein the one or more processors are further configured to dynamically change the application of the differential traffic control policy based on power control state changes for one or more of the modems.”

319. Rao-Montemurro-Freund-Araujo teaches this limitation. Araujo teaches that its power management policy “determines” whether an application’s request “involves a change in the device’s power state, such as a change from off to on.” Araujo ¶25. If the request does not involve such a change, “then the request may be processed,” but if it does, Araujo determines whether the power management policy “allows the device’s power state to be changed to service the request.” *Id.* Araujo elaborates on this, explaining that “various considerations” may be used to determine if a particular application’s request warrants changing a power state of the device or component thereof. *Id.* ¶¶25-27, Fig. 2; *see also id.* ¶20. For example, Araujo teaches that applications may be assigned statuses “indicating [their] relative worthiness to receive a power allocation” and that “[w]hether a program is permitted to consume power could be based on a finding as to whether the program’s status justifies the consumption of power.” *Id.* ¶27.

320. Araujo explains that its power management policy applies to the end-user device's "wireless network card . . . [and] a request to send data over a wireless network." *Id.* ¶20. Accordingly, if an application requests to send data over the network to perform an activity (an internet service activity) when the network card (modem)'s power state is on, that request will proceed. *Id.* ¶33. However, "if an application with a low status is requesting use [of] a network card [modem] that is presently turned off . . . the low status application's request may be denied or delayed." *Id.* ¶33; *see also id.* ¶42.

321. A POSA would have understood, based on these disclosures in Araujo, that Araujo teaches dynamically changing the application of the differential traffic control policy based on the power control state changes of a modem. Specifically, Araujo teaches that if an application's request to send data (internet service activity) requires the modem's power control state to change (e.g., from off to on), Araujo's power management policy allows that request to proceed only under certain conditions (e.g., where the application associated with the activity has a sufficiently high status to warrant the usage of power). On the other hand, if the request does not require the modem's power control state to change, the request is processed as usual. In this scenario, the policy *dynamically* changes based on the modem's power control state (e.g., whether the application's request to send data requires the modem to change from one power state to another, e.g.,

from off to on), and is a *traffic control* policy because it impacts whether an Internet service activity can proceed (e.g., is allowed, denied, or delayed). For instance, if the modem is not allowed to be turned on in response to the application's request to send data over the wireless network (an Internet service activity), the activity is denied, and the data packet cannot be sent.

322. A POSA would have been motivated to implement Araujo's power management policy as part of the decision to "selectively allow or deny one or more Internet service activities" made by the system's processor, *supra* [1.5], and a POSA would have reasonably expected success in doing so for the reasons discussed above, *supra* §IX.B.1.

4. **Claim 24: "The wireless end-user device of claim 1, wherein the one or more processors are configured to prevent the first one or more applications from changing the power state of at least one of the modems, and to not prevent the second one or more applications from changing the power state of the same modem or modems."**

323. Rao-Montemurro-Freund-Araujo teaches this limitation. As explained above, *supra* claim 17, Araujo teaches assigning applications statuses "reflect[ing their] worthiness to consume power" of the device. Araujo ¶27. For instance, Araujo explains that certain applications may be given a "VIP" status reflecting their "merit or justification to consume energy" that "allows them to consume power in situations where other programs would not be permitted to consume

power.” Araujo ¶27; *see also id.* ¶4 (“The policy may take into account any factors. One example factor is the identity and status of the program that is requesting action from a device.”). Araujo thus teaches the assignment of “statuses” to applications that permit them to consume particular amounts of power under certain circumstances. *Id.* ¶27.

324. A POSA would have been motivated to apply these teachings of Araujo to Rao-Montemurro-Freund to allow the processor to assign a “second one or more applications,” such as those an administrator previously approved, “VIP” status and the “first one or more applications” a lower, “non-VIP” status. Freund, 24:1-9, *supra* [1.4]-1.6]. In fact, Araujo specifically recommends the use of “binary VIP/non-VIP” application labels to indicate the applications’ “relative worthiness to receive a power allocation.” Araujo ¶27. A POSA would have understood that the result of such an implementation would be that the “second one or more applications” would be allowed to consume (and not prevented from consuming) power needed to change the power state of a modem in certain circumstances in which the “first one or more applications” would be prevented from consuming that same amount of power to change the power state of that same modem.

325. In the Rao-Montemurro-Freund-Araujo system, the user could augment the policy for the first one or more applications, but not the second one or

more applications, through the user interface. *Supra* [1.4]. A POSA would have understood that biasing the system towards allowing the second one or more applications to change the power states of modems, as discussed above, to communicate requests associated with their Internet service usage activities would be beneficial because the user would not otherwise be able to adjust a policy applicable to those applications and allow their Internet service usage activities to proceed.

326. By contrast, to improve power usage, a POSA would have biased the device towards disallowing the first one or more applications from changing the power states of modems to service their requests. A POSA would have understood that the user would have the option to modify the policy as it applies to the first one or more applications and could do so to override the system's baseline prevention of power state changes if needed. *Supra* claims 2-3. In this vein, Araujo teaches that when its power management policy determines that an application may not change the power state of a device or component thereof (e.g., modem), "a dialog box may be generated on a display" (user interface). Araujo ¶41. Araujo further notes that the dialog box can be configured to "inform the person of the request's energy-consumption effect, and of whether the requested consumption of energy is permitted under the policy" and explains that it might then "solicit input from the person" in response to this information. *Id.* ("For example, the dialog box

could say, ‘To preserve battery power, power-use policy blocks this action while the system is unplugged.’ The dialog box may also solicit input from the person (e.g., ‘Would you like to proceed anyway?’) . . .”).

327. A POSA thus would have been motivated to configure Rao-Montemurro-Freund-Araujo’s processors to prevent the first one or more applications from changing the power state of at least one of the modems, and to not prevent the second one or more applications from changing the power state of the same modem or modems. Doing so would have balanced the goals of power saving and ease of user operation, and a POSA would have expected success in implementing Rao-Montemurro-Freund-Araujo in this way in view of the references’ teachings.

X. SECONDARY CONSIDERATIONS DO NOT REBUT THE PRIMA FACIE CASE OF OBVIOUSNESS

328. I have considered the issue of secondary considerations, and I am currently unaware of any evidence of secondary considerations that would rebut the prima facie case of obviousness.

XI. CONCLUSION

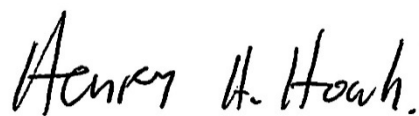
329. For the reasons set forth above, it is my opinion that claims 1-24 of the ’613 patent are unpatentable in view of the prior art.

330. 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.

331. I hereby declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct, and that all statements made of my own knowledge are true and that all statements made on information and belief are believed to be true. I understand that willful false statements are punishable by fine or imprisonment or both. *See* 18 U.S.C. § 1004.

Date: May 31, 2024

A handwritten signature in black ink that reads "Henry H. Houh". The signature is written in a cursive, slightly slanted style.

Henry Houh