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.,

Petitioner,

v.

Headwater Research LLC,
Patent Owner.

IPR2024-00942
IPR2024-00943
IPR2024-00944

U.S. Patent No. 8,589,541

DECLARATION OF ANDREW WOLFE PH.D.
IN SUPPORT OF PETITION FOR INTER PARTES REVIEW OF
U.S. PATENT NO. 8,589,541

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I. INTRODUCTION

1. I, Andrew Wolfe, submit this declaration to state my opinions on the matters described below.

2. I have been retained by 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. (collectively, "Petitioner") as an independent expert in this proceeding before the United States Patent and Trademark Office. Although I am being compensated at my usual and customary rate of $650 USD per hour, no part of my compensation depends on the outcome of this proceeding, and I have no other interest in this proceeding.

3. I understand that this proceeding involves U.S. Patent No. 8,589,541 ("the '541 patent," EX-1001), and I have been asked to provide my opinions as to the patentability of the claims of the '541 patent.

4. I have been asked to consider the validity of certain claims of the '541 patent based on certain prior art references. I have also been asked to consider the state of the art and prior art available as of January 28, 2009, which is the earliest claimed priority date on the face of the '541 patent. Based on the combination of prior art references discussed in this declaration, it is my opinion that claims 1-174 of the '541 patent are unpatentable for the reasons provided below.

II. QUALIFICATIONS AND BACKGROUND

5. I believe that I am well qualified to serve as a technical expert in this matter based upon my educational and work experience, which I summarize below. I understand that my curriculum vitae, which includes a more detailed summary of my background, experience, and publications, is being submitted as EX-1007.

6. In 1985, I earned a Bachelor's degree in Electrical Engineering and Computer Science from The Johns Hopkins University. In 1987, I received a Master's degree in Electrical and Computer Engineering from Carnegie Mellon University. In 1992, I received a Ph.D. in Computer Engineering from Carnegie Mellon University. My doctoral dissertation proposed a new approach for the architecture of a computer processor.

7. I have more than 35 years of experience as a computer architect, computer system designer, personal computer component designer, educator, and executive in the electronics industry.

8. In 1983, I began designing touch sensors, microprocessor-based computer systems, and I/O (input/output) cards for personal computers as a senior design engineer for Touch Technology, Inc. During the course of my design projects with Touch Technology, I designed I/O cards for PC- compatible computer systems, including the IBM PC-AT, to interface with interactive touch-based computer terminals that I designed for use in public information systems. I continued

designing and developing related technology as a consultant to the Carroll Touch division of AMP, Inc., where in 1986 I designed one of the first custom touch-screen integrated circuits. I designed the touch/pen input system for the Linus WriteTop, which many believe to be the first commercial tablet computer.

9. From 1986 through 1987, I designed and built a high-performance computer system as a student at Carnegie Mellon University. From 1986 through early 1988, I also developed the curriculum and supervised the teaching laboratory for processor design courses.

10. In the latter part of 1989, I worked as a senior design engineer for ESL-TRW Advanced Technology Division. While at ESL-TRW, I designed and built a bus interface and memory controller for a workstation- based computer system, and also worked on the design of a multiprocessor system.

11. At the end of 1989, I (along with some partners) reacquired the rights to the technology I had developed at Touch Technology and at AMP and founded The Graphics Technology Company. Over the next seven years, as an officer and a consultant for The Graphics Technology Company, I managed the company's engineering development activities and personally developed dozens of touch screen sensors, controllers, and interactive touch-based computer systems. Even these early computer products instantiated foreground and background processing tasks and managed communication priorities.

12. I have consulted, formally and informally, for a number of fabless semiconductor companies. In particular, I have served on the technical advisory boards for two processor design companies: BOPS, Inc., where I chaired the board; and Siroyan Ltd., where I served in a similar role for three networking chip companies—Intellon, Inc., Comsilica, Inc., and Entridia, Inc.—and one 3D game accelerator company, Ageia, Inc. Comsilica developed Wi-Fi components.

13. I have also served as a technology advisor to Motorola and to several venture capital funds in the U.S. and Europe. Currently, I am a director of Turtle Beach Corporation, providing guidance in its development of premium audio peripheral devices for a variety of commercial electronic products including wireless headsets and wireless game controllers.

14. From 1991 through 1997, I served on the Faculty of Princeton University as an Assistant Professor of Electrical Engineering. At Princeton, I taught undergraduate- and graduate-level courses in Computer Architecture, Advanced Computer Architecture, Display Technology, and Microprocessor Systems, and conducted sponsored research in the area of computer systems and related topics. From 1999 through 2002, while a Consulting Professor, I taught a Computer Architecture course to both undergraduate and graduate students at Stanford University. At Princeton, I received several teaching awards, both from students and from the School of Engineering. I have also taught advanced microprocessor

architecture to industry professionals in seminars sponsored by the Institute of Electrical and Electronics Engineers ("IEEE") and the Association for Computing Machinery ("ACM"). I am currently a lecturer at Santa Clara University teaching courses on Microprocessor Systems, Integrated Circuit Design, Real-Time Computing, and Mechatronics and currently serve as Faculty Senate President. In my classes, I teach about foreground and background processing tasks and assigning communication priorities.

15. From 1997 through 2002, I held a variety of executive positions at a publicly held fabless semiconductor company originally called S3, Inc. and later called SonicBlue Inc. I held the positions of Chief Technology Officer, Vice President of Systems Integration Products, Senior Vice President of Business Development, and Director of Technology, among others. At the time I joined S3, the company supplied graphics accelerators for more than 50% of the PCs sold in the United States. At S3 I supervised the design of several PC graphics accelerators. During my time at SonicBlue we launched more than 30 new consumer electronics products, including devices to support streaming audio and video, many of the first commercial products to support internet audio content, and Wi-Fi-based tablet computers. I also worked with Universal Music Group and Sony Entertainment on the development of systems for distribution and management of internet music

content and served on the board of RioPort.com, which also developed systems for distribution and management of internet music content.

16. I have published more than 50 peer-reviewed papers on computer architecture and computer systems and IC design. I also have chaired IEEE and ACM conferences in microarchitecture and integrated circuit design and served as an associate editor for IEEE and ACM journals. I served on the IEEE Computer Society Awards committee. I am an IEEE Fellow, an IEEE Computer Society Distinguished Contributor, and a Member of ACM. I am a named inventor on at least 57 U.S. patents and 37 foreign patents, which are listed in my curriculum vitae.

17. In 2002, I was the invited keynote speaker at the ACM/IEEE International Symposium on Microarchitecture and at the International Conference on Multimedia. From 1990 through 2005, I have also been an invited speaker on various aspects of technology and the PC industry at numerous industry events, including the Intel Developer's Forum, Microsoft Windows Hardware Engineering Conference, Microprocessor Forum, Embedded Systems Conference, Comdex, and Consumer Electronics Show, as well as at the Harvard Business School and the University of Illinois Law School. I have been interviewed on subjects related to computer graphics and video technology and the electronics industry by publications such as the *Wall Street Journal*, *New York Times*, *Los Angeles Times*, *Time*, *Newsweek*, *Forbes*, and *Fortune* as well as on CNN, NPR, and the BBC. I have also

spoken at dozens of universities including MIT, Stanford, University of Texas, Carnegie Mellon University, UCLA, University of Michigan, Rice University, and Duke University.

18. Additional details about my employment history, fields of expertise, and publications are included in my curriculum vitae, which I understand is being submitted as EX-1007.

III. MATERIALS CONSIDERED

19. In forming my opinions, I have reviewed the following documents:

Exhibit	Description
EX-1001	U.S. Patent No. 8,589,541 ("the '541 patent")
EX-1002	U.S. Patent Publication No. 2006/0039354 to Rao ("Rao")
EX-1003	U.S. Patent Publication No. 2010/0017506 to Fadell ("Fadell")
EX-1004	U.S. Patent No. 5,987,611 to Freund ("Freund")
EX-1005	U.S. Patent No. 8,028,060 to Wyld et al. ("Wyld")
EX-1006	File History of U.S. Patent No. 8,589,541 (Excerpted)
EX-1007	*Curriculum Vitae* of Andrew Wolfe
EX-1008	*Enable-ExchangeCertificate*, Microsoft, https://learn.microsoft.com/en-us/powershell/module/exchange/enable-exchangecertificate?view=exchange-ps (last visited May 15, 2024)
EX-1009	Larry L. Peterson & Bruce S. Davie, *Computer Networks: A Systems Approach* (3d ed. 2003)
EX-1010	U.S. Patent Publication No. 2007/0038763 to Oestvall ("Oestvall")
EX-1011	U.S. Patent Publication No. 2009/0207817 to Montemurro et al. ("Montemurro")
EX-1012	Elizabeth Woyke, *World's most wired airports*, NBC News (Mar. 11, 2008, 10:02 am), https://www.nbcnews.com/id/wbna23391922 (last visited May 15, 2024)
EX-1013	*Madison Avenue Calling*, The Gainesville Sun (Jan. 19, 2007, 11:00 pm), https://www.gainesville.com/story/news/2007/01/20/madison-avenue-calling/31509806007/ (last visited May 15, 2024)

Exhibit	Description
EX-1014	Spyros Sakellariadis, *Using Exchange Server with SMTP and POP3*, ITPro Today (May 31, 1998), https://www.itprotoday.com/email-and-calendaring/using-exchange-server-smtp-and-pop3#close-modal (last visited May 16, 2024)
EX-1016	U.S. Patent No. 8,914,783 to Van Camp ("Van Camp")

IV. LEGAL STANDARDS

20. In considering the subject matter of the '541 patent and its claims in light of the prior art and forming my opinions, I am relying on certain legal principles that counsel in this case explained to me. My understanding of these concepts is summarized below.

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

22. I understand that an invention, as defined by the claims of the patent, must not be anticipated or rendered obvious by the prior art.

A. Claim Construction

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

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

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

B. Anticipation Under 35 U.S.C. § 102

26. I understand that a patent claim is invalid as anticipated if each and every limitation set forth in the claim is disclosed (either expressly or inherently) in a single prior art reference. I understand that the features of the prior art reference must be arranged as required by the limitations of the claim, but the prior art need not use the exact terminology as recited in the claim.

C. Obviousness Under 35 U.S.C. § 103

27. I understand that a patent claim is invalid as obvious if the claimed invention would have been obvious to a person of ordinary skill in the art at the time the claimed invention was made. This means that even if all of the limitations of the

claim cannot be found in a single prior art reference that would anticipate the claim, a person of ordinary skill in the art who knows about all the prior art would have come up with the claimed invention. I understand that in an obviousness determination, the person of ordinary skill in the art is presumed to have knowledge of all material prior art. I understand that whether a claim is obvious is based upon the determination of several factual issues.

28. 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.

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

30. I understand that a patent claim composed of several 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.

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

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

D. Secondary Considerations of Non-Obviousness

33. I understand that certain secondary considerations may be considered in evaluating obviousness in order to prevent hindsight bias. These secondary considerations include the commercial success of products that practice the patent, long-felt need for the patented technology, failure by others to solve the problem addressed by the patent, initial skepticism by others in the industry, industry recognition and praise of the patented products, and efforts by others to copy the patented technology.

34. I have been informed that these secondary considerations of non-obviousness must be balanced against the strength of the *prima facie* case of obviousness. Where the invention represents no more than the predictable use of prior art elements according to their established functions, secondary considerations are inadequate to establish non-obviousness.

35. I have also been informed that the patentee must establish a nexus between any secondary considerations and the claimed invention. Where a

secondary consideration results from something other than what is both claimed and novel in the patent, there is no nexus to the merits of the claimed invention.

36. I have been informed that, for example, the nexus requirement as it applies to evidence of commercial success requires that the patentee must show that the sales of a product that allegedly practices the claimed invention must be a direct result of the unique characteristics of the claimed invention, as opposed to other economic and commercial factors that are unrelated to the patented invention. I understand this to mean 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.

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

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

V. THE '541 PATENT

A. Overview of the '541 Patent

39. The '541 patent discloses "Device Assisted Services (DAS) for protecting network capacity." EX-1001, 16:38-17:18. The patent purports to address network capacity and overloading by, "for example, differentially controlling . . . network service usage activities in various ways depending on the type of service activity requesting network access and/or requesting transactions with network resources." *Id.*, 15:5-17, 16:38-57 (same), 9:55-11:50 (discussing problem of network congestion and overloading).

40. As one example, the '541 patent discloses that network performance may be affected by "applications that maintain persistent network communication that generates a relatively high frequency of network data packets." *Id.*, 14:33-15:4. The '541 patent explains that "even when the user is not directly interacting with or benefiting from th[ese] type[s] of application[s], the application[s] can be running in the background and continuing to consume potentially significant network resources." *Id.* The communication may include, among other things, "frequent device signaling sequences to update widgets on a desktop," "synchroniz[ing] user data such as calendars, contacts, email, and/or other information/content," "check[ing] or updat[ing] email or RSS feeds," "virus updates," and "background email downloads." *Id.*

41. The '541 patent discloses that it may be desirable to apply "a service usage control policy for the network service usage activities to protect network capacity." *Id.*, 18:8-30, 18:39-55, 19:38-58. In embodiments, the policy may assign priorities to a service usage activity based on its classification as a background service. *See id.*, 18:31-19:6, 19:8-37 (describing types of "service usage activity"), 19:38-58, 20:14-43. Figures 14 and 18 provide flow diagrams for applying such a policy. *Id.*, 69:5-37, 70:57-71:3.

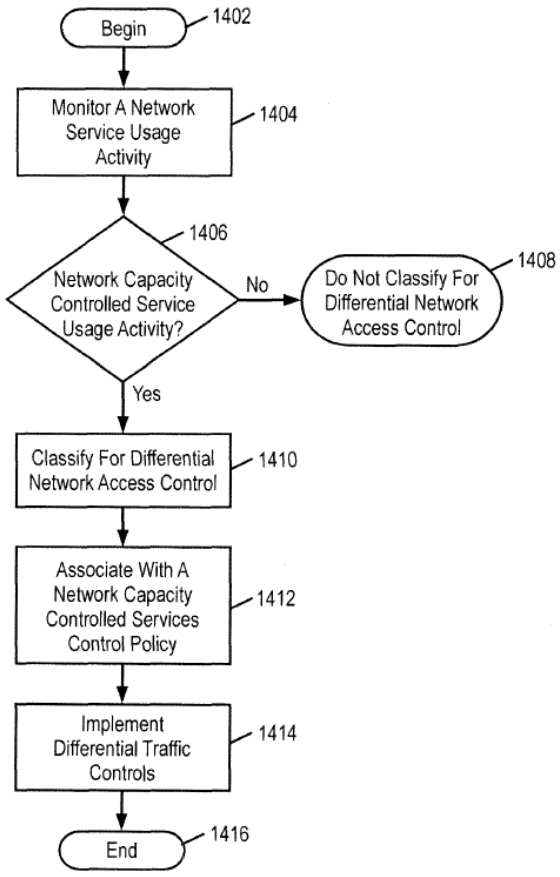


FIG. 14

Id. at Fig. 14.

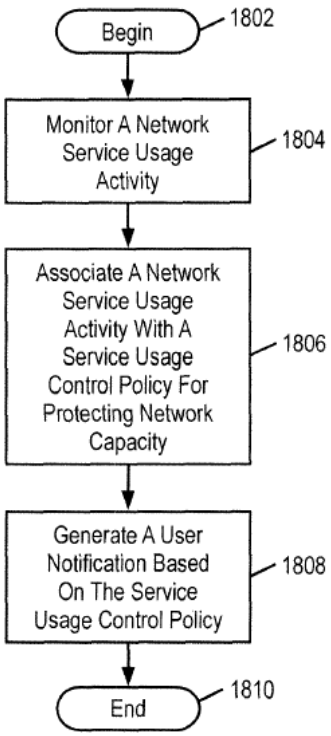


FIG. 18

Id. at Fig. 18.

B. Summary of the Prosecution History of the '541 Patent

42. I have reviewed the prosecution history of the application that led to the '541 patent. EX-1006. During prosecution, the Examiner issued a restriction requirement identifying three groups of claims as drawn to distinct inventions. EX-1006, 490. In response to this requirement, Applicant elected to pursue then claims

53-115,[1] which were directed to methods of the purported invention. EX-1006, 545-546.

43. Subsequently, the Examiner rejected the claims only once under 35 U.S.C. § 103 as obvious over a single prior art reference—U.S. Patent No. 7,228,354 to Chambliss et al. ("Chambliss"). EX-1006, 582. To support his rejection, the Examiner merely stated that Chambliss disclosed "service class usage" and "classification rules" and took "Official Notice" "that the various classification rules articulated by the various claims . . . appear to have been common knowledge in the art." *Id*. The Examiner explained that, "[t]o have provided such classification rules in place of the classification rules of [the prior art] would have been obvious to one of ordinary skill in the art." *Id*. The "classification rules" determine whether a "particular usage activity" is a "background service usage activity." The issued claims related to the "classification rules" include, for example, claims 44-51, 54-59, 161-162, 165-167, and 169. EX-1001, 114:8-50, 115:17-46, 123:22-47, 124:3-125:8, 125:13-33.

[1] Applicant's initial claim set included two claims labeled "claim 77" and two labeled "claim 82." EX-1006, 545. Applicant replaced the second "claim 82" and the second "claim 77" with new claims 114 and 115, respectively. *Id*.

44. In response, Applicant ***heavily*** amended claim 53; canceled claims 54-115; and added dependent claims 116-288. EX-1006, 660-689. Applicant asserted that Chambliss failed to teach or suggest any of the limitations of claim 53, as amended, and that claims 53 and 116-288 were therefore allowable over the cited prior art. *See id.*, 691-701.

45. Two months later, the Examiner and Applicant participated in an Examiner Interview, during which Applicant agreed to an Examiner's Amendment that would require the "user input" of claim 53 (and certain dependent claims) to be "obtained through a user interface of the wireless end-user device." *Id.*, 749-755. One week later, the Examiner issued a Notice of Allowance, justifying his decision by stating only that claims 53 and 116-288, as amended via the Examiner's Amendment, were allowed because "[t]he prior art of record, either alone or in combination, d[id] not disclose, or suggest, Applicant's claim language." *Id.*, 754-755.

46. I understand that Rao and Freund were not before the Examiner, and that he did not discuss Fadell, which was submitted with over 700 other references. '541 patent, Cover. Specifically, Fadell was not materially discussed in any Office Action or other substantive paper during prosecution.

C. Claim Construction of Terms in the '541 Patent

47. As discussed 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. I understand that a district court has yet to construe the claim terms of this patent. 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 '541 patent's specification and prosecution history. If any claim terms are differently construed, I reserve the right to reassess my opinions under said constructions.

D. Guide to the '541 Patent's Claims

48. The '541 patent's morass of claims can generally be grouped based on their subject matter as follows:

Claim(s)	Group/Subject Matter
1	**Independent Claim:** **1a:** A non-transitory computer-readable storage medium storing machine-executable instructions that, when executed by one or more processors of a wireless end-user device, cause the one or more processors to: **1b: identify a service usage activity** of the wireless end-user device, the service usage activity being associated with a first software component of a plurality of software components on the wireless end-user device, **1c**: the service usage activity comprising one or more prospective or successful communications over a wireless network; **1d: determine** whether the service usage activity comprises a **background activity**; **1e: determine at least an aspect of a policy** based on a user input obtained through a user interface of the wireless end-user device **or** based on information from a network element, **1f:** the policy to be applied if the service usage activity is the background activity, the policy at least for controlling the service usage activity; **1g:** and **if it is determined** that the service usage activity is the background activity, **apply the policy**.
2-6	**Communications Claims:** These claims generally provide further detail on the "one or more prospective or successful communications over the wireless network" recited in limitation [1c].
7-18	**Activity Identification Claims:** These claims generally provide further detail on how a "service usage activity" (e.g., as recited in limitation [1b] is identified. • Claims 10-16 (**Proxy Service Claims**) can be further grouped based on their incorporation of limitations relating to the provision of proxy services.
19-23	**First Software Component Claims:** These claims generally provide further detail on the "first software component" recited in limitation [1b].

Claim(s)	Group/Subject Matter
24, 172-74	**Network Element Claims:** These claims generally provide further detail on the "network element," as recited in limitation [1e], and/or require information to be conveyed to the "network element."
25-43	**Policy Claims:** These claims generally provide further detail on the "policy" and/or the "aspect of the policy" recited in limitation [1e].
44-59	**Background Activity Identification Claims:** These claims generally provide further detail on "determin[ing] whether the service usage activity comprises a background activity" as recited in limitation [1d].
60-76, 79-90	**Application (-Notification) Claims:** These claims generally provide further detail on "apply[ing] the policy" per limitation [1g]. • Claims 60-64, 80, 81, 87, and 88 (**Access/Flow Claims**) generally require the control of wireless network access and/or network traffic. • Claims 65-76 and 84-86 (**Information Claims**) generally require the communication of information to or from the "first software component." • Claims 79, 82, and 83 (**API Claims**) generally require the use of API functionalities. • Claims 89 and 90 (**Not Background Activity Claims**) generally require differential policy application if it is determined that the service usage activity does not comprise the background activity.
77, 78, 91-117	**Application-Notification Claims:** These claims generally require the provision of notifications, specify the contents of those notifications, and/or require user inputs in response to those notifications.
118-48	**+Notification Claims:** These claims generally require the further provision of notifications, specify the contents of those notifications, and/or require user inputs in response to those notifications. Many of these claims mirror the **Application-Notification Claims**, but these claims are generally broader in that they do not expressly require the notification to be part of the "appl[ication of] the policy."

Claim(s)	Group/Subject Matter
149-52	**Detection-Notification Claims:** These claims generally require the further detection of attempted usage of the "first software component" of [1b] and the provision of notifications in response. Many of these claims mirror the +**Notification Claims**.
153-59	**User Input Claims:** These claims generally provide further detail on "user input[s]" that may specify the "aspect of a policy" to be applied as recited by limitation [1e].
160-69	**Second Activity Claims:** These claims generally require the differential application of one or more "polic[ies]" or portions thereof to first and second "service usage activit[ies]," the first of which is recited in limitations [1b] and [1c].
170	This claim generally requires the further tracking of the "service usage activity."
171	This claim is directed to a wireless end-user device embodying the "non-transitory computer-readable storage medium" of claim 1.

49. The dependent claims are largely directed to simple variations and permutations of the independent claim. As shown in the attached **Appendix A**, they are often distinguished from one another by only very minor differences.

VI. PERSON OF ORDINARY SKILL IN THE ART

50. I have been informed that patentability must be analyzed from the perspective of a "person of ordinary skill in the art" in the same field as the patent-in-suit at the time of the invention. I also understand that several factors are considered in assessing the level of ordinary skill in the art, including (1) the types of problems encountered in the art; (2) the prior art solutions to those problems;

(3) the rapidity with which innovations are made; (4) the sophistication of the technology; and (5) the education level of active workers in the field.

51. I refer to a person of ordinary skill in the art here as a "POSITA." In my opinion, pertinent to the '541 patent as of its earliest priority date, a POSITA would have had a minimum of 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. Work experience can substitute for formal education and additional formal education can substitute for work experience. I at least meet this definition of a POSITA, now and as of the priority date of the '541 patent.

52. I am also familiar with the knowledge of a POSITA as of the priority date of the '541 patent. I am able to opine on how a POSITA would have understood the disclosure and claims of the '541 patent, the disclosures of the prior art, the various motivations to combine the prior art, and what combinations would have been obvious to a POSITA.

VII. THE PRIOR ART

A. Background and State of the Art for the '541 Patent

53. As of the priority date of the '541 patent, the various features and functionalities of the wireless end-user devices the '541 patent contemplates were well known to a POSITA. For instance, it was well understood that these devices

could communicate over one or more wireless networks (e.g., 3G, Wi-Fi) with individual devices and groups of devices, such as gateways, servers, server farms, and/or other end-user devices. *See, e.g.*, Rao ¶¶86-96, Fig. 1A; Fadell ¶¶24-29, 34-35; Wyld, 3:8-42, 4:8-21; Montemurro ¶¶12-14, Fig. 1.

54. It was also well-known that end-user devices were generally programmed to run applications in order to perform various functions (e.g., perform software updates) and/or provide various services (e.g., provide email, desktop-sharing, web-conferencing, or voice-over-internet-protocol ("VoIP") services; permit access to a Web browser), and that many of these applications would engage in activities capitalizing on the devices' ability to communicate across wireless networks (to, e.g., access an application server or access the Internet) to perform those functions and/or provide those services. *See, e.g.*, Rao ¶¶88, 90; Fadell ¶¶59-64; Wyld, 2:7-31, 3:47-50, 6:5-32; Montemurro ¶¶25, 32-33. The characteristics of these applications—e.g., whether they were running in the "foreground" or "background" of a device—as well as how to classify, distinguish, and control applications based on these characteristics were well understood as of the priority date of the '541 patent. *See, e.g.*, Rao ¶¶182, 188-89, 193; Oestvall ¶¶6, 8, 16-17, 20-25; Freund, 4:8-12, 4:33-35, 4:40-50, 6:7-14, 8:63-9:3, 10:8-43, 13:2-6, 13:27-29, 13:34-43, 24:13-15, 30:10-49; Wyld, 5:61-6:46, 7:10-28.

55. The available art as of the priority date of the '541 patent was also replete with information on the implementation of policies or rules to control network communications—including those based on the characteristics of the applications or activities associated with the network communications. *See, e.g.*, Rao ¶¶93, 108-09, 182-83, 187, 189, 193-95, 207; Fadell ¶¶51, 54, 62-65; Freund, 3:60-4:63, 5:53-64, 8:48-9:13, 9:29-36, 12:54-13:56, 15:28-16:29, 23:65-27:50, 30:10-49; Montemurro, Abstract, ¶¶11, 27, 29, 34-36, Fig. 2. This fact was even officially recognized by the Examiner in charge of the '541 patent's prosecution. *See, e.g.*, EX-1006, 582 (taking "Official Notice" of the fact that "classification rules" "appear to have been common knowledge in the art").

B. Overview of Rao

56. Rao was published on February 23, 2006, based on an application filed on July 22, 2005. Rao teaches[2] various systems and methods for "application-aware prioritization of client-side network communications." Rao, Abstract. Rao explains that its prioritization methods can improve the quality of a client's network communications and "the performance, operational characteristics, and user

[2] Throughout this declaration, I have used "teaches" to describe both what a reference expressly discloses and what a POSITA would have understood the reference to suggest.

experience on the client" by allowing the client to reorder network packets before processing instead of forcing the client to process network packets "in the order they are received." Rao ¶¶3-4, 80. Specifically, Rao teaches that a client implementing its prioritization methods can avoid processing network packets "generated or received for an application running in the background . . . ahead of a network packet generated or received for [an] application running in the foreground," thereby improving quality for applications "currently in active use by [a] user." *Id.* ¶3.

57. Rao teaches a client 105 having a remote access client 120. *See id.* ¶¶99-110. The remote access client 120 may intercept "one or more network packets associated with one or more applications" 338*a*-338*n* before they are communicated to network 104 and store them in a queue. *Id.* ¶38; *see id.* ¶¶43, 184, 186. The remote access client 120 may then determine whether "the queued one or more network packets [are] associated with" a first or second application of applications 338*a*-338*n* and assign priorities to the network packets. *Id.* ¶38; *see also id.* ¶¶40, 42-43, 45-46, 80, 184, 187-94. The network packets may then be ordered in one or more queues based on the assigned priorities. *See id.* ¶¶38, 40, 192-94.

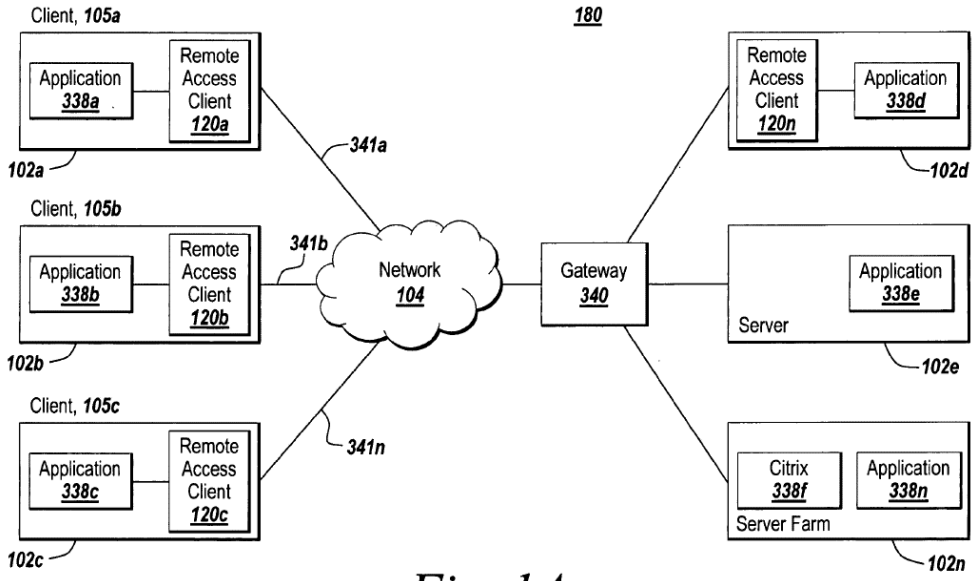


Fig. 1A

Id., Fig. 1A (depicting remote access clients 120*a-c* for clients 105*a-c*).

58. Rao explains that priorities may be assigned to network packets in accordance with various "policies 520 for specifying client-side prioritization of network communications related to applications 338*a*-338*n*." *Id.* ¶182. The policies 520 may prioritize network packets based on, among other things, the names, types, or other characteristics of the associated applications, such as the applications are "running in the foreground or the background of the client." *Id.* ¶¶182, 188-89, 192-93. Rao notes that the policies may be specified by various mechanisms. For example, a user may configure policies through a user interface, or they may be "provided by or downloaded via [a] gateway." *Id.* ¶183. Rao's methods accordingly "provide[] 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.* ¶179.

59. Rao also teaches that its remote access client 120 may "consider[] other network factors," including network congestion, in determining what network packets to communicate from what queue and may choose to communicate lower-priority network packets before higher-priority ones based on these factors. *Id.* ¶195. Rao's remote access client 120 therefore manages network communications "in accordance with any policies 520 . . . and in further view of any network statistics and other factors occurring on [a] network." *Id.*

C. Overview of Fadell

60. Fadell was published January 21, 2010, based on an application filed September 29, 2008. Fadell teaches systems and methods for monitoring data and bandwidth usage. Fadell, Title. Like the '541 patent, Fadell teaches that "users have increased data consumption dramatically[,] leading at times to congestion and utilization stress on data providers." *Id.* ¶3. Fadell teaches that data providers may accordingly charge for access based on the amount of resources consumed. *Id.* ¶16. To assist users in managing usage relative to data providers' pricing mechanisms, Fadell teaches a resource utilization component that "may monitor their utilization, provide alerts at certain thresholds, and/or perform utilization shifting actions such as application control and scheduling." *Id.* ¶17.

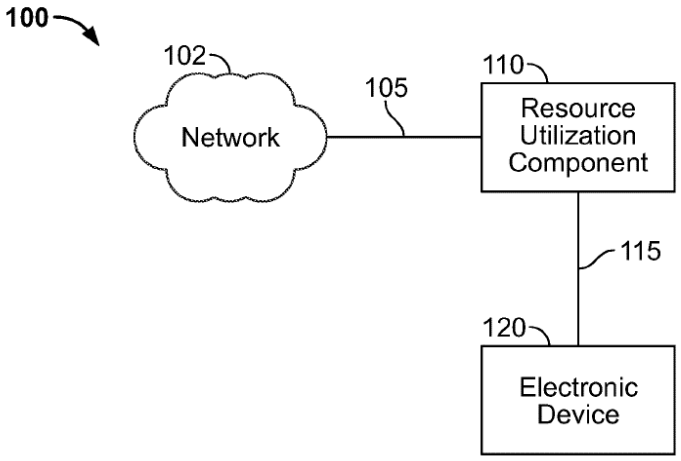


FIG. 1

Id., Fig. 1 (depicting resource utilization component 110).

61. Fadell teaches that the resource utilization component may provide "any suitable notification or information to subscribers or data provider resource consumers," including "notices of the amount of resources utilized and the amount of resources remaining during the subscription period." *Id.* ¶17. The notices may be provided when particular conditions are met, such as when a consumer's consumption reaches a given threshold or falls within a particular range. *Id.*; *see also id.* ¶¶19, 21-29 (describing resource utilization component 110). Fadell teaches that, in certain embodiments, the consumer may set the range. *Id.* ¶51. Among other things, the notifications may provide information about a consumer's service plan, allow a consumer to decide whether to exceed the plan by purchasing additional resources or limit usage to avoid overages, or allow a consumer to switch networks. *Id.* ¶¶50-70, Figs. 2-5.

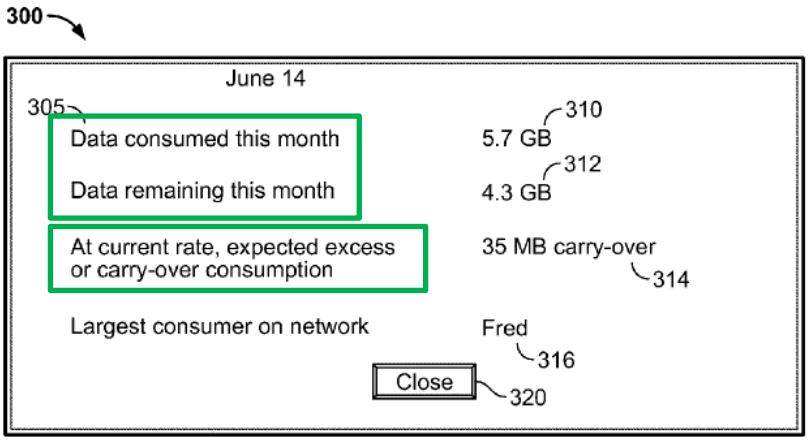


FIG. 3

Id., Fig. 3 (annotated).

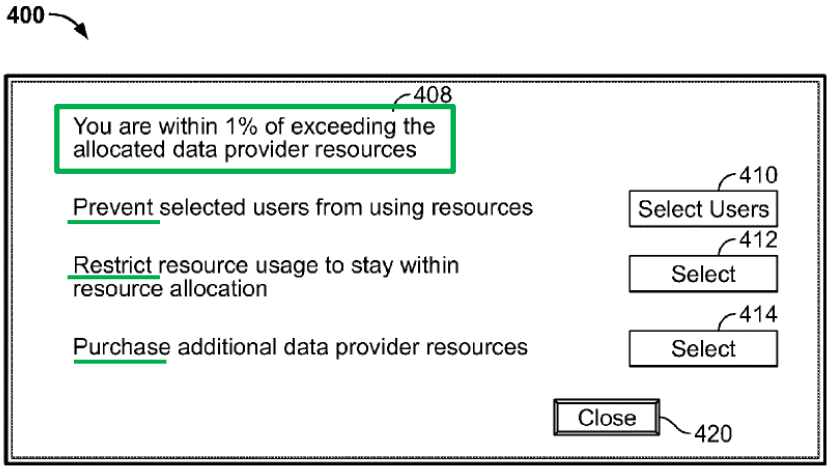


FIG. 4

Id., Fig. 4 (annotated).

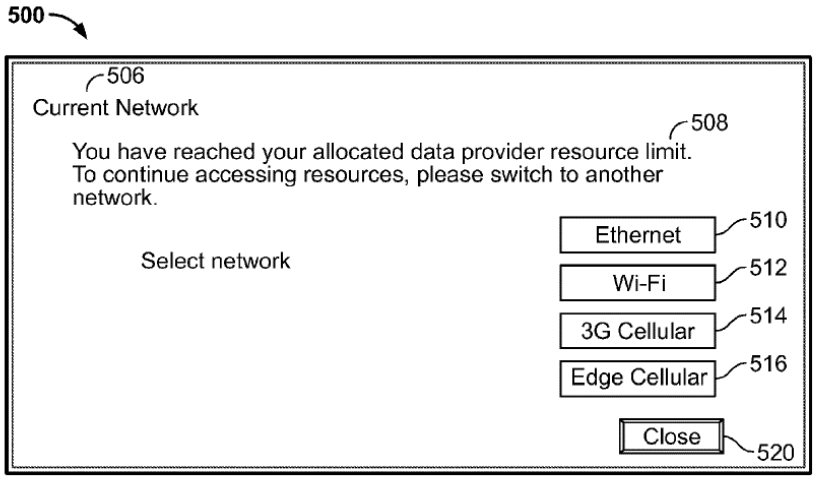


FIG. 5

Id., Fig. 5 (annotated).

D. Overview of Freund

62. Freund issued November 16, 1999, from an application filed May 6, 1997. Freund teaches systems and methods for "[c]lient-based monitoring and filtering of access." Freund, Abstract. Freund teaches that corporate information systems ("IS") departments address "unprecedented challenges" stemming from opening "previously-closed [corporate] computing environments . . . to a worldwide network of computer systems." *Id.*, 1:58-2:14. Freund teaches monitoring and controlling client access to networks and describes both centralized and decentralized access-control functionalities. *Id.*, 2:15-3:34, 3:51-59. Freund teaches that its methods may be implemented by LAN administrators or "Internet Service Providers (ISPs) or similar organizations." *Id.*, 4:5-8, 12:66-13:2, 21:47-56.

63. Freund teaches a client with a client monitor application 311 responsible for intercepting, interpreting, monitoring, logging, and filtering network communications associated with various applications; "keeping a list of currently active processes; [and] intercepting certain keyboard, mouse[,] and other interactive user activities in order to determine which process[es are] actively used." *Id.*, 2:29-39, 4:30-39; 5:44-45, 6:7-15, 13:23-33, 14:52-62, 15:13-18, 15:28-30, 21:21-28, 29:17-30:49. The client monitor receives, from an "access management application" on a central station, "access rules" governing which individual or groups of clients, applications, or protocols are authorized to access the Internet and criteria for how and when the access rules should be applied and/or disclosed. *Id.*, 3:60-4:28; *see, e.g.*, *id.*, 5:38-41, 8:48-53, 9:29-36, 12:54-61, 12:66-13:22, 15:33-16:3, 21:28-33, 23:65-27:50. The client monitor can then "determine if [a] 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 for the given specific user." *Id.*, 4:46-54; *see also id.*, 5:46-51, 5:55-64, 8:45-47, 10:8-13, 10:55-58, 11:9-15, 13:39-47, 15:30-33, 16:8-29. The client monitor may restrict network traffic in many ways, such as by "denying Internet access, issu[ing] a warning, redirecting the access, creating a log entry," "disallowing (i.e., blocking)" access, or "patch[ing]" or "modify[ing]" messages. *Id.*, 4:26-28, 5:61-64, 19:57-60, 21:12-20.

64. Freund's client monitor may "detect[] interactive commands (e.g., keyboard/mouse)" to determine when an application is "active[ly]" using the Internet and is in the "foreground," as opposed to being "passive[ly]" used by the client in the "background." *Id.*, 6:7-15, 8:63-9:3, 10:8-10, 10:17-27, 10:40-43. The client monitor may "maintain[] a list of active [a]pplications (processes)" and intercept the WinSock send() and/or recv() calls of those applications to determine "the time[s] of the call[s]" and whether the calls "use[] an Internet protocol usually associated with interactive activity." *Id.*, 30:11-22. Additionally or alternatively, the client monitor may intercept keyboard and mouse messages sent by the client's operating system (e.g., Windows) to a window, then "identif[y] the target window and [a]pplication of the message." *Id.*, 30:30-35.

VIII. OPINIONS ON UNPATENTABILITY

65. In the analysis that follows, I identify the following prior art and combinations of prior art that, in my opinion, anticipate and/or render obvious the claims of the '541 patent:

Section	Combination of Prior Art References
A	Rao anticipates and/or renders obvious claims 1, 3-6, 8-26, 28, 34, 35, 39, 45, 49, 50, 58-62, 64, 79-83, 87-90, 157, 165, 169, 171, and 172 under 35 U.S.C. §§ 102, 103.
B	Rao in view of Fadell renders obvious claims 1, 2, 7, 27, 30-33, 36-38, 40-43, 46, 63, 65-78, 91-96, 99, 102-20, 121-38, 140-56, 158-64, 166-68, 170, 173, and 174 under 35 U.S.C. § 103.
C	Rao in view of Freund renders obvious claims 29, 44, 47, 48, 51-57, and 84-86 under 35 U.S.C. § 103.
D	Rao in combination with Fadell and in further view of Freund renders obvious claims 97, 98, 100, 101, and 139 under 35 U.S.C. § 103.

A. Rao Anticipates and/or Renders Obvious Claims 1, 3-6, 8-26, 28, 34, 35, 39, 45, 49, 50, 58-62, 64, 79-83, 87-90, 157, 165, 169, 171, and 172

1. Rao's "Embodiments"

66. Rao occasionally explains that its disclosures may relate to distinct embodiments, but Rao explicitly invites a POSITA to combine them, noting that "any of the techniques of the present invention, such as the illustrative methods of FIGS. 2B, 3B, 3C, 4, 5B, and 6B, can be practiced in one or more combinations with each other." Rao ¶218 (noting that Rao's "peer-to-peer routing technique may be practiced with the false acknowledgement and/or MTU adjustment techniques," and "further combined with the client-side application-aware prioritization technique and/or the network disruption shielding technique"); *see also id.* ¶¶74, 131 ("The present invention provides the following techniques, which may be practiced stand-

alone or in any combination: 1) peer-to-peer route optimization, 2) communications via a lossless protocol of packets constructed for transmission via a lossy protocol, 3) reducing network fragmentation by adjusting maximum transmission unit (MTU) adjustment to account for encryption, 4) client-side application-aware network communication prioritization, and 5) shielding a device from network disruption."), 182-83 (explaining that a POSITA "will recognize and appreciate the multitude of ways to define client-side application priorities").

67. In view of Rao's express instruction to use these "embodiments" together, a POSITA would have understood Rao to disclose various aspects of a single system. Moreover, even if Rao's "embodiments" were found to be distinct disclosures of separate inventions, a POSITA would have been motivated and found it obvious to combine the various features of those embodiments into a single system in view of Rao's express invitation and the benefits Rao teaches.

2. Claim 1

a. [1a] "A non-transitory computer-readable storage medium storing machine-executable instructions that, when executed by one or more processors of a wireless end-user device, cause the one or more processors to:"

68. To the extent it is determined that the preamble is limiting, Rao teaches a non-transitory computer-readable storage medium storing machine-executable instructions that, when executed by one or more processors of a wireless end-user device, cause the one or more processors to perform operations.

69. For example, Rao teaches a client 105 that is "any type and/or form of computing device such as a personal computer or computer server." *See, e.g.*, Rao ¶¶118-31, Figs. 1A, 1B, 1C, 1D, 1E. Rao teaches that "each computing device 102 includes a ***central processing unit 102***, and a ***main memory unit 104***."[3,4] *Id.* The central processing unit 102 may be "any logic circuitry that responds to and processes instructions fetched from the main memory unit 104." *Id.* ¶119. Main memory unit 104 may be "one or more memory chips capable of storing data and allowing any storage location to be directly accessed by the microprocessor 100." *Id.* ¶120. Rao teaches that main memory unit 104 may be volatile or non-volatile memory, such as DDR SDRAM (volatile) and/or FRAM (non-volatile). *Id.* Rao also teaches that

> computing device 102 may further comprise a ***storage device 128***, such as one or more hard disk drives or redundant arrays of independent

[3] Rao identifies a "central processing unit" and "computing device" with the same numeral "102." I understand that, while numbered the same, these terms describe separate structures: the central processing unit of the computing device, and the computing device itself. Rao also refers to a main memory unit and network with the same numeral "104." Again, I understand these to respectively describe the main memory unit of the computing device and the network that the computing device communicates with or through.

[4] All emphasis is added unless otherwise noted.

> disks, for storing an operating system and other related software, and for storing application software programs such as any program related to the remote access client 120 of the present invention.

Id. ¶124. In one embodiment, remote access client software 120 is stored on storage device 128. *Id.*, Fig. 1D.

70. Accordingly, Rao teaches both a non-transitory computer-readable storage medium and one or more processors.

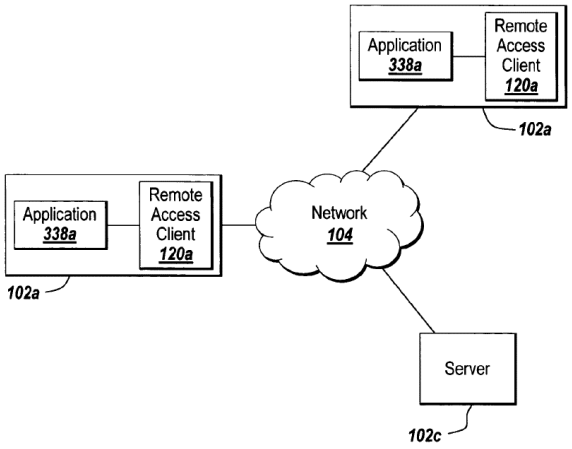


Fig. 1B

Id., Fig. 1B.

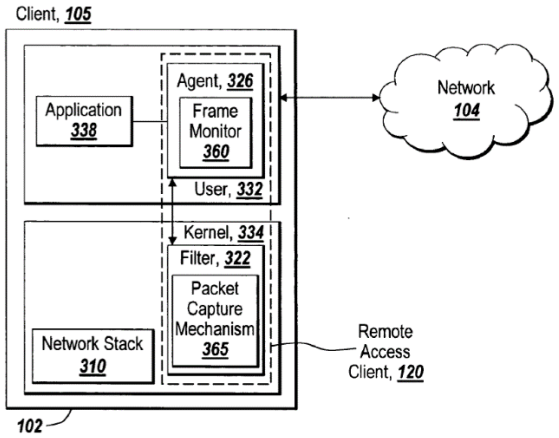


Fig. 1C

Id., Fig. 1C.

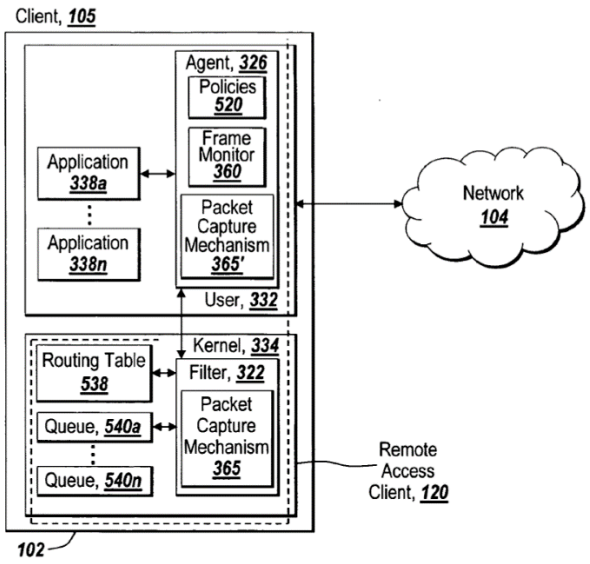


Fig. 5A

Id., Fig. 5A.

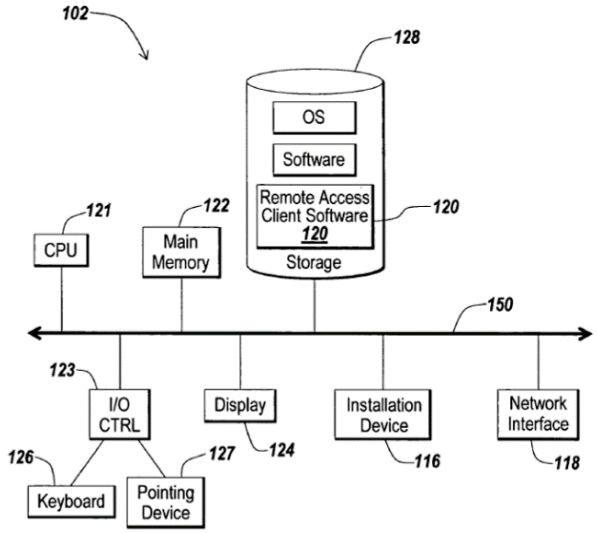


Fig. 1D

Id., Fig. 1D.

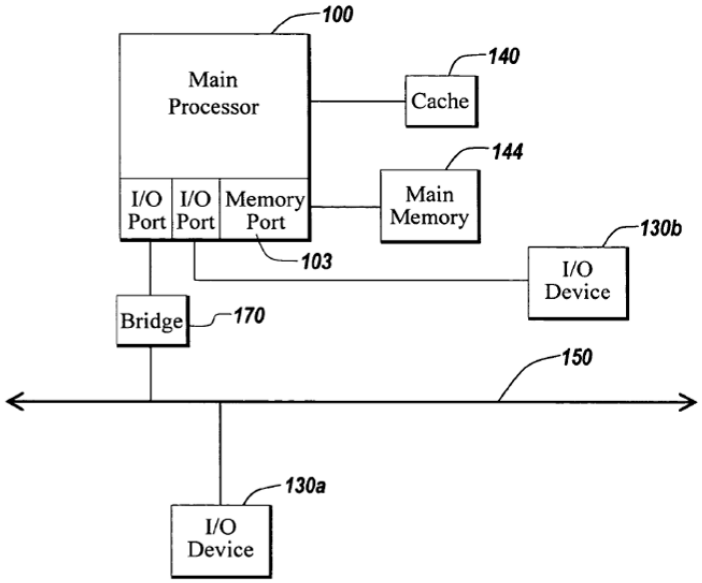


Fig. 1E

Id., Fig. 1E.

71. Rao teaches that the "central processing unit" of computing device 102 "responds to and processes ***instructions*** fetched from the main memory unit 104." *Id.* ¶119. A POSITA would have understood that instructions must be stored (e.g., in main memory unit 104/storage device 128) for the CPU to fetch the instructions. Rao further teaches that the "remote access client 120, or any portion thereof . . . may comprise an application, module, service, computer program, software component, web service, web component, library, function, process, task, thread, or any other type and/or form of ***executable instruction*** which is designed to and capable of executing the functionality of the present invention." *Id.* ¶116. Storage

device 128 also "stor[es] an operating system and other related software," as well as "***application software programs*** such as any program related to the remote access client 120 of the present invention." *Id.* ¶124. This teaches machine-executable instructions stored on the non-transitory computer-readable storage medium that, when executed by one or more processors of a wireless end-user device, cause the one or more processors to perform operations.

72. Computing device 102 may be a wireless device: "computing device 102 may include a network interface 118 to interface to a Local Area Network (LAN), ***Wide Area Network (WAN)*** or the Internet through a variety of connections including, but not limited to, standard telephone lines, LAN or ***WAN links*** (e.g., ***802.11***, T1, T3, 56 kb, X.25), broadband connections (e.g., ISDN, Frame Relay, ATM), ***wireless connections***, or some combination of any or all of the above." *Id.* ¶125; *see also id.* ¶100 ("The network stack 310 may comprise one or more protocols, such as the TCP/IP protocol over Ethernet or a ***wireless protocol***, such as ***IEEE 802.11***, as those skilled in the art will recognize and appreciate."). This teaches a "wireless" end-user device, as claimed.

73. Rao further teaches that computing device 102 of client 105 is an "end-user" device: "computing device 102 can be any workstation, desktop computer, ***laptop or notebook computer***, server, ***handheld computer***, ***mobile telephone***, any other computer, or other form of computing or telecommunications

device that is capable of communication and that has sufficient processor power and memory capacity to perform the operations described herein." *Id.* ¶130. The computing device 102 serves as a "***client 105***" in a client-server and/or peer-to-peer network. *Id.* ¶¶79-116. Rao further teaches that "computing device 102 (herein also referred to as a ***client 105***)" may have "an operating system that includes a ***user mode*** 332, also referred to as an application or user space." *Id.* ¶99.

b. [1b] "identify a service usage activity of the wireless end-user device, the service usage activity being associated with a first software component of a plurality of software components on the wireless end-user device,"

74. Rao teaches identifying a service usage activity of the wireless end-user device, the service usage activity being associated with a first software component of a plurality of software components on the wireless end-user device.

75. For example, Rao teaches "client-side application-aware prioritization techniques" associated with communications over a wireless network by an application on client 105. *See, e.g.*, Rao ¶¶3-4, 38-47, 80, 99-117, 179-95, Figs. 1A, 1B, 1C, 5A, 5B. As discussed below, Rao's prioritization techniques disclose the claimed "identify[ing] by "intercepting," "inspecting," and/or "storing" network packets in steps 555, 560, and 565. *Id.* ¶¶41-46, 102, 105, 184-86, Fig. 5B (Steps 555, 560, 565).

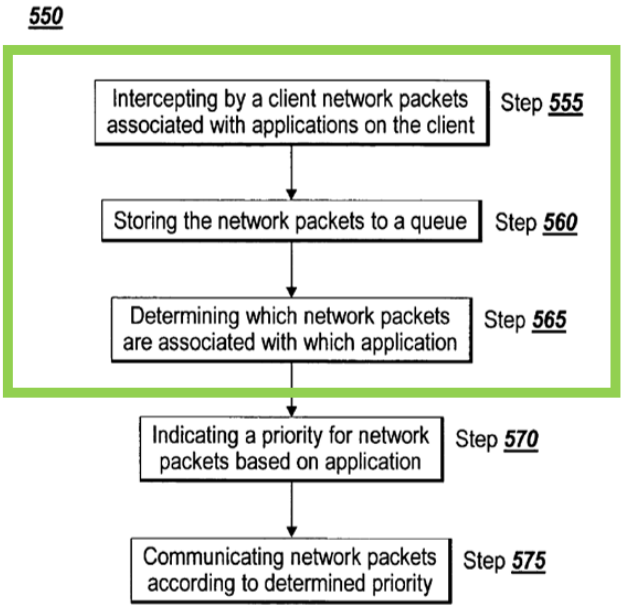


Fig. 5B

Id., Fig. 5B (annotating Steps 555, 560, 565).

76. Rao teaches "a first software component of a plurality of software components on the wireless end-user device." For example, Rao teaches that client 105 may "execute ***one or more applications 338a-338n***, which access the network 104 via the agent 326 and filter 322 of the remote access client 120." *Id.* ¶179; *see also id.* ¶¶87-91, 180-95. Each application is or includes a software component on the wireless end-user device. *See, e.g.*, *id.* ¶¶184 (describing "applications 338*a*-338*n* on the client 105"), 188 (describing application "memory usage" and "execution time"). The applications disclosed by Rao are or include a plurality of software components on the wireless end-user device.

77. Rao's one or more applications are associated with "service usage activity." In embodiments, Rao teaches that "the applications 338*a*-338*n* provide one or more real-time data communications, such as VoIP" or "email, collaboration, online meeting, and/or desktop sharing related services or functionality." *Id.* ¶¶179, 184, 192. Rao's applications correspond with the disclosed applications in the '541 patent, including "a voice connection (e.g., coded voice connection or voice over IP (VoIP) connection)," "an email text connection," "an email download connection," "a streaming media connection," "a network connection flow or stream, a socket connection, a TCP connection, a destination/port assigned connection, an IP connection, a UDP connection, an HTTP or HTTPS connection, a TLS connection, an SSL connection, a VPN connection, [and] a general network services connection." EX-1001, 19:8-37.

78. Rao teaches "identify[ing] a service usage activity of the wireless end-user device . . . associated with a first software component of a plurality of software components on the wireless end-user device" in several ways. For example, Rao teaches that client 105 may also include filter 322 and agent 326, which "form [a] remote access client 120 for routing packets via a network, or for otherwise providing remote access connectivity." Rao ¶¶99, 179-81. Filter 322 may include a packet capture mechanism 365 that "may ***intercept*** any of the network traffic of the client 105, such as network packets associated with the application 338." *Id.* ¶104;

see also id. ¶¶52, 101-16, Fig. 1C. Rao alternatively teaches that packet capture mechanism 365 may be included in the agent 326 "instead of or in addition to the filter 322," and that it "may use any hooking application programming interface (API) to ***intercept, hook, or otherwise obtain*** inbound and/or outbound packets of the client 105, such as the network traffic associated with application 338." *Id.* ¶110, Fig. 5A.

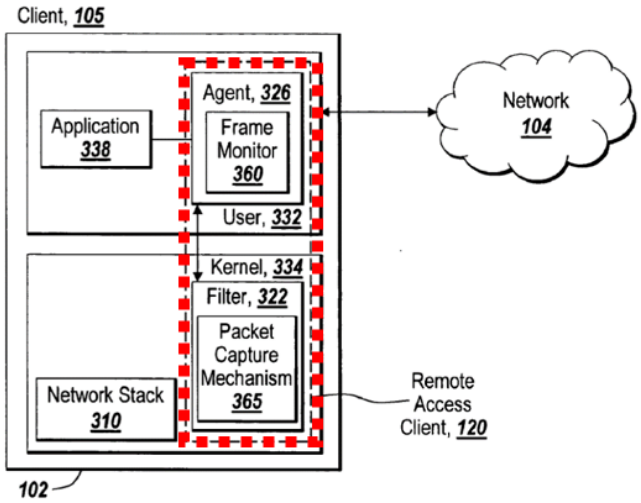


Fig. 1C

Id., Fig. 1C (annotating remote access client 120).

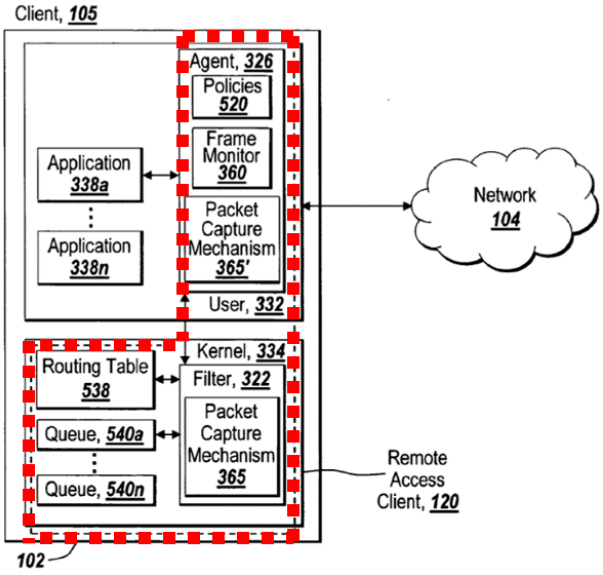


Fig. 5A

Id., Fig. 5A (annotating remote access client 120).

79. Rao's "intercepting" network packets associated with applications 338*a*-338*n* teaches the claimed "identify[ing] a service usage activity." A POSITA would have understood that intercepting a network packet is identifying a packet for processing, or at a minimum that intercepting a network packet requires identifying a network packet. Rao's intercepting is consistent with the '541 patent, which describes embodiments of its "traffic control" as "***intercepting***" API level or "application messaging layer requests (e.g., socket open/send requests)," where the intercepted requests "can be copied (e.g., to memory) and queued (e.g., delayed or throttled) or dropped (e.g., blocked)." EX-1001, 96:66-97:54.

80. Rao also teaches the claimed "identify[ing]" by disclosing that "the network packets intercepted at step 555 may be ***stored*** in a queue 540*a*-540*n*." Rao

¶186, Fig. 5C (Step 565); *see also id.* ¶¶180 ("[T]he queues 540*a*-540*n* may be associated with or assigned to network packets related to applications 338*a*-338*n* of the client 105."), 184, 191-93. "At step 565, a priority for the intercepted and queued network packet is determined based on the type and/or priority of the application 338*a*-338*n*." *Id.* ¶184. A POSITA would have understood that storing an intercepted network packet in a queue that corresponds to a particular application or service level is identifying a network packet, or that at a minimum storing an intercepted network packet requires identifying a network packet. Rao's storing is consistent with the '541 patent, which describes embodiments of its "traffic control" as intercepting API level or "application messaging layer requests (e.g., socket open/send requests)" so that the intercepted requests "can be ***copied (e.g., to memory)*** and ***queued*** (e.g., delayed or throttled)." EX-1001, 96:66-97:54.

81. Rao further teaches the claimed "identify[ing]" by disclosing that filter 322 "can ***inspect*** the contents of the packets, such as routing information, to determine the action to take" against the packets. Rao ¶102; *see also id.* ¶¶105-07 ("[T]he filter 322 intercepts all outbound packets of the client 105 for inspection."). Rao teaches that, at Step 565, "agent 326 ***identifies*** the network packet as generated from an application 338*a*-338*n* by any of the content of the network packet, such as any headers, fields, or the type and content of data in the payload of the network packet." *Id.* ¶187. It may do so by "matching information from the routing table 538,

such as source and destination IP addresses and ports numbers with the IP addresses and ports numbers of the network packet," and in some embodiments "perform[ing] a checksum on the packet to verify that the identified application actually generated the packet." *Id.* Rao teaches that Step 565 may precede Step 560 in certain embodiments by disclosing that network packets may be "stored to a determined priority queue 540*a*-540*n* or a queue 540*a*-540*n* associated with an application 338*a*-338*n* ***after*** . . . steps 565 and/or step 570." *Id.* ¶186.

82. A POSITA would have understood that inspecting and associating a network packet is identifying a packet and its contents, or that at a minimum inspecting and associating a network packet requires identifying a network packet. Rao's inspecting is also consistent with the '541 patent's corresponding description of identifying a service usage activity, which includes "monitoring a network service usage activity of a device in network communication (e.g., wireless network communication)." EX-1001, 69:5-35, Fig. 14; *see also id.*, 70:57-71:3, Fig. 18. The '541 patent teaches that embodiments of service usage monitoring "include[] characterizing service usage activities by streams, flows, destination/port, [and/or] packet inspection." *Id.*, 87:54-65. This is also consistent with dependent claim 17, which recites that "identify[ing] a service usage activity of the wireless end-user device comprises identify[ing] the service usage activity based on . . . a packet inspection." *Id.*, Claim 17. Rao's associating an application with a network packet

is further consistent with the '541 patent's "identify[ing]." *See id.*, 72:22-28 (disclosing "identifying" service activities by "application headers"), Claim 8. I note that Rao teaches "indicating" a priority for the packets based on the associated application (step 570), which a POSITA would recognize, confirms that they are identified as claimed. Rao, Fig. 5B.

83. Rao's network packets also disclose the claimed "service usage activity" because Rao teaches that the network packets are bound for network 104, which may be a wireless network. Rao ¶¶41-46; *see also id.* ¶¶101-16, 52, Figs. 1C, 5A. This corresponds with the '541 patent's description of a network service usage activity as "any activity by [a] device that includes ***wireless*** network communication." EX-1001, 19:8-37.

c. [1c] "the service usage activity comprising one or more prospective or successful communications over a wireless network;"

84. Rao teaches that the service usage activity comprises one or more prospective or successful communications over a wireless network.

85. For example, Rao teaches that remote access client 120 "intercept[s] network traffic of any of the applications 338*a*-338*n* of the client 105," where remote access client 120 of computing device 102 "is connected to network 104." Rao ¶¶179-80. Rao teaches that "computing device 102 may include a network interface 118 to interface to a Local Area Network (LAN), ***Wide Area Network (WAN)*** or the

Internet through a variety of connections including . . . ***wireless connections***." *Id.* ¶125. Rao further teaches that network 104 can be a "local-area network (LAN), . . . or a wide area network (WAN), such as the Internet or the World Wide Web," and that client 105 and gateway 340 may connect to "***wireless connections***" including "IEEE 802.11, IEEE 802.11a, IEEE 802.11b, [or] IEEE 802.11g." *Id.* ¶95. Rao also teaches that packet capture mechanism 365 may "obtain ***inbound and/or outbound*** packets of the client 105, such as the network traffic associated with application 338." *Id.* ¶110; *see also id.* ¶185 (same).

86. Rao's outbound and/or inbound network packets associated with wireless network 104 teaches "the service usage activity comprising . . . communications over a wireless network." Rao's intercepting, inspecting, and/or storing network packets associated with network 104 in queues before communicating them from the queues teaches identifying one or more ***prospective*** communications over a wireless network. *See id.* ¶¶184 ("[A]t step 555 . . . , the client 105 intercepts one or more network[] packets associated with an application 338*a*-338*n* on the client 105, and, at step 560, the network packets are stored to a queue 540*a*-540*n*."); *see also id.* ¶¶105, 110-11, 180, 184-86, 194-95. Rao's intercepting "inbound . . . [network packets] of the client 105 . . . associated with application 338" teaches identifying one or more ***successful*** communications over a wireless network. *Id.* ¶184. So does Rao's communicating outbound network

packets from the queues. *See id.* ¶¶184 ("[A]t step 575, the network packets are communicated according to the determined priority."), 189-95.

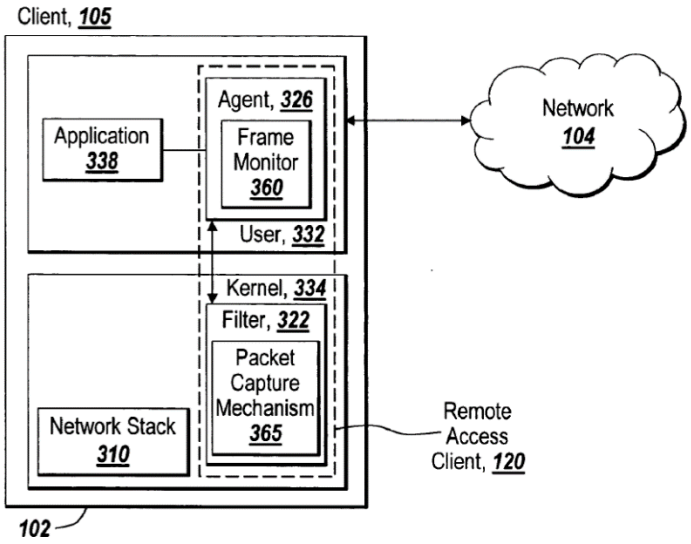


Fig. 1C

Id., Fig. 1C.

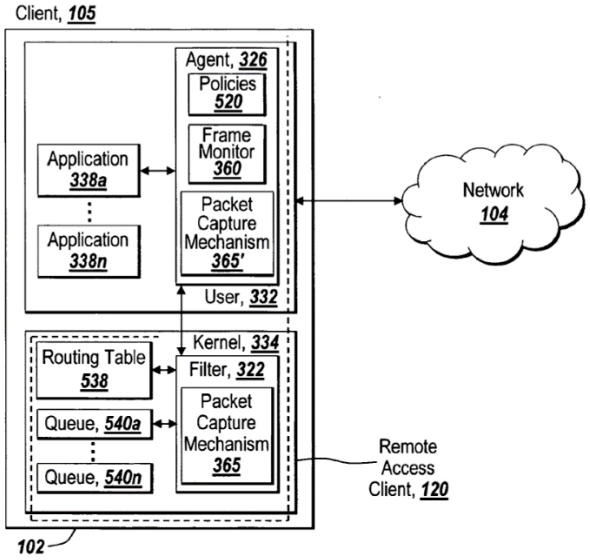


Fig. 5A

Id., Fig. 5A.

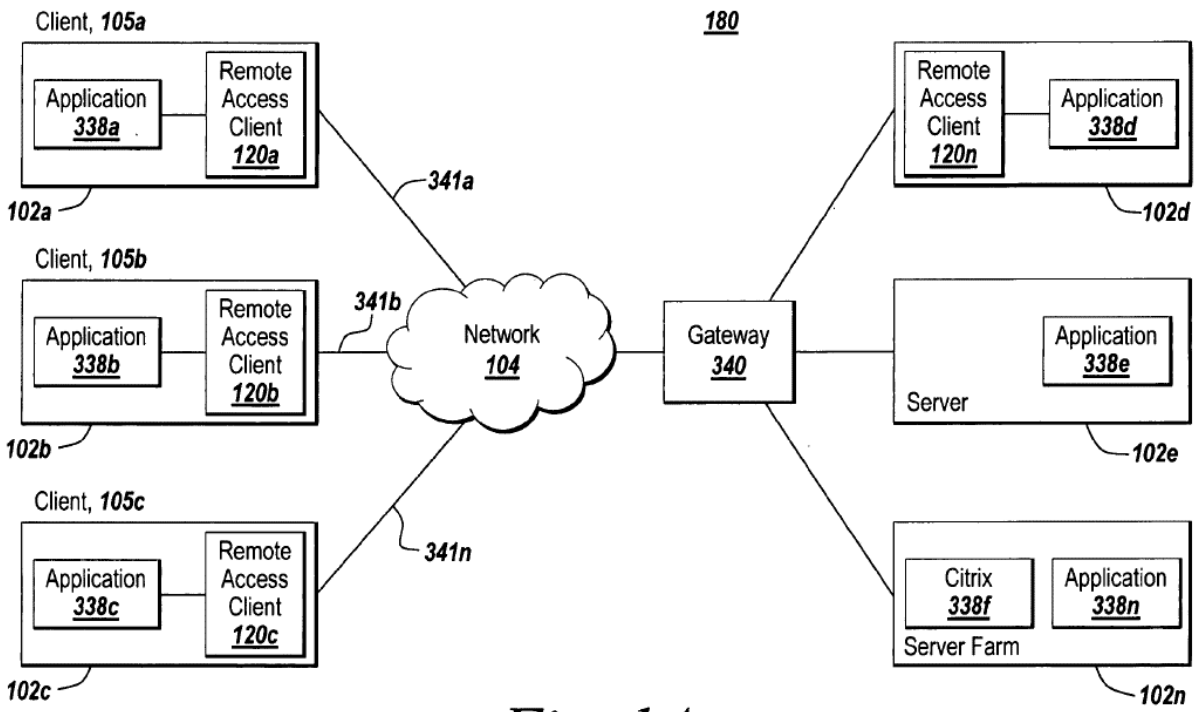


Fig. 1A

Id., Fig. 1A.

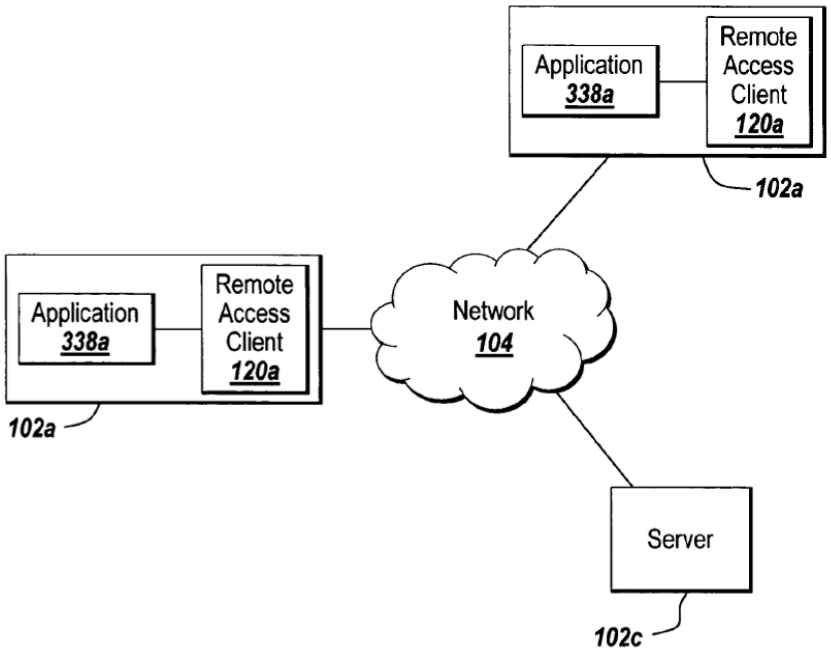


Fig. 1B

Id., Fig. 1B.

d. [1d] "determine whether the service usage activity comprises a background activity;"

87. Rao teaches determining whether the service usage activity comprises a background activity.

88. For example, Rao teaches that, after intercepting packets from application 338*a*-338*n*, remote access client 120 "***determines*** the association of network packets with applications 338*a*-338*n* in order to determine priorities and apply any priority based policies 520." Rao ¶187. During this process, Rao teaches that remote access client 120 may "***determine*** whether the application 338*a*-338*n* associated with the network packet is running in the foreground or the background

of the client 105." *Id.* ¶188; *see also id.* ¶¶38-41 ("The client ***determines*** the queued one or more network packets is associated with a first application of the client." . . . "In some embodiments, the first application is running in the foreground, and ***[a] second application is running in the background***."); 182 (describing policies "based on whether an application is running in the foreground or the background of the client 105"). Rao makes this determination in, for example, step 565 of method 550 when the network packet is associated with an application. *Id.* ¶¶187-88.

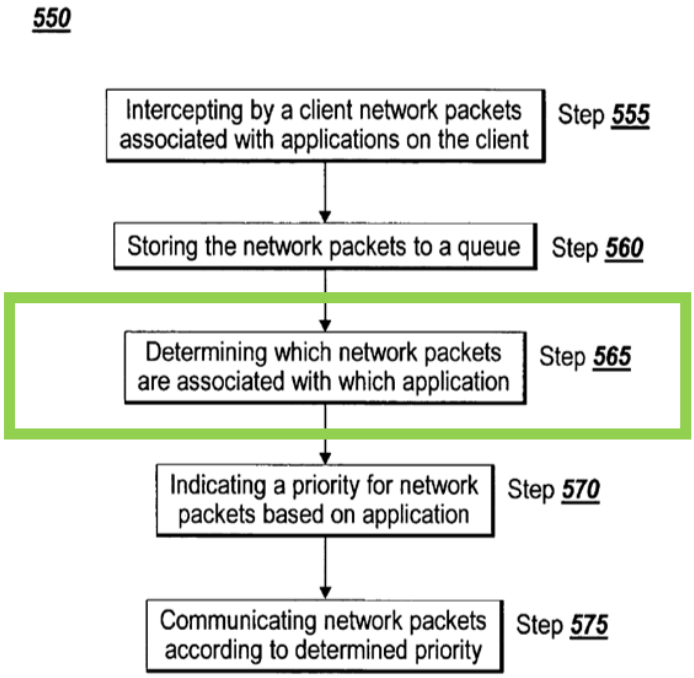


Fig. 5B

Id., Fig. 5B (annotating Step 565).

89. A POSITA would have understood that, by determining whether network packets are associated with an application "running in the background,"

Rao's remote access client 120 determines that the service usage activity associated with that application "comprises a background activity." A POSITA also would have understood that, by determining whether network packets are associated with an application running in the background of client 105, Rao's remote access client 120 determines whether the service usage activity associated with a first software component comprises a background activity, as claimed.

90. A POSITA would have further understood that determining whether an activity is a background activity was well known, as evidenced by, for example, Rao. Moreover, a POSITA would have recognized that the particular methodology for making that determination (several examples of which are identified in dependent claims) would have been a simple design choice and would have had a reasonable expectation of success in choosing among the finite number of known options for making such a determination.

e. [1e] "determine at least an aspect of a policy based on a user input obtained through a user interface of the wireless end-user device or based on information from a network element,"

91. Rao teaches determining at least an aspect of a policy based on a user input obtained through a user interface of the wireless end-user device or based on information from a network element.

92. For example, Rao teaches that remote access client 120 may include "***one or more policies 520*** for specifying client-side prioritization of network

communications related to applications 338*a*-338*n*." Rao ¶182. Rao's "one or more policies 520" teaches a "policy," as claimed.

93. In one embodiment, Rao teaches that policies 520 "may be ***accessible*** by the agent 326, ***configured*** into the agent 326, or ***loaded*** by the agent 326." *Id.* ¶183. For example, Rao teaches that "the policies 520 may be ***provided by or downloaded via the gateway 340***" over network 104. *Id.* ¶183, Fig. 1A. Clients 105 "communicate over the network 104 to the gateway 340." *Id.* ¶87; *see also id.* ¶¶90-96. This teaches determining at least an aspect of a policy "based on information from a network element," as claimed.

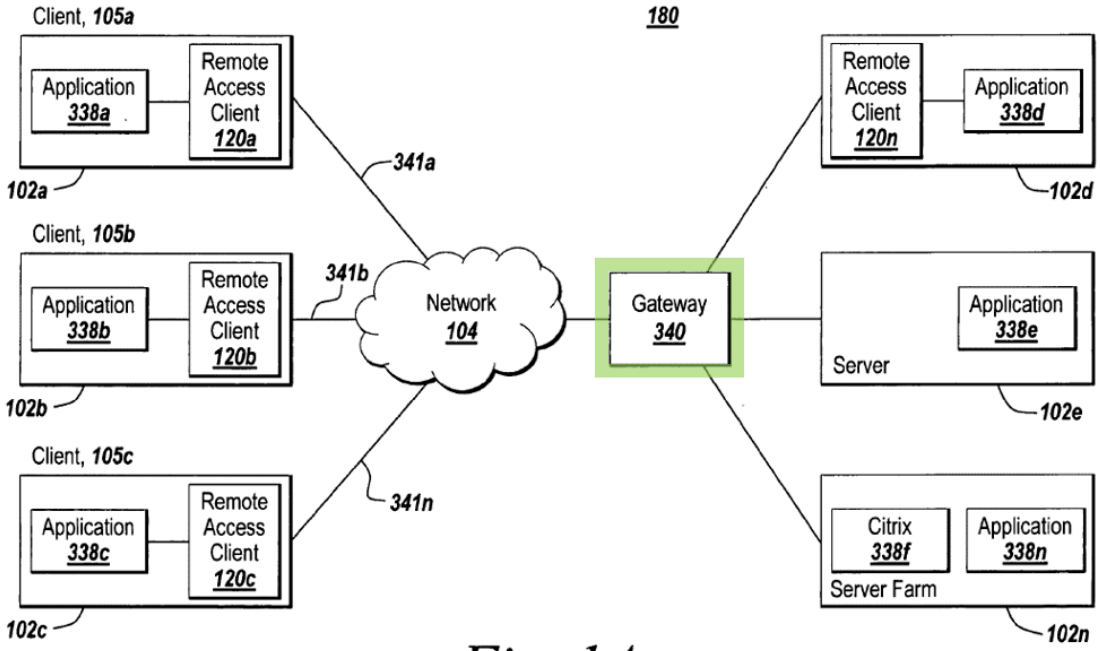


Fig. 1A

Id., Fig. 1A (annotating gateway 340).

94. Rao also teaches determining at least an aspect of a policy "based on a user input obtained through a user interface of the wireless end-user device." For example, Rao teaches that policies 520 "may be configurable ***by a user*** by any suitable means and/or mechanism." *Id.* ¶183. In one embodiment, "agent 326 may provide a configuration mechanism such as ***a user interface, graphical or otherwise, design[ed] and constructed for configuring or specifying the policies 520***." *Id.*

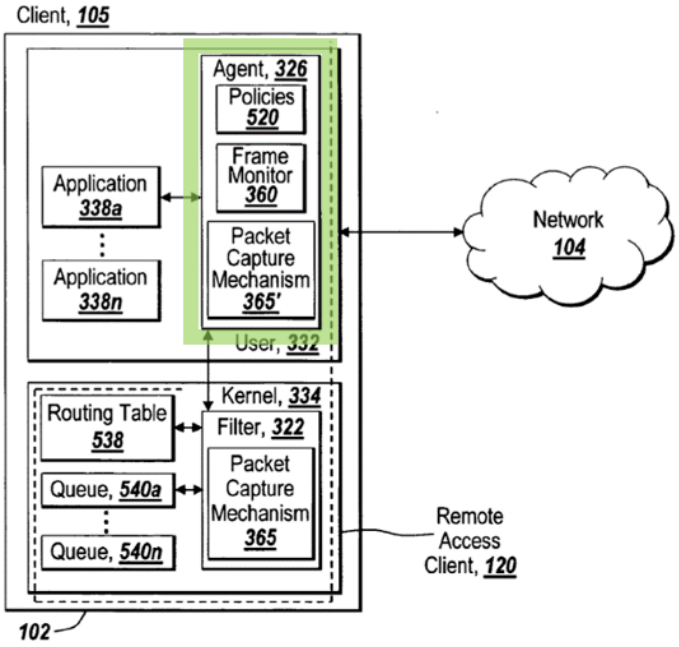


Fig. 5A

Id., Fig. 5A (annotating agent 326). Rao teaches that agent 326 is part of the wireless end-user device. *See supra* Limitation [1a].

95. Rao teaches that policies 520 may "define prioritization based on whether an application is running in the foreground or the background of the client

105." Rao ¶182; *see also id.* ¶¶38-43, 180, Figs. 5A, 5B. A POSITA would have understood that Rao's defining priorities for network packets, including those associated with background or foreground applications, teaches the claimed "policy." The specific priorities assigned to the network packets—e.g., the priorities (e.g., whether they are communicated last or first) assigned based on whether the applications associated with the packets are background or foreground applications in view of the user input or information from gateway 340—teaches an "aspect" of the policy that is ultimately applied.

96. To the extent Rao does not expressly disclose determining at least an aspect of the "policy." Rao teaches this and thus renders this limitation obvious. As discussed, Rao teaches that its policies may "define prioritization" on an application-by-application basis and based on whether an application is running in the foreground or the background of client 105, and that "[e]ach network packet may be placed and arranged in a ***priority order*** respective to all other intercepted network packets ***to provide a packet by packet prioritization*** across all applications 338*a*-338*n* and intercepted network packets." *Id.* ¶191. Rao therefore teaches assigning priority based on an application running in the background and arranging the network packets according to a defined priority order within one or more queues. A POSITA would have been motivated to obtain information from the network or the user to determine the prioritization to be applied (both generally and to the specific

application and associated packets) to implement the system as Rao suggests. *See, e.g.*, *id.* ¶184 ("The client 105, using the techniques of the present invention, may prioritize the real-time data communications of application 338*a* ahead of other applications, such as non-real-time data communication applications.").

f. [1f] "the policy to be applied if the service usage activity is the background activity, the policy at least for controlling the service usage activity,"

97. Rao teaches the policy to be applied if the service usage activity is the background activity, the policy at least for controlling the service usage activity.

98. For example, Rao teaches that policies 520 may "define prioritization [of network packets] based on ***whether*** an application is running in the ***foreground or the background*** of the client 105." Rao ¶182; *see also id.* ¶¶40-42, 188-89. Rao teaches that, "[w]ithin each application associated queue 540*a*-540*n* organized by specific application 338*a*-338*n*, type or category of application 338*a*-338*n*, or by protocol, the network packets may be further prioritized by the ***characteristic of the application 338a-338n*** generating them, e.g., a ***foreground application***." *Id.* ¶193.

99. Rao also teaches that "the policies 520 may be specified ***conditionally***, such as if one application 338*a* is running, a second application 338*b* may have a higher or lower priority." *Id.* ¶182. In certain circumstances, "one or more queues 540*a*-540*n* may be used for network packets intercepted but ***not prioritized*** because

a policy 520 does not . . . apply to the network packet, or the policies 520 indicate to ignore or not process the network packet for prioritization." *Id.*

100. Rao therefore teaches policies that are conditional and apply based on the characteristics of the applications, such as whether the applications (and thus, the associated network communications/service usage activities) are running in the foreground or background. Rao's policies 520 defining prioritization based on whether an application running in the background of client 105 (e.g., assigning a specific priority to the service usage activity associated with the application) teaches a policy to be applied if the service usage activity is the background activity.

101. Rao teaches that policies 520 may "control[] the service usage activity," as claimed, by teaching that, after the network packets are prioritized in step 570, they are communicated "according to the determined priority" in step 575. *Id.* ¶¶189-95; *see also id.* ¶¶40-41 ("preventing" a network packet from being communicated ahead of other packets and "holding" the packet in a queue before "releasing" the held packet, where "[a] first application is running in the foreground, and [a] second application is running in the background").

102. To the extent it is argued Rao does not expressly disclose applying a policy "if" the service usage activity is the background activity, it would have been obvious to modify Rao to apply a policy in this manner. For example, a POSITA would have found it obvious to modify Rao to apply a priority to network packets in

queues 540*a*-540*n* "if" they were received from applications running in the background (e.g., from background service usage activities). In doing so, the determined aspect of Rao's policy would have been, for example, for remote access client 120 to identify characteristics of network packets and specifically focus on deprioritizing background applications associated with background service usage activity. A POSITA would have understood that, where an application is running in the background, an associated service usage activity is also occurring in the background. The policy would have applied a priority (e.g., a lower priority) to network packets if they were determined to be from background activities.

103. A POSITA would have found it obvious to modify and/or apply Rao in this manner because Rao teaches doing so. For example, Rao teaches that its policies can be "conditional[]," that they can include prioritization rules based on "characteristic[s] of the application 338*a*-338*n* generating them, e.g., a foreground application [or not]," and that certain network packets may be "intercepted but not prioritized" because a policy does not apply to those packets. *Id.* ¶¶182, 193; *see also id.* ¶¶40-42, 188-89.

104. A POSITA also would have been motivated to modify Rao in this way because it would have improved Rao's system and furthered its objectives. For example, applying a policy that assigns, e.g., a lower priority if a network packet is background activity would have improved Rao's system by deprioritizing

background activities relative to activities associated with active applications, as Rao teaches. *See* Rao ¶3 (disclosing that it is not desirable to have background network activities be placed ahead of the activities of active applications running in the foreground). This would have reduced network congestion caused by potentially unnecessary or unwanted background activities, improved available bandwidth for applications operating in the foreground, and improved the efficiency and speed of the system. This also would have isolated background activities a user may or may not have been aware of and given them a lower priority relative to the activities of active applications the user may be engaging with. Background requests for email, RSS feeds, and software updates, for example, would be deprioritized behind applications users are actively using or those requiring real-time communications.

105. Indeed, Rao recognizes this benefit and teaches deprioritizing background activities. In one example, Rao teaches deprioritizing background activity compared to real-time (e.g., VoIP) communication to avoid "increasing the latency and reducing the quality of the voice communication." Rao ¶3. Rao also recognizes the benefit of deprioritizing background activities relative to the activities of "other applications." *Id.* ¶¶80 (noting that this "improve or increase the performance, operational characteristics, and user experience on the client based on the applications running on the client"), 184 (prioritizing "real-time data communications . . . ahead of other applications"). A POSITA therefore would have

found it obvious to apply and/or modify Rao to apply a policy of deprioritizing a background activity behind a foreground activity if a network packet is determined to be background activity.

g. [1g] "and if it is determined that the service usage activity is the background activity, apply the policy."

106. Rao teaches that if it is determined that the service usage activity is the background activity, apply the policy.

107. For example, Rao teaches this limitation by applying a priority to network packets associated with background activity and transmitting those packets according to the applied priority.

108. For example, Rao teaches that remote access client 120 "indicates a priority for intercepted and queued network packets based on the application 338*a*-338*n* associated with the packet." Rao ¶189, Fig. 5 (Step 570). Rao teaches that "the agent 326 uses the policies 520 to ***apply a priority*** to network packets of applications 338*a*-338*n* in accordance with the prioritization rules specified or indicated by the policies 520," which may involve using "characteristics of the application 338*a*-338*n*, such as running in the foreground or ***background***, to indicate priority for a network packet of the application 338*a*-338*n*." *Id.* ¶189. Agent 326 then "indicates the priority to the filter 322 for management of network packet queues 540*a*-540*n* ***to apply*** the indicated priorities." *Id.* ¶¶189-93. The network

packets are then communicated from the queues "according to the determined priorities for the network packets." *Id.* ¶¶194-95, Fig. 5 (Step 575).

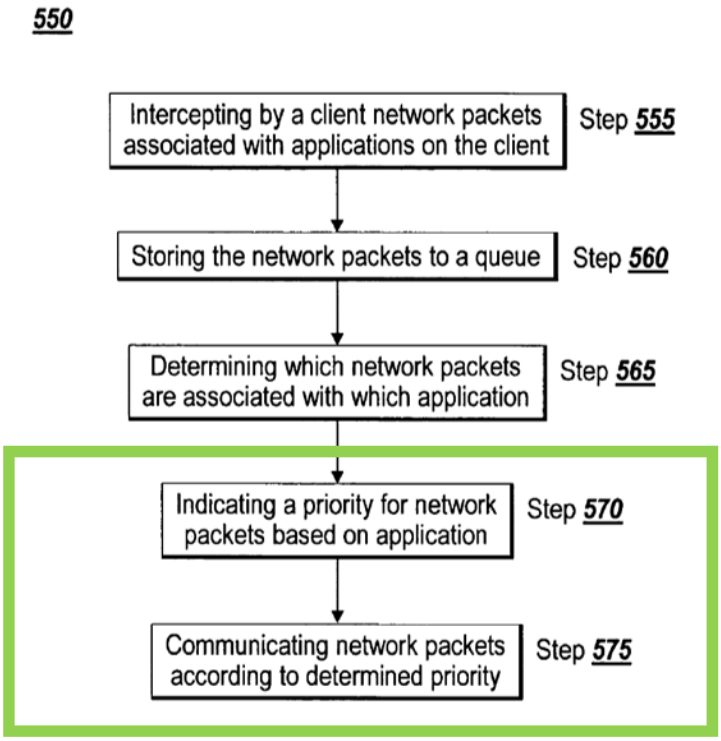


Fig. 5B

Id., Fig. 5B (annotating Steps 570, 575).

109. Rao applying prioritization to network packets determined to be from applications running in the background and communicating those packets according to the applied prioritization teaches applying the policy "if it is determined that the service usage activity is the background activity," as claimed.

110. To the extent it is argued Rao does not expressly disclose applying a policy "if" it is determined that the service usage activity is the background activity, it would have been obvious to modify Rao to apply a policy in that manner for the

reasons discussed above in connection with claim 1, limitation [1f]. *See supra* Limitation [1f]. For example, a POSITA would have found it obvious to modify Rao to apply, e.g., a lower priority to network packets in queues 540*a*-540*n* if they were received from applications running in the background (e.g., from background activity). As discussed, the policy would deprioritize network packets if they were determined to be from a background activity. A POSITA would have applied and/or modified Rao in this manner and been motivated to do so for the reasons discussed above in connection with claim 1, limitation [1f].

3. Claim 3

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein the one or more prospective or successful communications over the wireless network comprise a communication associated with a network access, background signaling, a cloud synchronization service, an information feed, a download, an e-mail, a chat client, a security update, a peer-to-peer networking application update, a report of a behavior associated with the wireless end-user device, or a combination of these."

111. Rao teaches this limitation.

112. For example, Rao teaches communication associated with a network access. Rao teaches that remote access client 120 intercepts, inspects, stores, and/or transmits "***network traffic*** of any of the applications 338*a*-338*n* of the client 105" before it is sent to network 104, and "queu[es] and prioritiz[es] ***network***

communications of the client 105." Rao ¶¶179-80; *see supra* Limitation [1c]. Rao also teaches that applications 338*a*-338*n* may "***access a network***, such as network 104." Rao ¶88. Rao disclosing that its network traffic (i.e., the "one or more prospective communications over the wireless network") is associated with applications 338*a*-338*n* that "access a network" teaches "one or more prospective or successful communications over the wireless network" associated with a network access.

113. Rao also teaches communication associated with "an e-mail," as claimed. Rao teaches that "one or more of the applications 338*a*-338*n* ***may provide email***, collaboration, online meeting, and/or desktop sharing related services or functionality." *Id.* ¶179; *see also id.* ¶192 (queu[ing] "all network packets for a type of application 338*a*-338*n*, ***such as an email*** . . . ***application***" in a particular queue "used ***for email related applications***"). A POSITA would have understood that Rao's communications would include the sending and receiving of emails, and that such communications would therefore "comprise . . . communication[s] associated with" emails. Indeed, Rao teaches that client 105 may communicate with "an application server providing email services such as Microsoft Exchange." *Id.* ¶90.

114. Rao also teaches communication associated with a "chat client," as claimed. Rao teaches that applications 338*a*-338*n* may "provide one or more real-time data communications." *Id.* ¶179. Rao notes that such real-time data applications

include those that provide "web collaboration, screen or desktop sharing, and ***instant messaging***" services. *Id.* ¶¶4, 75. A POSITA would have understood that instant messaging applications disclose "chat clients" because instant messaging provides a means for parties to exchange messages in a chat interface.

4. Claim 4

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein the one or more prospective or successful communications over the wireless network comprise a communication associated with a content update or a content download."

115. Rao teaches this limitation.

116. For example, Rao teaches that applications 338 may comprise "real-time data communications, such as applications for streaming video and/or audio." Rao ¶88. Rao also teaches that applications 338 may include email applications. *Id.* ¶¶179, 192 ("an email or voice application"). A POSITA would have understood that both an email application that requests and receives emails and email attachments and a streaming video application that receives downloaded video disclose a content download," as claimed.

117. This understanding is consistent with the '541 patent's disclosure of "content," which includes examples such as "***email*** downloads, email text, ***video***, music, eBooks, widget update streams, and download ***streams***," '541 patent, 94:53-95:37, "content downloads (e.g., . . . such as for image, music, ***video***, eBook

content, ***email attachments***, content/media subscriptions, RSS/news feeds, text/image/***video chat***, software updates, and/or other content downloads), *id.*, 93:29-45, and "background ***email downloads***, content subscription service updates and downloads (e.g., music/***video*** downloads, news feeds, etc.), text/***voice***/***video*** chat clients," *id.*, 14:52-15:5.

5. Claim 5

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein the one or more prospective or successful communications over the wireless network comprise a communication associated with an image, music, a video, an electronic book, an e-mail attachment, a content or media subscription, a news feed, a text message, a video chat, or a combination of these."

118. Rao teaches this limitation.

119. For example, as explained above, Rao teaches that its network traffic may be associated with email applications. *See supra* Claim 3. A POSITA would have understood that an email application sending emails (and their associated attachments) teaches communication associated with "an e-mail attachment," as claimed.

120. Rao also explains that applications 338*a*-338*n* may include "applications for ***streaming video*** and/or audio," Rao ¶88, or provide "***online meeting***[] or desktop sharing related services or functionality," *id.* ¶179; *see id.* ¶¶4, 75, 90 (noting that client 105 may communicate with a server running a hosted

service application like GoToMeeting.com, WebEx.com, or LiveMeeting.com), 117. By disclosing that network traffic may be associated with video streaming and online meeting applications, Rao teaches communication over a wireless network that may be associated with "a video" and/or "a video chat," as claimed. A POSITA would have understood these communications to include audio and visual data that can be displayed on another computer, and therefore include communication associated with a "video" and/or a "video chat."

6. Claim 6

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein the one or more prospective or successful communications over the wireless network comprise a communication associated with a device application or widget, a device operating system function, a file download, streaming media, a software update, a firmware update, a website, a connection to a server, a web browser, or a synchronization service."

121. Rao teaches this limitation.

122. For example, as explained in connection with claim 1, Rao teaches that its end-user device may be a "laptop or notebook computer," "handheld computer," "mobile telephone," or "any other computer[] or other form of computing or telecommunications device." Rao ¶130; *see supra* Limitation [1a]. Rao's device includes one or more applications 338*a*-338*n* that transmit network packets that Rao's remote access client may intercept, queue, and prioritize. *Id.* ¶179; *see also*

id. ¶¶87-91, 180-95. Rao therefore teaches communication associated with a "device application" because Rao teaches intercepting network traffic from applications on its device (e.g., computing device 102 and/or client 105). *See id.* ¶¶87-91, 179-95.

123. Rao also teaches communications associated with "a file download" and "a web browser." For example, Rao teaches receiving emails and email attachments, as discussed in claims 3-5. *See supra* Claims 3-5. A POSITA would have understood that receiving emails and email attachments requires downloading the same, and that email attachments are types of "files." Rao therefore teaches communication associated with "a file download," as claimed. Rao also teaches that applications 338*a*-338*n* can be "any type and/or form of ***web browser***." Rao ¶88. A POSITA would have understood that sending and receiving network packets from a web browser application teaches communication associated with "a web browser," as claimed.

7. Claim 8

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein identify a service usage activity of the wireless end-user device comprises identify: an application identifier associated with the service usage activity or the first software component, an operating system function identifier associated with the service usage activity or the first software component, an aggregate service activity identifier, a component service activity identifier, or a combination of these."

124. Rao teaches that identifying a service usage activity comprises identifying an application identifier associated with the service usage activity or the first software component for the reasons explained above in connection with claim 1, limitation [1b]. *See supra* Limitation [1b]. For example, Rao teaches that filter 322 inspects network packets and, at step 565, "agent 326 identifies the network packet as generated from an application 338*a*-338*n* by any of the content of the network packet, such as any headers, fields, or the type and content of data in the payload of the network packet." Rao ¶¶102, 105-07, 187. Rao also teaches that agent 326 includes a frame monitor 360 that may inspect the packet, determine which application 338 generated the packet, and make a policy determination responsive to the identified application. *Id.* ¶¶108-09. Rao further teaches that agent 326 may associate the network packet "with an application 338*a*-338*n* by matching information from the routing table 538, such as source and destination IP addresses

and ports numbers with the IP addresses and ports numbers of the network packet." *Id.* ¶187.

125. A POSITA would have understood that a network packet's header, field, and/or the type or content of data in the payload teaches an application identifier associated with the service usage activity or the first software component. These are associated with the service usage activity (e.g., the network packet) and identify which application sent the network packet.

8. Claim 9

a. [9a] "The non-transitory computer-readable storage medium recited in claim 1, wherein the service usage activity results from cooperation between the first software component and at least one other software component, application, process, function, activity, or service, and"

126. Rao teaches this limitation.

127. As discussed above, Rao teaches that "client 105 may execute one or more applications 338*a*-338*n*, which access the network 104 . . . [and] provide one or more real-time data communications, such as VoIP" or "email, collaboration, online meeting, and/or desktop sharing related services or functionality." Rao ¶179; *see also id.* ¶¶184, 192; *see supra* Limitations [1b]-[1c].

128. A POSITA would have understood that certain of applications 338*a*-338*n* (first software components) cooperate with other software components, applications, processes, functions, activity, or services.

129. For example, Rao teaches that certain of applications 338*a*-338*n* are email applications, *see* Rao ¶¶179, 192, and that client 105 communicates across a network with "an application server providing email services such as Microsoft Exchange" in order to facilitate the provision of email services, *id.* ¶90. The provision of email services by an email application through the application's communication with an application server providing email services (e.g., Microsoft Exchange) constitutes a service usage activity resulting from cooperation between the email application resident on the end-user device (e.g., first software component) and the application server (i.e., an "other" application/software component/service).

b. [9b] "wherein identify a service usage activity of the wireless end-user device comprises: identify a data flow to or from the at least one other software component, application, process, function, activity, or service; and associate the data flow with the first software component."

130. Rao teaches this limitation.

131. As discussed above, Rao teaches a remote access client 120 capable of identifying a service usage activity at least by "intercept[ing] network traffic of any of the applications 338*a*-338*n* of the client 105," *id.* ¶185; *see also id.* ¶104, and "identif[ying] . . . network packet[s] as generated from an application 338*a*-338*n*" by inspecting the network packets' content, *id.* ¶187; *see also id.* ¶¶109, 193; *see supra* Limitation [1b].

132. Based on these disclosures, a POSITA would have recognized that Rao's remote access client 120 would intercept any network packets sent from an application 338*a*-338*n* (e.g., an email application) to an application server (e.g., "an application server providing email services such as Microsoft Exchange") and identify them as generated by (i.e., associated with) the email application. Rao ¶90. In this way, Rao's remote access client identifies a data flow (i.e., the network packets) sent from the email application (first software component) to the application server providing email services (the other application/software component/service). Rao explains that this data flow is associated with the email application (first software component). *See, e.g.*, *id.* ¶¶187 (explaining "the remote access client 120 of the present [invention] determines the association of network packets with applications 338*a*-338*n*"), 192 (describing queue for email communications). To the extent Rao does not expressly disclose identifying a data flow and associating it with an email application, it would have been obvious based on Rao and a POSITA's knowledge of applications, including email applications.

9. Claim 10

a. "The non-transitory computer-readable storage medium recited in claim 9, wherein the first software component comprises at least a portion of an application, and wherein the at least one other software component, application, process, function, activity, or service performs a proxy function."

133. For the reasons disclosed in connection with claim 9, Rao teaches that the first software component comprises at least a portion of an application, and that the at least one other software component, application, process, function, activity, and/or service performs a proxy function.

134. As discussed, Rao teaches that certain of applications 338*a*-338*n* are email applications, *see id.* ¶¶179, 192, and that client 105 communicates across a network with "an application server providing email services such as Microsoft Exchange" (i.e., the other application/software component/service) to facilitate the provision of email services, *id.* ¶90; *see also id.* ¶¶88, 94, 215; *supra* Claim 9.

135. A POSITA would have understood that an email application is at least a portion of an application.

136. A POSITA would have further understood that an application server that provides email services (e.g., Microsoft Exchange) is an "email service manager," as that term is used in the '541 patent. EX-1001, 76:1. A POSITA therefore would have recognized that such an application server (i.e., other application/software component/service/etc.) is a "[p]roxy [s]ervice [m]anager[],"

as that term is used in the '541 patent, and that it accordingly performs proxy service functions, as claimed. *Id.*, 75:56-76:9 ("Example Proxy Service Managers include the following: . . . email service manager . . . .").

137. At the time of the alleged invention, it was well known that email application servers such as Microsoft Exchange were proxy service managers, as that term is used in the '541 patent, and used known proxy managers and proxy servers like SMTP, POP, and IMAP proxies. A POSITA would have read this portion of the '541 patent to be consistent with that understanding.

10. Claim 11

a. "The non-transitory computer-readable storage medium recited in claim 9, wherein the at least one other software component, application, process, function, activity, or service performs a proxy function."

138. Rao teaches that the at least one other software component, application, process, function, activity and/or service performs a proxy function for at least the reasons provided above with respect to claim 10. *See supra* Claim 10.

11. Claim 12

a. "The non-transitory computer-readable storage medium recited in claim 9, wherein the at least one other software component, application, process, function, activity, or service comprises a media service manager, an e-mail service manager, a domain name service (DNS) function, a software download service manager, a media download manager, a data download service manager, a media library function, a simple mail transfer protocol (SMTP) proxy, an Internet message access protocol (IMAP) proxy, a post office protocol (POP) proxy, a hypertext transfer protocol (HTTP) proxy, an instant messaging (IM) proxy, a virtual private network (VPN) service manager, or a secure socket layer (SSL) proxy."

139. Rao teaches this limitation.

140. As discussed above, Rao teaches that certain of applications 338*a*-338*n* are email applications, *see* Rao ¶¶179, 192, and that client 105 communicates across a network with "an application server providing email services such as Microsoft Exchange" (the at least one other software component, application, process, function, activity, or service) in order to facilitate the provision of email services, *id.* ¶90; *see also id.* ¶¶88, 94, 215; *supra* Claim 9. A POSITA would have understood that an application server that provides email services (e.g., Microsoft Exchange) is an "email service manager," as that term is used in the '541 patent. EX-1001, 76:1; *see supra* Claim 10. Moreover, a POSITA would have understood that at the time of the alleged invention, Microsoft Exchange utilized SMTP, POP, IMAP, and other proxy protocols, and a POSITA would therefore have understood Microsoft

Exchange to comprise one or more of SMTP, POP, and IMAP proxies as well. *See, e.g.*, EX-1008, EX-1014. This is consistent with the '541 patent's disclosures of a proxy service manager. EX-1001, 75:56-76:9.

12. Claim 13

a. [13a] "The non-transitory computer-readable storage medium recited in claim 1, wherein identify a service usage activity of the wireless end-user device comprises: monitor an application proxy service flow; and"

141. Rao teaches this limitation.

142. As discussed above, Rao teaches that "client 105 may execute one or more applications 338*a*-338*n*, which access the network 104 . . . [and] provide one or more real-time data communications, such as VoIP" or "email, collaboration, online meeting, and/or desktop sharing related services or functionality." Rao ¶179; *see also id.* ¶¶184, 192; *supra* Limitations [1b]-[1c].

143. Rao teaches that certain of applications 338*a*-338*n* are email applications, *see* Rao ¶¶179, 192, and that client 105 communicates across a network with "an application server providing email services such as Microsoft Exchange" in order to facilitate the provision of email services, *id.* ¶90; *see also supra* Claim 9. As explained above, a POSITA would have recognized that an application server that provides email services (e.g., Microsoft Exchange) is a "[p]roxy [s]ervice [m]anager[]." EX-1001, 75:56-76:9; *see also supra* Claim 10. Consequently, a

POSITA would have understood that the network packets communicated from the email application to the application server to facilitate the provision of email services constitute an application proxy service flow because they form a data flow from an application to the proxy service manager from the application. *See* EX-1001, 76:10-25.

144. As explained above, Rao teaches a remote access client 120 capable of identifying a service usage activity at least by "intercept[ing] network traffic of any of the applications 338*a*-338*n* of the client 105" (e.g., email applications), Rao ¶185; *see also id.* ¶104, and "identif[ying] . . . network packet[s] as generated from an application 338*a*-338*n*" by inspecting the network packets' content, *id.* ¶187; *see also id.* ¶¶109, 193; *supra* Limitation [1b]. A POSITA would have recognized that each of these actions Rao's remote access client 120 takes—intercepting, inspecting, and associating network packets with their originating applications—would constitute or involve "monitoring" those network packets (i.e., the application proxy service flow, in the case of an email application).

b. [13b] "classify the application proxy service flow as being initiated by or belonging to the first software component."

145. Rao teaches this limitation.

146. As discussed above, Rao teaches that the remote access client 120 can "identif[y] . . . network packet[s] as generated from an application 338*a*-338*n*" (e.g.,

an email application) by inspecting the network packets' content, *id.* ¶187; *see also id.* ¶¶109, 193; *supra* Limitation [1b]. A POSITA would have recognized that Rao's remote access client 120 would thus identify any network packets sent from an email application to an application server that provides email services (e.g., Microsoft Exchange) (the application proxy service flow) as generated by (initiated by or belonging to) the email application. *See supra* Limitation [9b].

147. A POSITA also would have recognized that Rao's remote access client 120 would "classify" the network packets as belonging to the email application to allow the system to later determine whether the packets are associated with background activities and prioritize them accordingly. *See supra* Limitations [1d], [1f]-[1g]; *see also, e.g.*, Rao ¶¶187 (explaining "the remote access client 120 of the present [invention] determines the association of network packets with applications 338*a*-338*n*"), 192.

13. Claim 14

a. [14a] "The non-transitory computer-readable storage medium recited in claim 1, wherein identify a service usage activity of the wireless end-user device comprises: associate an identifier identifying the first software component with a request to a proxy service;"

148. Rao teaches this limitation.

149. As discussed above, Rao teaches that certain of applications 338*a*-338*n* are email applications, *see* Rao ¶¶179, 192, and that client 105 communicates across

a network with "an application server providing email services such as Microsoft Exchange" in order to facilitate the provision of email services, *id.* ¶90; *see also supra* Claim 9. A POSITA would have recognized that an application server that provides email services (e.g., Microsoft Exchange) is a "[p]roxy [s]ervice [m]anager[]." EX-1001, 75:56-76:9; *see also supra* Claim 10, and that the email services the application server provides are "proxy services."

150. A POSITA would have further understood that the client-side email application would communicate with the application server by sending outgoing requests ("request[s] to a proxy service") and the network packets sent per that request would be a service usage activity.

151. Rao teaches that outgoing network packets, including those associated with requests from the email application to the email server (i.e., the proxy service), are associated with an "identifier identifying the first software component." For example, Rao teaches that "the remote access client 120 of the present [invention] determines the association of network packets with applications 338*a*-338*n*" and that "[t]he client 105, such as via agent 326, can associate network traffic with applications 338*a*-338*n*." Rao ¶187. Agent 326 "can ***associate*** network traffic with applications 338*a*-338*n* by any suitable means and/or mechanisms," including "by any of the content of the network packet, such as ***any headers, fields, or the type and content of data*** in the payload of the network packet." *Id.* Rao also specifies

that "a network packet is associated with an application 338*a*-338*n* by matching information from the routing table 538, such as source and destination IP addresses and ports numbers with ***the IP addresses and ports numbers of the network packet***." *Id.* Rao explains that a "source IP address . . . may represent the IP address of the client 105 . . . by which an application 338*a*-338*n* on the client 105 communicates on the network" and the "destination IP address may represent the IP address of a peer computing device to which the application 33*a*-338*n* communicates with via the destination port used by the peer device." *Id.* ¶181.

152. A POSITA would have accordingly understood that Rao associates network packets, including those associated with requests to a proxy service, with an identifier (e.g., a header, field, or content of the network packets, or an IP address or port number) that identifies the application, e.g., the email application (i.e., the first software component). Rao therefore teaches associating an identifier (e.g., IP address) identifying the first software component (e.g., email application) with a request to a proxy service (e.g., Microsoft Exchange).

b. [14b] associate the request to the proxy service with a traffic flow, the traffic flow comprising the service usage activity; and

153. Rao teaches this limitation.

154. For example, Rao teaches a traffic flow of network packets (i.e., the service usage activity) associated with an applications, such as an email application.

See, e.g., Rao ¶¶ 187 (explaining that "the remote access client 120 of the present [invention] determines the association of network packets with applications 338*a*-338*n*"), 192 (describing queue for email communications).

155. Rao teaches that its filter 322 associates packets (e.g., those associated with a request to a proxy service) with the appropriate traffic flow. It explains that "all network[] packets for a type of application 338*a*-338*n*, such as an email . . . application, . . . may be placed in a queue 540*a*-540*n* for prioritizing networks packets for one or more applications." *Id.* ¶192. Rao contemplates that "online collaboration related applications 338*a*-338*n* may be placed and prioritized in a first queue 540 …. [and a] second queue 540*b* may be used for email related applications 338*a*-338*n*." *Id.*

156. A POSITA would accordingly have understood that Rao associates the request to the proxy service with a traffic flow comprising the service usage activity by identifying and queuing email-related packets into a queue for email applications, as Rao discloses.

c. [14c] associate the traffic flow with the identifier.

157. Rao teaches this limitation.

158. As noted above, a POSITA would have recognized that the source and destination IP addresses described in Rao are identifiers. *See supra* Limitation [14a]. Rao explains that traffic flows (e.g., multiple network packets sent and received

from, e.g., the email application and application server) are associated with these identifiers.

159. For example, Rao explains that its remote access client 120 may "identif[y] . . . network packet[s] as generated from an application 338*a*-338*n*" (e.g., an email application) by inspecting the network packets' content. *Id.* ¶187; *see also id.* ¶¶109, 193; *supra* Limitation [1b]. For example, it may "match[] information from [a] routing table 538, such as source and destination IP addresses," "with the IP addresses . . . of the network packet[s]." Rao ¶187.

160. A POSITA would have recognized that, by identifying the network packets that make up the flow of network traffic associated with the email application's communications with the application server (e.g., Microsoft Exchange) using routing table 538, Rao's remote access client 120 associates the network traffic flow with one or more of the source and destination IP addresses associated with the email application (the identifiers).

14. Claim 15

a. "The non-transitory computer-readable storage medium recited in claim 14, wherein the identifier comprises a name, a fingerprint, an identification tag, a process number, or a credential."

161. Rao teaches this limitation.

162. A POSITA would have understood that the source and destination IP addresses discussed above with respect to claim 14 are identifiers that would identify

the email application with which the IP addresses were associated. *See supra* Claim 14. Rao teaches that the "network packet is associated with an application 338*a*-338*n* by matching information from the routing table 538, such as source and destination IP addresses [which are the sending/receiving device addresses] and ports numbers ***with the IP addresses and ports numbers of the network packet***." Rao ¶¶187, 192.

163. A POSITA also would have recognized that these IP addresses are "device credentials," as that term is used in the '541 patent. EX-1001, 28:59-61 (describing "device credentials (e.g., . . . IP address)").

15. Claim 16

a. [16a] "The non-transitory computer-readable storage medium recited in claim 1, wherein the service usage activity results from cooperation between the first software component and a proxy function, and"

164. Rao teaches this limitation.

165. As discussed above, a POSITA would have understood that the provision of email services by an email application through the application's communication with an application server providing email services (e.g., Microsoft Exchange) constitutes a service usage activity resulting from cooperation between the email application (i.e., first software component) and the proxy functions provided by the application server. *See supra* Limitation [9a]. A POSITA also would have recognized that the application server performs proxy functions, *see supra*

Claim 10, and that the email application (which communicates with the application server) therefore cooperates with proxy functions to provide the service usage activity (e.g., the cooperation facilitates the provision of email services).

b. [16b] "wherein identify a service usage activity of the wireless end-user device comprises: identify a data flow to or from the proxy function; and associate the data flow with the first software component."

166. Rao teaches that identifying a service usage activity of the wireless end-user device comprises identifying a data flow to or from the proxy function and associating the data flow with the first software component for at least the reasons provided above with respect to claim 9. *See supra* Limitation [9b].

167. Because a POSITA would have recognized that the application server providing email services (e.g., Microsoft Exchange) performs proxy functions, *see supra* Claim 10, a POSITA would have recognized that Rao's remote access client 120 would identify a data flow to or from the proxy function (e.g., the multiple network packets sent from the email application to the application server) and associate the data flow with the first software component (e.g., the email application). *See supra* Limitation [9b].

16. Claim 17

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein identify a service usage activity of the wireless end-user device comprises identify the service usage activity based on a stream, a flow, a destination, a port, a packet inspection, or a combination of these."

168. Rao teaches this limitation.

169. For example, Rao teaches that filter 322 of packet capture mechanism 365 can "inspect the contents of [network] packets, such as routing information, to determine the action to take based on the filtering table." Rao ¶102; *see also id.* ¶¶105-09 ("[T]he filter 322 intercepts all outbound packets of the client 105 for inspection."). At step 565, "agent 326 identifies the network packet as generated from an application 338*a*-338*n* by any of the ***content of the network packet***, such as any headers, fields, or the type and content of data in the payload of the network packet." *Id.* ¶187. It may do so by "matching information from the routing table 538, such as source and ***destination IP addresses*** and ports numbers with the IP addresses and ports numbers of the network packet." *Id.*

170. Rao further teaches that remote access client 120 "may also have, access, or use a routing table 538, for determining how to route network packets of the client via the agent 326." *Id.* ¶181. Routing table 538 includes "information about a source computing device and a ***destination computing device*** to identify a communication path or connection between a source and destination communication

points," including "a source IP address and ***source port***, and a destination IP address and ***destination port*** to identify a communication path on the network 104." *Id.*; *see also id.* ¶¶182 ("[P]olicies 520 may indicate prioritization based on the destination network address, such as host name or IP address, and/or destination port number."), 187, 190, 192. Rao therefore teaches identifying the service usage activity based on at least a destination, a port, and/or a packet inspection.

17. Claim 18

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein identify a service usage activity of the wireless end-user device comprises determine an identifier associated with the first software component, a number associated with the first software component, a name associated with the first software component, or a signature associated with the first software component."

171. Rao teaches this limitation.

172. Rao teaches identifying a service usage activity that comprises an application identifier associated with the first software component for the reasons explained above in connection with claim 1, limitation [1b]. For example, Rao teaches that filter 322 inspects network packets and, at step 565, "agent 326 identifies the network packet ***as generated from an application*** 338*a*-338*n* by any of the content of the network packet, such as any headers, fields, or the type and content of data in the payload of the network packet." Rao ¶¶102, 105-07, 187. Rao also teaches that agent 326 includes a frame monitor 360 that may inspect the packet, determine

which application 338 generated the packet, and make a policy determination responsive to the identified application. *Id.* ¶¶108-09. Rao further teaches that agent 326 may associate the network packet "with an application 338*a*-338*n* by matching information from the routing table 538, such as source and destination IP addresses and ports numbers with the IP addresses and ports numbers of the network packet." *Id.* ¶187.

173. A POSITA would have understood that a network packet's header, field, and/or type or content of data in the payload teaches an identifier associated with the first software component (e.g., the network packet is associated with the application 338*a*-338*n*), and that Rao's system determines the identifier in inspecting the "content of the network packet, such as any headers, fields, or the type and content of data." *See* Rao ¶¶ 187, 109, 193.

18. Claim 19

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein the first software component comprises at least a portion of an application on the wireless end-user device."

174. Rao teaches this limitation.

175. For example, as discussed above, Rao teaches that client 105 may "execute ***one or more applications 338*a-*338*n** which access the network 104 via the agent 326 and filter 322 of the remote access client 120." Rao ¶179; *see also id.* ¶¶87-91, 180-95; *supra* Limitation [1b]. Each of these applications are located and

run on the wireless end-user device, *see, e.g.*, Rao ¶¶184 (describing "applications 338*a*-338*n* on the client 105"), 188 (describing application "memory usage" and "execution time"), and ordinarily and obviously comprises at least a portion of an application.

19. Claim 20

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein the first software component comprises an operating system component, function, or service."

176. Rao teaches this limitation.

177. Rao teaches that "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." Rao ¶99; *see also id.* ¶128 ("The computing device 102 can be running any operating system such as any of the versions of the Microsoft® Windows operating systems, the different releases of the Unix and Linux operating systems, any version of the MacOS® for Macintosh computers, any embedded operating system, any real-time operating system, any open source operating system, any proprietary operating system, any operating systems for mobile computing devices, or any other operating system capable of running on the computing device and performing the operations described herein."); *id.* ¶¶106, 124, 129.

178. A POSITA would have understood that Rao teaches an application that includes an operating system ("OS") function, component, or service with an associated service usage activity. For example, a POSITA would have known that one common function, component, or service of an OS is an OS update or auto-update. *See, e.g.*, Fadell ¶¶60-61 (disclosing known "auto-update processes"); Van Camp, 3:61-64 ("Software updates may include … operating system updates"). A POSITA would have known that OS updates are common and necessary to keep the OS up-to-date with the OS developers' latest software. Given Rao's disclosure of a client 105 with an OS and applications 338*a*-338*n* and a POSITA's knowledge of auto-update processes for keeping an OS up-to-date, it would have been obvious to implement one or more of Rao's applications 338*a*-338*n* as an OS auto-update application that launches and sends network packets (e.g., service usage activity) to perform an OS function, component, or service (e.g., an OS update).

179. A POSITA would have been motivated to implement and/or modify Rao's applications 338*a*-338*n* to perform an OS update process because it would have enabled monitoring of software versions on Rao's client 105 and updated the OS as necessary via network 104. This would have maintained the usability of client 105 by allowing an OS developer to address any security vulnerabilities or usability issues in, and otherwise continually improve, the OS of client 105. This would have involved nothing more than the application of a POSITA's knowledge to Rao's

client 105 and applications 338*a*-338*n* to yield predictable results. A POSITA further would have recognized the benefits of applying Rao's prioritization, as described in connection with claim 1, to OS update activity (e.g., service usage activity). For example, to the extent they occurred in the foreground of client 105, network communications associated with OS updates could be prioritized over background activity; to the extent they occurred in the background of client 105, they could be deprioritized relative to the activities of active applications. This would allow the user device to update more efficiently. Applying Rao's prioritization to such service usage activities would have been no more than a routine application of ordinary skill.

20. Claim 21

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein the first software component comprises a software function, utility, process, or tool."

180. Rao teaches this limitation.

181. For example, as noted above, Rao teaches that client 105 may "execute ***one or more applications 338*a-*338*n**, which access the network 104 via the agent 326 and filter 322 of the remote access client 120." Rao ¶179; *see also id.* ¶¶87-91, 180-95. Each application 338*a*-338*n* is a software component on the wireless end-user device, *see, e.g.*, *id.* ¶¶184, 188; *see also supra* Limitation [1b], that, e.g., "provide[s] one or more real-time data communications, such as VoIP" or "email, collaboration, online meeting, and/or desktop sharing related services or

functionality," Rao ¶¶179, 184, 192. A POSITA would have understood that, to perform these services or provide these functionalities, one or more of applications 338*a*-338*n* must each comprise a plurality of processes that can run on client 105. For instance, an application that provides email services must run a plurality of processes permitting the sending and receiving of emails and their associated attachments. Similarly, an application that provides online meeting functionality must run a plurality of processes that allow client 105 to receive, transmit, and (dis)play audio and video.

182. That Rao teaches applications 338*a*-338*n* comprising multiple processes is further supported by Rao's disclosure that its "remote access client 120 may determine any priorities, such as ***process task priority***, assigned to the application 338*a*-338*n* by the operating system of the client 105." *Id.* ¶188. A POSITA would have recognized that the OS of client 105 could not assign "process task priorit[ies]" to applications 338*a*-338*n* unless those applications comprised underlying processes that the OS could prioritize. *See id.*

183. In addition, Rao teaches that, in certain embodiments, to aid filter 322 in "apply[ing] the indicated priorities" to intercepted network packets, "agent 326 [may] provide[] to the filter 322 a mapping between applications 338*a*-338*n*, ***such as by*** application name or ***process id***, to the routing information in a routing table 538." *Id.* ¶190. A POSITA would have understood that applications 338*a*-338*n*

would have "process ids" that could be used for mapping only if the applications comprised underlying processes associated with the "process ids." *See id.*

21. Claim 22

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein the first software component comprises a plurality of applications, processes, functions, activities, or services."

184. Rao teaches this limitation.

185. For example, as noted above, Rao teaches that client 105 may "execute ***one or more applications 338*a-*338*n**, which access the network 104 via the agent 326 and filter 322 of the remote access client 120." Rao ¶179; *see also id.* ¶¶87-91, 180-95. Each application 338*a*-338*n* is a software component on the wireless end-user device, *see, e.g.*, *id.* ¶¶184, 188; *see also supra* Limitation [1b], that, e.g., "provide[s] one or more real-time data communications, such as VoIP" or "email, collaboration, online meeting, and/or desktop sharing related services or functionality," Rao ¶¶179, 184, 192. As explained above with respect to claim 21, a POSITA would have understood that, to perform these services or provide these functionalities, one or more of applications 338*a*-338*n* must each comprise a plurality of processes that can run on client 105. For instance, an application that provides email services must run a plurality of processes permitting the sending and receiving emails and their associated attachments. Similarly, an application that

provides online meeting functionality must run a plurality of processes that allow client 105 to receive, transmit, and (dis)play audio and video.

22. Claim 23

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein the first software component comprises a Java archive (JAR) file, an application that uses an operating system (OS) function, an application that uses a proxy service function, or an OS process function that supports an application or OS function."

186. Rao teaches this limitation.

187. For example, Rao teaches that application 338*a*-338*n* "can be any type and/or form of application, such as . . . a Java applet." Rao ¶88. A POSITA would have understood that the files associated with Java applets are typically housed in Java Archive (JAR) files. Accordingly, a POSITA would have recognized that Rao teaches that application 338*a*-338*n* may comprise a JAR file.

188. Additionally, Rao teaches that applications 338*a*-338*n* may be email applications, *id.* ¶¶179, 192, that rely on client 105's communication with, e.g., "an application server providing email services such as Microsoft Exchange," *id.* ¶90; *see also supra* Limitations [9a], [13a]; Claims 10, 11, 12. A POSITA would have understood that Microsoft Exchange and similar application servers that provide email services are email service managers. *See supra* Claims 10, 12. A POSITA would have further recognized that the '541 patent identifies "email service

managers" as a type of "[p]roxy [s]ervice [m]anager[]" that performs proxy service functions, EX-1001, 75:66-76:1, and that Microsoft Exchange and similar application servers that provide email services would therefore constitute "proxy service managers," as that term is used in the '541 patent, that perform one or more proxy service functions. Consequently, to the extent that Rao teaches that applications 338*a*-338*n* may be email applications, Rao teaches applications that rely on (or use) one or more proxy service functions.

23. Claim 24

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein the network element is communicatively coupled to the wireless end-user device over the wireless network."

189. Rao teaches this limitation.

190. For example, as discussed in connection with claim 1, Rao teaches that "policies 520 may be provided by or downloaded via the ***gateway 340***" (i.e., the network element) to agent 326 on client 105 over network 104 (i.e., the wireless network). *Id.* ¶183, Fig. 1A; *see supra* Limitations [1c], [1e]. Rao further explains that client 105 (i.e., the wireless end-user device) "communicate[s] over the network 104 to the gateway 340" or "via the gateway 340" to, e.g., servers, server farms, or peer computing devices. *Id.* ¶¶87, 90-96; Claim 1; *see also supra* Limitation [1e].

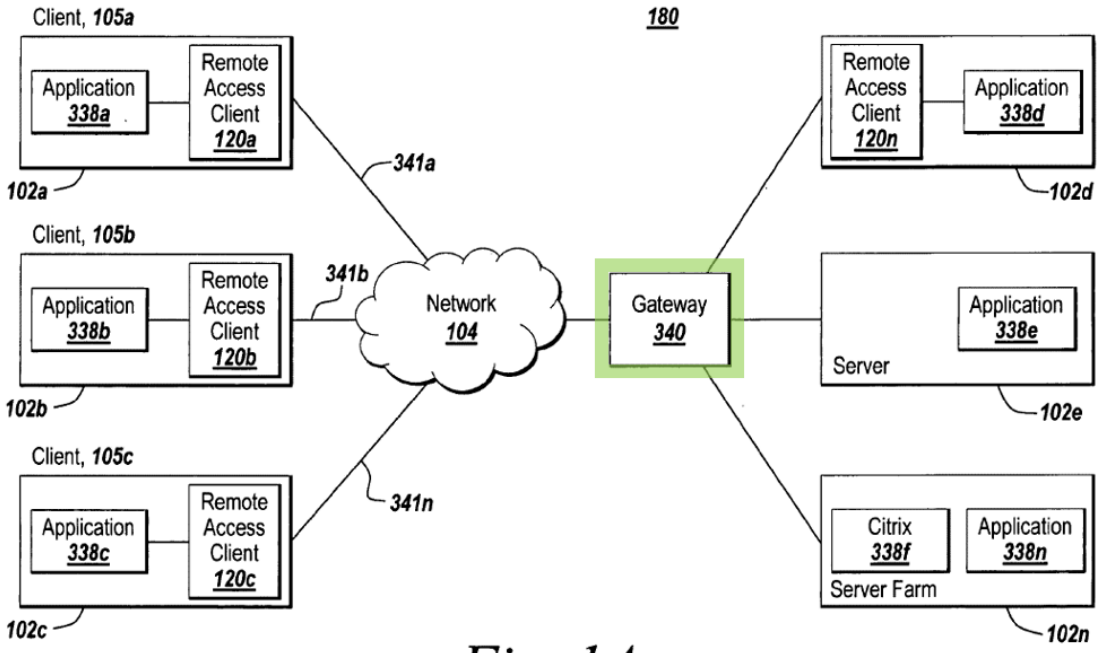


Fig. 1A

Rao, Fig. 1A (annotating gateway 340).

191. Based on these disclosures, a POSITA would have recognized that client 105 and gateway 340 are communicatively coupled to one another over network 104.

24. Claim 25

a. "The non-transitory computer readable storage medium recited in claim 1, wherein the policy is based on an amount of time, a time of day, a day of a week, a schedule, a network busy state, a network performance state, a network quality-of-service state, a priority of the service usage activity, or a combination of these."

192. Rao teaches this limitation.

193. For example, Rao teaches that remote access client 120 may include "one or more ***policies 520 for specifying client-side prioritization of network***

communications related to applications 338*a*-338*n*." Rao ¶182; *see supra* Limitation [1e]. As noted above, Rao's network communications disclose the "one or more prospective or successful communications over the wireless network" that make up the "service usage activity" of claim 1. *See supra* Limitation [1c].

194. Rao explains that, upon intercepting and queuing a network packet, remote access client 120 "determines the association of [the] network packet[] with applications 338*a*-338*n* in order to determine priorities and apply any ***priority based policies 520***." Rao ¶187; *see also id.* ¶¶179-80, 182, 184-86, 188, 189 ("In one embodiment, the agent 326 uses the policies 520 to apply a priority to network packets of applications 338*a*-338*n* in accordance with ***the prioritization rules specified or indicated by the policies 520***."), 190-93. Rao's remote access client 120 "***may use*** any combination of ***the policies 520*** and characteristics of the application 338*a*-338*n* ***to indicate a priority for the network packets*** of the application 338*a*-338*n*." *Id.* ¶189. For instance, policies 520 may "***define prioritization***" for the network packets "based on whether an application is running in the foreground or the background of the client 105," *id.* ¶182; *see also id.* ¶¶41, 46, 188-89, or based on a "process task priority[] assigned to the application 338*a*-338*n* by the operating system of the client 105," *id.* ¶ 188. They may also "***indicate prioritization***" for the network packets "based on the destination network address, such as host name or IP address, and/or destination port number," or specify conditional priorities for

network communications such that "if one application 338*a* is running, a second application 338*b* may have a higher or lower priority." *Id.* ¶182.

25. Claim 26

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein the policy is based on a background service class, a background service state, or a combination of these."

195. Rao teaches this limitation.

196. Rao teaches that policies 520 may "define prioritization" for network packets "based on ***whether an application*** [associated with the network packets] ***is running in the foreground or the background*** of the client 105." *Id.* ¶182; *see also id.* ¶¶38-43, 180, 188-89, 193, Figs. 5A, 5B. Rao further explains that "[e]ach network packet may be placed and arranged in a priority order respective to all other . . . network packets to provide a packet by packet prioritization across all applications 338*a*-338*n* and . . . network packets." *Id.* ¶191. As discussed above, a POSITA would have been motivated and found it obvious to determine and apply a policy that assigned a specific priority (e.g., a lower priority) to network packets that were associated with applications 338*a*-338*n* running in the background of client 105. *See supra* Limitations [1e]-[1f]. A POSITA would have further recognized that Rao teaches or at least renders obvious prioritizing network communications based on a characterization of the communications as background services (i.e., a class of services associated with application(s) running in the background of client 105).

26. Claim 28

a. "The non-transitory computer readable storage medium recited in claim 1, wherein the policy is based on a behavior of the first software component, a behavior of the service usage activity, a messaging layer behavior, a random back-off, a power state of the wireless end-user device, a usage state of the wireless end-user device, or a combination of these.

197. Rao teaches this limitation.

198. The '541 patent describes "application behavior[s]" as including things like "conference meeting services, video streaming, content update[s], software update[s], and/or other similar application behavior[s]." EX-1001, 14:44-47.

199. Rao uses the term "type" to refer to similar behaviors. For example, Rao explains that "email or voice application[s]" are "type[s] of application[s]," Rao ¶192, thereby characterizing these applications based on their "behaviors," as that term is used in the '541 patent. *See, e.g.*, *id.* ¶¶192-93.

200. Rao further explains that its "policies 520 may be specified by . . . the type of application 338*a*-338*n*," Rao ¶182; *see also id.* ¶¶ 179, 184, 191-93 (explaining that packets may be queued such that "a first queue 540*a*" is used "for collaboration related applications" and "[a] second queue 540*b* [is] used for email related applications"). A POSITA thus would have understood that Rao teaches that the policy is based on a behavior of the first software component.

27. Claim 34

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein controlling the service usage activity comprises preventing the first software component from launching, executing, or running."

201. Rao teaches this limitation. Specifically, Rao teaches that controlling the service usage activity comprises preventing the first software component from running.

202. Rao teaches that "[b]ased on the indicated priorities for applications 338*a*-338*n*, in some embodiments, the filter 322 may place, arrange, or coordinate network packets into queues 540*a*-540*n* in support of the priorities" and that "[e]ach network packet may be placed and arranged in a priority order respective to all other intercepted network packets to provide a ***packet by packet prioritization*** across all applications 338*a*-338*n* and intercepted network packets." Rao ¶191. Rao also teaches that "network packets are organized into priority queues . . . so that the network packets of the highest priority queue 540*a*-540*n* are communicated first, and then the next highest priority queue 540*a*-540*n* second, and so on." *Id.* ¶194.

203. Rao further teaches that "the remote access client 120 may queue the network packets and ***discard*** some of the network packets after a predetermined period of time." *Id.* ¶¶207, 102. "The remote access client 120 may use the policies 520 to determine which network packets to queue and/or discard. For example, a

network packet of a first application 338*a* may be queued while a network packet of a second application 338*n* is discarded." *Id.* ¶207. Rao teaches that "it may be desirable to discard packets . . . to reduce latency and quality issues." *Id.*

204. A POSITA would have been motivated to combine Rao's prioritization, queuing, and discarding disclosures to produce a system capable of prioritizing, queuing, and, subsequently, discarding packets in, e.g., a secondary queue during, during a network disruption to more efficiently allocate available network resources to the transmission of higher priority network packets in, e.g., a primary queue. Doing so would have been a routine exercise of ordinary techniques for a POSITA. A POSITA also would have recognized that discarding network packets in a secondary queue during a network disruption would not affect the priorities (*see supra* Claim 1) of the remaining network packets.

205. A POSITA would have understood that, because Rao's system may discard network packets during a network disruption, Rao's system can prevent lower-priority applications (i.e., first software components) from executing or running, and that Rao thus teaches that controlling the service usage activity comprises "preventing the first software component from . . . executing, or running." *See, e.g.*, Oestvall ¶¶15 (noting that "untrusted third party applications . . . are prevented from running in the background and are suspended"), 23 (explaining that its system may "simply place any interrupts from the background untrusted

application 4 to the back of its queue and never allow them to be executed"). By discarding the packets, processes initiated by lower-priority applications cannot execute, and the system similarly discards in-bound packets that would otherwise cause an application process to run.

28. Claim 35

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein the at least an aspect of the policy is based on the user input obtained through the user interface of the wireless end-user device, and wherein the user input identifies the first software component or the service usage activity."

206. Rao teaches this limitation.

207. Rao teaches an aspect of a policy based on a user input obtained through a user interface of the wireless end-user device for the reasons explained above in connection with claim 1, limitation [1e]. *See supra* Limitation [1e]. Rao teaches that policies 520 "may be configurable ***by a user*** by any suitable means and/or mechanism," and that "agent 326 may provide a configuration mechanism such as ***a user interface, graphical or otherwise, design[ed] and constructed for configuring or specifying the policies 520***." Rao ¶183.

208. Rao also teaches that the user input identifies the first software component or the service usage activity. Rao teaches that "***a user may specify the priority of the first application or the second application.***" *Id.* ¶42; *see also id.* ¶46 ("[T]he first application may have a priority higher than the second application of

the client. Furthermore, the client may include ***a configuration mechanism for a user to specify the priority***.”). A POSITA would have understood that, to specify an application’s priority, a user must identify the application (e.g., a first software component) in question and associate it with the desired priority.

29. Claim 39

a. “The non-transitory computer-readable storage medium recited in claim 1, wherein the policy is based on a type of the service usage activity, a priority of the service usage activity, a duration of the service usage activity, a characteristic of the wireless network, a quality-of-service (QoS) rule associated with the service usage activity, or a combination of these.”

209. Rao teaches this limitation. Specifically, Rao teaches that the policy is based on a priority of the service usage activity. Rao teaches these limitation for the reasons explained above in claim 25. *See supra* Claim 25; *see also* Rao ¶¶41, 46, 179-80, 182, 184-93.

30. Claim 45

a. “The non-transitory computer-readable storage medium recited in claim 1, wherein determine whether the service usage activity comprises a background activity comprises determine whether the first software component is in a user interface foreground.”

210. Rao teaches this limitation.

211. As discussed above, Rao teaches determining whether the service usage activity comprises a background activity based on whether an application 338*a*-338*n*

associated with the service usage activity is running in the foreground or background of client 105. *See supra* Limitation [1d].

212. Rao also teaches a wireless end-user device that includes a user interface. *See supra* Limitation [1e]. And Rao teaches that "remote access client 120 may determine whether the application 338*a*-338*n* associated with [a] network packet is running in the foreground or the background of the client 105." Rao ¶188; *see also* Rao ¶¶182, 187-88; *supra* Limitation [1d].

213. A POSITA would have recognized that, to determine whether an application (and its associated service usage activity) is running in the foreground of client 105, Rao's system would have to determine whether that application is in the foreground of client 105's user interface (i.e., whether it is visible to and/or actively being used by the user). A POSITA would have understood that, by determining that an application is running in client 105's user interface foreground, the system can conclude that the same application is not running in the background.

214. To the extent it is argued that Rao does not expressly disclose determining whether an application is in a user interface foreground, it would have been obvious to a POSITA to configure Rao's system to determine whether applications are in a user interface foreground (e.g., visible to and/or actively being used by the user) and characterize them as foreground applications (and not background applications) so that network packets associated with those applications'

activities can be properly prioritized in the manner Rao describes. *See supra* Limitation [1d]. Indeed, one of Rao's goals is to prioritize the activities of "an application [that] is running in the foreground and currently in active use by the user" over background activities. Rao ¶3. Moreover, determining (e.g., based on user inputs) that a user is interacting with an application (and therefore that the application is in the user interface foreground) was well known and routine in the art.

215. Moreover, each of claims 44-59 recites known and well-understood options for determining "whether [a] service usage activity comprises a background activity." In my opinion, a POSITA would have understood that each option was a well-known technique for making such a determination (as evidenced by the prior art of record) and would have appreciated the benefits of employing each option (as discussed herein). Indeed, a POSITA would have understood that the options recited in claims 44-59 were each one solution selected from a finite number of well-known, identified, predictable solutions that a POSITA could implement with a reasonable expectation of success.

31. Claim 49

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein determine whether the service usage activity comprises a background activity comprises determine whether the service usage activity is a foreground activity."

216. Rao teaches this limitation.

217. As discussed above, Rao teaches determining whether the service usage activity comprises a background activity based on whether an application 338*a*-338*n* associated with the service usage activity is running in the foreground or background of client 105. *See supra* Limitation [1d].

218. Rao also teaches that "remote access client 120 may determine whether the application 338*a*-338*n* associated with the network packet is running ***in the foreground*** or the background of the client 105." Rao ¶188. And Rao teaches that, after intercepting packets from application 338*a*-338*n*, remote access client 120 "determines the association of network packets with applications 338*a*-338*n* in order to determine priorities and apply any priority based policies 520." Rao ¶187; *see also id.* ¶¶38-41 ("The client determines the queued one or more network packets is associated with a first application of the client. . . . In some embodiments, the first application is running in the foreground, and [a] second application is running in the background."). A POSITA would have understood that a service usage activity

associated with an application running in a client's foreground is a foreground activity (and not a background activity).

219. A POSITA would have understood that by determining whether network packets are associated with an application running in the foreground or background of client 105, Rao necessarily determines whether the service usage activity comprises a foreground activity (versus a background activity), as claimed.

220. Moreover, each of claims 44-59 recites known and well-understood options for determining "whether [a] service usage activity comprises a background activity." In my opinion, a POSITA would have understood that each option was a well-known technique for making such a determination (as evidenced by the prior art of record) and would have appreciated the benefits of employing each option (as discussed herein). Indeed, a POSITA would have understood that the options recited in claims 44-59 were each one solution selected from a finite number of well-known, identified, predictable solutions that a POSITA could implement with a reasonable expectation of success.

32. Claim 50

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein determine whether the service usage activity comprises a background activity comprises determine whether the first software component is a foreground component."

221. Rao teaches this limitation.

222. As discussed above, Rao teaches determining whether the service usage activity comprises a background activity based on whether an application 338*a*-338*n* associated with the service usage activity is running in the foreground or background of client 105. *See supra* Limitation [1d].

223. Rao also teaches that, "although an application is ***running in the foreground and currently in active use by the user,*** a network packet generated or received for an application running in the background may be processed ahead of a network packet generated or received for the application running in the foreground." Rao ¶3. A POSITA would have understood that an application running in the foreground of a client and in active use by the user is a foreground component.

224. Rao's remote access client 120 prioritizes network packets based on whether the applications that generated them are running in the foreground or the background of client 105. *See, e.g.*, Rao ¶¶182, 187-88; *see also supra* Limitation [1d]. A POSITA would have recognized that, to prioritize the communications of an application based on whether it is running in the foreground or the background, remote access client 120 would have to determine whether that application is a foreground component.

225. To the extent it is argued that Rao does not expressly disclose determining whether an application is a foreground component, it would have been obvious to a POSITA to configure Rao to determine whether an application is a

foreground component so that network packets associated with that application can be properly prioritized in the manner Rao describes. *See supra* Limitation [1d]. Moreover determining (e.g., based on user inputs) whether a user is interacting with an application (and therefore the application is a foreground component) was well known and routine in the art.

226. Moreover, each of claims 44-59 recites a known option for how to determine "whether the service usage activity comprises a background activity." In my opinion, a POSITA would have understood that each such option was a well-known technique for making such a determination (as evidenced by the prior art of record), and a POSITA would have appreciated the benefits of employing each option (as discussed herein). Indeed, a POSITA would have understood that the options recited in claims 44-59 were each one solution selected from a finite number of well-known, identified, predictable solutions that a POSITA could implement with a reasonable expectation of success.

33. Claim 58

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein determine whether the service usage activity comprises a background activity comprises determine whether content associated with the service usage activity is in a foreground of a user interface of the wireless end-user device."

227. Rao teaches this limitation.

228. As explained above, Rao teaches determining whether the service usage activity comprises a background activity. *See supra* Limitation [1d]. Rao also teaches a wireless end-user device that includes a user interface. *See supra* Limitation [1e].

229. Rao explains that foreground applications are "in active use by the user." Rao ¶3. Rao further describes "interactive" user sessions, which "[may] involve[] multimedia elements such as video, voice, chat, gaming, and virtual reality." *Id.* ¶¶133, 140. Though discussed primarily in the context of other embodiments, a POSITA would have understood these interactive user sessions to be exemplary "active use[s]" that, per Rao's disclosures, qualify as foreground activities. *See id.* ¶3. A POSITA also would have recognized that an application that engages in interactive user sessions, such as an online meeting application, displays content in the foreground of a user interface of a device when a user engages in such a session (e.g., makes a video call).

230. It thus would have been obvious to a POSITA to rely on whether an application's content is displayed in the foreground of the user interface of the device to determine whether the service usage activities associated with that content are foreground or background activities. Specifically, it would have been obvious for a POSITA to configure a system to determine that, if the application's content is displayed in the foreground of the device, the application is engaged in an interactive

user session (i.e., an active use) that qualifies as a foreground activity (and not a background activity). Importantly, this would allow the system to use information already available to it (e.g., whether an application's content is in the foreground of the device's user interface) to determine whether activities are in the foreground or background, thereby enabling the prioritization of network packets as suggested by Rao. *See supra* Limitation [1d].

231. Moreover, each of claims 44-59 recites known and well-understood options for determining "whether [a] service usage activity comprises a background activity." In my opinion, a POSITA would have understood that each option was a well-known technique for making such a determination (as evidenced by the prior art of record) and would have appreciated the benefits of employing each option (as discussed herein). Indeed, a POSITA would have understood that the options recited in claims 44-59 were each one solution selected from a finite number of well-known, identified, predictable solutions that a POSITA could implement with a reasonable expectation of success.

34. Claim 59

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein determine whether the service usage activity comprises a background activity comprises determine whether the first software component is active."

232. Rao teaches this limitation.

233. As explained above, Rao teaches determining whether the service usage activity comprises a background activity. *See supra* Limitation [1d]. In Rao, determining whether the service usage activity comprises a background activity comprises determining whether the first software component is active.

234. For example, Rao explains that a foreground application is "in ***active use*** by the user." Rao ¶3. Rao also teaches that its agent 326 may "determine[whether] the one or more network[] packets of [an] application comprise[] real-time data." *Id.* ¶44. A POSITA would have understood that a foreground application that is in "active use by the user" and is generating network packets comprising real-time data is active and thus not a background activity and would have used this information to determine whether a service usage activity comprises a background activity.

235. Moreover, each of claims 44-59 recites known and well-understood options for determining "whether [a] service usage activity comprises a background activity." In my opinion, a POSITA would have understood that each option was a well-known technique for making such a determination (as evidenced by the prior art of record) and would have appreciated the benefits of employing each option (as discussed herein). Indeed, a POSITA would have understood that the options recited in claims 44-59 were each one solution selected from a finite number of well-known,

identified, predictable solutions that a POSITA could implement with a reasonable expectation of success.

35. Claim 60

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein apply the policy comprises at least assist in allowing, restricting, delaying, throttling, or preventing the service usage activity."

236. Rao teaches this limitation.

237. For example, Rao's remote access client 120 applies a prioritization policy to network packets of applications 338*a*-338*n*. *See* Rao ¶¶189-95; *supra* Limitation [1g]. The remote access client 120 then forms network packet queues "according to the determined priorities" so that the "network packets of the highest priority queue 540*a*-540*n* are communicated first, and then the next highest priority queue 540*a*-540*n* second, and so on." Rao ¶194. It would have been obvious to a POSITA that, in Rao's system, communication of the network packets in the lower priority queues is delayed until after the network packets in the higher priority queues are communicated.

238. Rao teaches that its method includes "holding, by the client, in the queue a network packet associated with [a] second application and releasing the held network packet upon communication of the one or more network packets associated with [a] first application prioritized ahead of the held network packet." *Id*. ¶40. A

POSITA would have recognized that Rao therefore teaches that the network packet associated with the "second application" described by Rao is delayed.

36. Claim 61

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein apply the policy comprises at least assist in: blocking access to the wireless network, restricting access to the wireless network, delaying access to the wireless network, or aggregating and holding the service usage activity."

239. Rao teaches this limitation.

240. As discussed above, Rao's remote access client 120 applies priorities to network packets of applications 338*a*-338*n* based on the prioritization rules in policies 520, arranges network packets in queues 540*a*-540*n* based on their priorities, and communicates the network packets from the queues in accordance with their priorities. *See* Rao ¶¶189-95; *supra* Limitation [1f], [1g]. The network packets in the highest priority queue are communicated first, those in the next highest priority queue second, and so on. Rao ¶194. Given these disclosures, a POSITA would have recognized that Rao teaches that the network packets in the lower priority queues cannot access the wireless network until after those in the higher priority queues are communicated (i.e., that their network access is delayed).

241. Moreover, Rao's "storing and/or arranging network packets" in lower priority queues teaches "aggregating and holding" network packets (e.g., the service usage activity). *Id.* ¶180; *see id*. ¶¶40 ("[T]he method includes holding, by the client,

in the queue a network packet associated with the second application, and releasing the held network packet upon communication of the one or more network packets associated with the first application prioritized ahead of the held network packet."), 191 ("[T]he filter 322 may place, arrange, or coordinate network packets into queues 540*a*-540*n* in support of the priorities.").

37. Claim 62

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein apply the policy comprises at least assist in queuing, time-windowing, suspending, quarantining, killing, or removing the service usage activity."

242. Rao teaches this limitation.

243. For example, Rao's remote access client 120 applies priorities to network packets of applications 338*a*-338*n* based on the prioritization rules in policies 520, arranges network packets in queues 540*a*-540*n* based on their priorities, and communicates the network packets from the queues in accordance with their priorities. *See* Rao ¶¶189-95; *supra* Limitations [1f], [1g]. Rao teaches that, as part of this process, remote access client 120 may "stor[e] the one or more network packets to a queue," *id*. ¶¶38, 43, and that the network packets in the highest priority queue are communicated first, those in the next highest priority queue second, and so on, *id.* ¶194.

38. Claim 64

a. [64a] "The non-transitory computer-readable storage medium recited in claim 1, wherein the one or more prospective or successful communications over the wireless network comprise one or more Internet protocol (IP) address requests, and"

244. Rao teaches this limitation.

245. For example, Rao discloses a peer-to-peer communication session between a first computing device on a first network and a second computing device on a second network. Rao ¶5. Rao explains that these devices may connect via a tunneling session through a third computing device (such as an SSL VPN gateway). *Id.* ¶¶5, 11, 136-37. In this example, when the first computing device communicates a request to initiate a connection with the second computing device, the third computing device intercepts this request and sends the "last known public IP address of the second computing device" to the first computing device. *Id.* ¶137; *see also id.* ¶¶5, 11.

246. It would have been obvious to a POSITA that the request from the first computing device to initiate a connection with the second computing device via the VPN gateway comprises a request for the IP address (or an IP address request) of the second computing device in view of Rao's express disclosure that, in response to the request, the VPN gateway sends the second computing device's IP address to the first computing device.

247. Further, to the extent Rao's tunneling and prioritization disclosures are considered separate inventions, a POSITA reviewing Rao also would have understood the benefits of the disclosed tunneling procedure to establish a secure connection with a computing device in a private network via VPN and would have been motivated to apply the disclosed prioritization system (*see supra* Claim 1) when the device is connected using the disclosed tunneling procedure. Rao teaches that such a connection "provides better voice quality and reduces latency related to VoIP communications as well as other real-time data communications." *Id.* ¶135. A POSITA would have recognized that Rao's prioritization scheme would work in the same manner when combined with the tunneling procedure, particularly because Rao expressly states that "any of the [disclosed] techniques … can be practiced in one or more combinations with each other." *Id.* ¶218. A POSITA would recognize that in the combined system, a communication over the wireless network would include an IP address request as disclosed in Rao, and combining multiple teachings from the Rao system would have been well within the skill of a POSITA and would have yielded predictable results.

b. [64b] "wherein apply the policy comprises at least assist in withholding, <u>delaying</u>, time-windowing, in frequency, or aggregating at least a portion of the service usage activity."

248. Rao teaches this limitation.

249. As explained previously, *see supra* Claim 60, Rao teaches wherein apply the policy comprises at least assist in allowing, restricting, delaying, throttling, or preventing the service usage activity. Therefore, Rao also teaches wherein apply the policy comprises at least assist in allowing, restricting, delaying, throttling, or preventing ***at least a portion of*** the service usage activity. As explained above, *see supra* Limitation [64a], if these are considered separate, a POSITA would have recognized that Rao's prioritization is compatible and would work in the same manner when combined with its tunneling methods.

250. Rao teaches that apply the policy comprises at least assist in allowing, restricting, delaying, throttling, or preventing at least a portion of the service usage activity when the one or more prospective or successful communications over the wireless network comprise one or more Internet protocol (IP) address requests.

251. For example, Rao teaches that "according to the determined priorities," Rao forms network packet queues so that the "network packets of the highest priority queue 540*a*-540*n* are communicated first, and then the next highest priority queue 540*a*-540*n* second, and so on." Rao ¶194. Thus, Rao teaches delaying at least a portion of the service usage activity depending on its assigned priority.

39. Claim 79

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein apply the policy comprises at least assist in intercepting a stack application programming interface (API) level or application messaging layer request."

252. Rao teaches this limitation.

253. As discussed above, Rao teaches that remote access client 120 "indicates . . . priorit[ies] for intercepted and queued network packets based on the application[s] 338*a*-338*n* associated with the packet[s]." Rao ¶189, Fig. 5 (Step 570); *see supra* Limitation [1g]. Rao teaches that "the agent 326 uses the policies 520 to apply . . . priorit[ies] to network packets of applications 338*a*-338*n* in accordance with the prioritization rules specified or indicated by the policies 520." Rao ¶189; *see supra* Limitation [1g]. Agent 326 then "***indicates the priorit[ies] to the filter 322*** for management of network packet queues 540*a*-540*n* ***to apply the indicated priorities***." *Id.* ¶¶189-93; *see supra* Limitation [1g]. The network packets are then communicated from the queues "according to the determined priorities for the network packets." *Id.* ¶¶194-95, Fig. 5 (Step 575); *see supra* Limitation [1g].

254. Rao teaches that the filter 322 "may comprise a network driver, such as a network driver operating at any layer, or portion thereof, of a network stack 310 of the client 105." Rao ¶101.

255. Rao also explains that "the agent 326 may communicate the priority of network packets to the filter 322 . . . via an ***application programming interface (API)***, such [as] an ***IOCTL interface***, or any other type and/or form of interface known to those ordinarily skilled in the art." *Id.* ¶190; *see also id.* ¶106 (explaining that "the agent 326 and the filter 322 communicate via an IOCTL application programming interface (API)," which may be "any IOCTL libraries and function calls provided by the Microsoft Windows family of operating systems" and/or "provided by any portion of the operating system running on the client 105").

256. A POSITA would have recognized that, for determined priorities to be communicated from the agent 326 to the filter 322 so that they can be applied, *see id.* ¶¶189-93, the filter 322 would need to send a call (i.e., request) to the agent 326 through the API requesting that the agent 326 send the priorities. Because the filter 322 may operate at a layer (or portion thereof) of network stack 310, *see id.*, ¶101, a POSITA would have understood that the request would constitute a "stack application programming interface (API) level" request. *See* EX-1001, 16:38-45 (describing "network stack application interface level/layer"). A POSITA would further recognize that, in order to perform the callback functions that return the priorities to the filter 322, the agent 326 would need to at least assist in intercepting the filter 322's stack API level request.

257. A POSITA's understanding in this regard would be supported by Rao's disclosure that agent 326 and filter 322 may comprise applications, *see id.* ¶116, and of various application models that incorporate APIs like "ActiveX control[s]," "Java applet[s]," and "Remote Desktop (RDP) client[s]," *see, e.g.*, *id.* ¶88, each of which ordinarily includes callback functions that at least assist in intercepting stack API level requests. It would also be consistent with what a POSITA would have understood about API functionalities at the time. *See, e.g.*, Wyld, 7:36-40 (noting that a software component may request information, such as "usage statistics on a given network connection," by "provid[ing] an API in an interface to a call stack within an operating system").

40. Claim 80

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein apply the policy comprises at least assist in killing or suspending the service usage activity or the first software component."

258. Rao teaches this limitation.

259. For example, in Rao, network packet queues are formed "according to the determined priorities" such that "network packets of the highest priority queue 540*a*-540*n* are communicated first, and then the next highest priority queue 540*a*-540*n* second, and so on." Rao ¶194. It would have been obvious to a POSITA that placing network packets in a lower priority queue would suspend the associated service usage activity until the network packets were ready to be communicated

according to their priority; higher priority packets would consume network resources and disallow the lower priority packets from accessing the network during the time of suspension. *See, e.g.*, Oestvall ¶¶15 (noting that "untrusted third party applications . . . are prevented from running in the background and are suspended"), 23 (explaining that its system may "simply place any interrupts from the background untrusted application 4 to the back of its queue and never allow them to be executed").

260. Rao also teaches that, in some embodiments, "the remote access client 120 may discard network packets during [a network] disruption, such [as] any packets related to a lossy protocol, such as RTP over UDP for voice communications." Rao ¶207. Rao explains that "[t]he remote access client 120 may use the policies 520 to determine which network packets to queue and/or discard. For example, a network packet of a first application 338*a* may be queued while a network packet of a second application 338*n* is discarded." *Id.* Rao teaches that "it may be desirable to discard packets . . . to reduce latency and quality issues." *Id.*

261. It would have been obvious to a POSITA that discarding network packets would kill or suspend the service usage activity associated with the packets. Based on Rao's disclosures, a POSITA would have been motivated to include prioritization steps and discarding steps to identify which packets in a secondary queue to discard during, e.g., a network disruption to more efficiently use available

network resources for higher priority network packets. Doing so would have been a routine exercise of ordinary techniques for a POSITA. A POSITA also would have recognized that discarding network packets during a network disruption would not affect the priorities (*see supra* Claim 1) of the remaining network packets.

41. Claim 81

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein apply the policy comprises at least assist in changing or setting a priority of the service usage activity."

262. Rao teaches this limitation.

263. For example, in Rao, "the agent 326 uses the policies 520 to apply a priority to network packets of applications 338*a*-338*n* in accordance with the prioritization rules specified or indicated by the policies 520," which may involve using "characteristics of the application 338*a*-338*n*, such as running in the foreground or background, to indicate priority for a network packet of the application 338*a*-338*n*." *Id.* ¶189. Agent 326 also "indicates the priority to the filter 322 for management of network packet queues 540*a*-540*n* to apply the indicated priorities." *Id.* ¶190.

264. It would have been obvious to a POSITA that applying a priority to the network packets of applications 338*a*-338*n*, as Rao discloses, teaches at least assisting in setting a priority of the service usage activity because in Rao, the priority

for the packets associated with each service usage activity is set when the priority is applied.

265. A POSITA also would have recognized that Rao teaches that applying the policy comprises changing a priority of the service usage activity. For example, Rao teaches that it determines at least an aspect of a policy based on a user input obtained through a user interface of the wireless end-user device or based on information from a network element (e.g., gateway 340). *See supra* Limitation [1e]. Based on these disclosures, a POSITA would have recognized that Rao's policy may change as the user provides new inputs or as the system receives new information from gateway 340 (i.e., the network element) and that, as each new policy is applied, the existing priority of the service usage activity changes.

42. Claim 82

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein apply the policy comprises at least assist in emulating a network application programming interface (API) message."

266. Rao teaches this limitation.

267. The '541 patent states that "implementing traffic control for network capacity controlled services using DAS techniques for network service usage activities that are unaware of network capacity control is provided by emulating network API messaging (e.g., effectively providing a spoofed or emulated network API)." EX-1001, 97:55-60. The '541 patent also explains that emulating an API

includes intercepting, modifying, and/or replacing various messages related to the network service activity. *Id.*, 97:60-98:5.

268. Rao teaches that its network communication controls may be "transparent[]" to applications 338*a*-338*n* or even client 105. *See, e.g.*, Rao ¶¶ 41, 46, 52, 57. A POSITA would have understood that, where controls are transparent to an application, the application is unaware of the controls.

269. Rao further teaches using "a false acknowledgement technique when communicating a lossy or unreliable protocol via a lossless or reliable protocol." *Id.* ¶150. Rao explains that, according to this technique, the remote access client 120 provides a false acknowledgement of receipt of a lossless protocol packet. *See id.* ¶¶154-56, 160-62 ("[T]he false acknowledgement of receipt of the network packet may comprise the same form and/or type as an actual acknowledgement of receipt of the network packet."). A POSITA would have understood that this false acknowledgement is a locally generated API message masquerading as a network API message and is accordingly "emulating a network API message," consistent with the aforementioned descriptions in the '541 patent, which describe "emulating" as providing a spoofed API. *See* EX-1001, 97:55-60. Rao expressly teaches that this technique can be practiced in conjunction with its prioritization techniques, *see, e.g.*, *id.* ¶218, and a POSITA would have understood that Rao's false acknowledgement

technique would be practiced as part of transmitting packets according to Rao's prioritization policy.

43. Claim 83

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein apply the policy comprises at least assist in intercepting, modifying, blocking, removing, injecting, swapping, or replacing an application interface message."

270. Rao teaches this limitation for the reasons presented in connection with claim 79. As discussed there, Rao teaches that the policy comprises at least assist in intercepting a specific application interface message (e.g., a stack application programming interface (API) level request). *See supra* claim 79; *see also* [1f]-[1g].

44. Claim 87

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein apply the policy comprises: identify a socket to be opened for the service usage activity; and based on a condition, block the service usage activity or terminate the socket."

271. Rao teaches this limitation.

272. Rao applies a prioritization policy to network packets of applications 338*a*-338*n*. *See* Rao ¶¶189-95; *supra* Limitation [1g]. And, as noted above, Rao's applications 338*a*-338*n* each have associated network packets (an associated service usage activity). *See supra* Limitation [1b].

273. Rao explains that, in its system, "a network packet is associated with an application 338*a*-338*n* by matching information from the routing table 538, such

as source and destination IP addresses and ports numbers with the IP addresses and ports numbers of the network packet." Rao ¶187; *see also id.* ¶190 ("An application 338*a*-338*n* corresponding to a network packet can be identified by any combination of source and destination identifiers, such as IP addresses and port numbers."). The "source" and "destination" ports are the ports by which the sending and receiving applications communicate over the wireless network, per Rao. *Id.* ¶181. Rao also explains that, when the remote access client 120 queues packets (e.g., applies the policy), "intercepted network packets for an application communicating to a first destination IP address[] and a first destination port may be placed in a first queue 540a." Rao ¶192.

274. A POSITA would have understood that by identifying the source and destination port, Rao identifies a port to be opened for the service usage activity—the open port permits the communication of the packet. In doing so, Rao discloses or identifying a socket to be opened for the service usage activity. A POSITA would have recognized that the '541 patent uses the term "socket" to refer to an "IP address, protocol, and/or port." *See* EX-1001, 22:29; *see also id.* 22:29-30 ("socket address

(e.g., port number)").[5] A POSITA would also have known that a socket is a connection to a port, such that identifying the port encompasses identifying a socket.

275. Even if Rao did not disclose identifying a socket, a POSITA would have found this obvious in view of Rao's teachings. As discussed, Rao teaches identifying ports as part of queuing and communicating packets. It explains that the application "that originally generated the IP packet" may monitor the ports and notes that packets are transmitted by "opening a specific port." *Id.* ¶¶¶112, 167, 181. Given the relationship between the socket and the port, a POSITA would have recognized that identifying a socket would be a minor variant on this technique and would have considered it obvious. Indeed, as I note above, the '541 patent expressly uses "socket" to refer to a "port," confirming that a POSITA would have understood disclosure of one to disclose or at least suggests the other. EX-1001, 22:29.

276. Thus, Rao teaches that applying the policy comprises identifying a socket to be opened for service usage activity.

277. Rao also explains that "the filter 322 may use a filter table for filtering packets" and "can inspect the contents of the packets, such as routing information,

[5] A POSITA would have understood that a "socket" is best described as a connection to a port. *See, e.g.*, EX-1009 at 31-33 (explaining that a socket may be bound to a specific port).

to determine the action to take." *Id.* ¶102. "[T]he filter 322 may drop or accept the network packets depending on their content." *Id.* Further, "[t]he filter table may also be used to ensure that unwanted packets are discarded" or "to deny access to particular protocols or to prevent unauthorized access." *Id.* And Rao teaches that "the remote access client 120 may queue the network packets and discard some of the network packets after a predetermined period of time." *Id.* ¶207. "The remote access client 120 may use the policies 520 to determine which network packets to queue and/or discard." *Id.*

278. For the reasons explained in connection with claims 34 and 80, a POSITA would have been motivated to combine the disclosures of Rao to produce a system capable of performing Rao's prioritization and discarding steps and identifying which packets to discard during a network disruption, and doing so would have been a routine exercise of ordinary techniques for a POSITA. *See supra* Claims 34, 80.

279. A POSITA would have understood that, because Rao teaches that network packets may be blocked or discarded based on their content, Rao teaches that applying the policy comprises "based on a condition, block[ing] the service usage activity or terminat[ing] the socket."

45. Claim 88

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein controlling the service usage activity comprises: blocking a network access event or attempt associated with the first software component, modulating a number of access events or attempts associated with the first software component, aggregating a plurality of access events or attempts associated with the first software component, or time-windowing the number of access events or attempts associated with the first software component."

280. Rao teaches this limitation.

281. For example, Rao teaches that controlling the service usage activity comprises intercepting and storing network packets associated with applications 338*a*-338*n* in queues 540*a*-540*n* before determining their priorities based on, for example, being background activities. Rao ¶¶180, 184-95; *see also supra* Limitations [1b]-[1g]. Rao's "storing and/or arranging network packets" in queues teaches "aggregating" network packets. Rao ¶¶180, 184-95; *see id.* ¶191 (discussing "plac[ing], arrang[ing], or coordinate[ing] network packets into queues 540*a*-540*n* in support of the priorities"). Rao's communicating network packets from queues "according to [a] determined priority" teaches "modulating" network packets because network packets are selectively sent from the queues according to their priority and not when they are first transmitted by an associated application. *Id.*; *see id.* ¶¶40 ("[T]he method includes holding, by the client, in the queue a network

packet associated with the second application, and releasing the held network packet upon communication of the one or more network packets associated with the first application prioritized ahead of the held network packet."); 194 (explaining that "network packets of the highest priority queue 540*a*-540*n* are communicated first, and then the next highest priority queue 540*a*-540*n* second").

282. Rao further teaches that remote access client 120 may "throttle back or not communicate network packets related to other network[] factors, such as congestion, even though the network packets may have a higher priority than other network packets in a queue 540*a*-540*n*," and that its system can thus "control[] and manage[] the prioritization of network communications of the client 105 . . . in accordance with any policies 520 for the client 105 and in further view of any . . . other factors occurring on the network." *Id.* ¶195. A POSITA would have understood that the remote access client 120's considering network congestion and similar factors teaches a policy (which may include Rao's policy regarding background activity) for "modulating" network packets.

283. Accordingly, a POSITA would have understood that Rao teaches controlling the service usage activity by "modulating." A POSITA would have further understood that Rao teaches modulating "the number of access events or attempts associated with the first software component," as claimed.

284. Rao's intercepted network packets disclose an "access event or attempt associated with the first software component" because the network packets are associated with applications 338*a*-338*n* accessing or attempting to access network 104, including for example, the Internet. *See, e.g.*, *id.* ¶¶87-89, 95, 179 ("The client 105 may execute one or more applications 338*a*-338*n*, which ***access the network 104*** via the agent 326 and filter 322 of the remote access client 120.").

46. Claim 89

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein, when executed by the one or more processors of the wireless end-user device, the machine-executable instructions further cause the one or more processors to: if it is determined that the service usage activity is not the background activity, refrain from applying the policy."

285. Rao teaches this limitation.

286. As discussed above, Rao teaches determining whether the service usage activity comprises a background activity and applying the policy if it is determined that the service usage activity is the background activity. *See supra* Limitations [1d]-[1g]. As explained in those sections, Rao also teaches that the remote access client 120 may determine that a service usage activity is not a background activity, i.e., is a foreground activity. *See supra* Limitation [1d]. Thus, a POSITA would have understood that Rao's system also determines whether the service usage activity is not the background activity.

287. Likewise, as explained above regarding limitations [1f]-[1g], Rao's policies 520 define prioritization based on whether an application is running in the foreground or the background, and Rao expressly teaches that the policies are conditional and apply based on characteristics of the application, such as whether the application is in the foreground or background. *See supra* Limitations [1f]-[1g] (citing Rao ¶¶40-42, 182, 188, 193). In other words, and as explained above, Rao teaches applying a policy ***if*** the service usage activity ***is the background activity***. *Supra* Limitations [1f]-[1g]. Rao therefore also teaches that, if it is determined that the service usage activity ***is not the background activity***, the processor refrains from applying the policy. For example, in Rao, network packets associated with a background application are assigned a lower priority, whereas those associated with a foreground application are not. Rao ¶3.

288. For the same reasons discussed above in connection with limitations [1f]-[1g], to the extent it is argued that Rao does not expressly disclose refraining from applying the policy if the service usage activity is not the background activity, a POSITA would have been motivated and found it obvious to modify Rao to produce a system to do so to further Rao's objectives. For example, applying a policy that assigns a priority to a network packet only if it is associated with a background activity (and refrains from applying the policy if not) would have simplified Rao's system by deprioritizing background activities relative to the activities of active

applications without requiring a user to consider or set other prioritization factors (e.g., for individual applications). This would have reduced network congestion caused by (potentially unnecessary or unwanted) background activities, improved available bandwidth for applications in the foreground, and improved the overall efficiency and speed of the system while minimizing the burden on the user. A de-prioritization policy would be applied to background requests for email, RSS feeds, and software updates, for example, to deprioritize them over the activities of foreground applications users are actively using or requiring real-time communication, to which the policy is not applied.

289. Indeed, Rao recognizes the benefits of and teaches deprioritizing background activities but not foreground activities. In one example, Rao teaches deprioritizing background activity and not real-time (VoIP) communication to avoid "increasing the latency and reducing the quality of the voice communication." Rao ¶3. Rao also recognizes the quality and latency benefits of deprioritizing background activities relative to the activities of "other applications." *Id.* ¶¶80 (disclosing that it "may improve or increase the performance, operational characteristics, and user experience on the client based on the applications running on the client"), 184 (prioritizing "real-time data communications . . . ahead of other applications"). A POSITA therefore would have found it obvious to apply and/or modify Rao to

refrain from applying the policy if it is determined that the service usage activity is not the background activity.

47. Claim 90

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein the policy is a first policy, and wherein, when executed by the one or more processors of the wireless end-user device, the machine-executable instructions further cause the one or more processors to: if it is determined that the service usage activity is not the background activity, apply a second policy."

290. Rao teaches this limitation.

291. The claims of the '541 patent make clear that "apply[ing a] policy" may comprise various activities, such as "allowing, restricting, delaying, throttling, or preventing the service usage activity." *See, e.g.*, EX-1001, Claim 60. Thus, applying a first policy may include restricting, delaying, or throttling a service usage activity, while applying a second policy may include "allowing" the service usage activity.

292. Rao teaches claim 90 for the reasons presented above in connection with claim 89. *See supra* Claim 89; Limitations [1e], [1f]-[1g]. As discussed above, Rao discloses delaying network packets by applying a de-prioritization policy if the service usage activity is the background activity (i.e., applying the first policy), but allowing packets to go through without being deprioritized if the service activity is not the background activity (i.e., applying a second policy of allowing packets). In other words, as explained above, Rao teaches applying a first policy ***if*** the service

usage activity ***is the background activity*** and not applying the first policy ***if*** the service usage activity ***is not the background activity***. *See supra* Limitations [1f]-[1g]. Not applying the policy if the service usage activity is not the background activity—i.e., allowing the service usage activity unchanged—is a second policy.

293. A POSITA would have understood that implementing such functionality could be achieved either as a single policy (e.g., with multiple aspects) or as two separate policies, and the decision as to which approach to take would have been recognized by a POSITA as a simple design choice among known alternatives. Moreover, choosing to implement this functionality as separate policies (as opposed to a single policy) is one of two possible approaches to the problem, and POSITA would have had a reasonable expectation of success in using separate policies.

48. Claim 157

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein the user input obtained through the user interface of the wireless end-user device comprises a directive to apply the policy to a second software component of the plurality of software components on the wireless end-user device."

294. Rao renders this limitation obvious.

295. As discussed above in claim 1, limitation [1e], Rao teaches determining an aspect of a policy based on a user input. Specifically, Rao teaches that policies 520 "may be ***configurable by a user*** by any suitable means and/or mechanism," including by "a user interface, graphical or otherwise, design[ed] and constructed

for configuring or specifying the policies 520." Rao ¶183; *see supra* Limitation [1e]. Rao teaches that the policies may "define prioritization based on whether an application [338*a*-338*n*] is running in the foreground or the background of the client 105." Rao ¶182.

296. A POSITA would have understood that Rao teaches a user input comprising a directive to apply the policy to a second application (i.e., second software component) because Rao teaches, pursuant to policies 520 configurable by a user through a user interface, prioritizing the network packets of any application in the plurality of applications 338*a*-338*n* based on whether it is running in the foreground or background of the client 105. *See supra* Limitations [1b], [1e]-[1g]. Thus, Rao teaches, based on a directive received from a user input, applying a prioritization policy to at least two applications, where both applications may be running in the background or the second application may be running in the foreground. Applying the policy would comprise applying a priority to the network packets of the second application, such that the network packets would be transmitted ahead of or behind those of the first application (i.e., the first software component). Rao therefore teaches receiving a user input that includes a "directive to apply the policy to a second software component" because the input requires the prioritization of the network communications of applications 338*a*-338*n*.

297. To the extent the claim requires the user input to specify a particular application, for example by name or identifier, Rao also teaches and renders this limitation obvious. For example, Rao teaches that its policies may "be specified by the name of the application 338*a*-338*n*." *Id.* ¶182. A POSITA would have found it obvious to determine at least an aspect of a policy by a user input through a user interface that includes a directive to apply the policy to a particular application (e.g., a second software component) because Rao teaches doing so. A POSITA would have been motivated to modify and/or apply Rao in this manner to properly prioritize, for example, a particular application known to operate in the background (e.g., one that performs application or virus software updates or requests emails and associated attachments, as Rao teaches) or foreground (e.g., a web browser, audio and/or video streaming application, or other application that is actively used, *see, e.g.*, Rao ¶¶ 3, 88). Doing so would have allowed a user to apply a priority to specific applications, where the user may have a preference or desire to place that application at a particular priority level. This would have increased the usability and functionality of Rao's system by providing a user with more control over implementation of its policies.

49. Claim 165

a. [165a] "The non-transitory computer-readable storage medium recited in claim 1, wherein the service usage activity is a first service usage activity, and wherein the one or more prospective or successful communications over the wireless network are first one or more prospective or successful communications over the first wireless network, and wherein the background activity is a first background activity, and wherein the user input obtained through the user interface of the wireless end-user device is a first user input, and wherein, when executed by the one or more processors of the wireless end-user device, the machine-executable instructions further cause the one or more processors to:"

298. Rao teaches this limitation for the reasons provided above in connection with claim 1, limitations [1a]-[1g]. *See supra* Claim 1. As discussed above, Rao teaches a service usage activity and one or more prospective or successful communications over a wireless network, a background activity, and user input obtained through a user interface, and a POSITA would have understood that these may be a "first" service usage activity, "first" one or more prospective or successful communications over a wireless network, "first" background activity, and "first" user input obtained through a user interface. *See supra* Claim 1.

b. [165b] "identify a second service usage activity of the wireless end-user device, the second service usage activity being associated with a second software component of the plurality of software components on the wireless end-user device, the second service usage activity comprising second one or more prospective or successful communications over the wireless network;"

299. Rao teaches or at least renders this limitation obvious.

300. For example, Rao teaches "intercepting, by the client, the ***one or more network packets*** transparently to the ***one or more applications on the client***." Rao ¶¶41-46, 184-85, Fig. 5B (Step 555). Rao's intercepting network packets from one or more applications on the client teaches or renders obvious identifying first and second service usage activities associated with first and second software components, respectively. For the reasons explained with respect to claim 1, limitation [1b], Rao also teaches "identify[ing]," a "service usage activity," a "wireless end-user device," and "one or more prospective or successful communications over the wireless network" related to a second software component. *See supra* Limitation [1b].

c. [165c] "determine whether the second service usage activity is a second background activity; and if it is determined that the second service usage activity is the second background activity, apply at least a portion of the policy, wherein the at least a portion of the policy is based on a second user input."

301. Rao teaches this limitation.

302. For the reasons explained in connection with claim 1, limitations [1e]-[1g], Rao teaches determining whether a service usage activity is the background activity and applying a policy based on that determination. *See supra* Limitations [1e]-[1g]. Rao also teaches a policy based on a user input, as discussed with respect to claim 1, limitation [1b]. *See supra* Limitation [1b]. Rao teaches applying a policy to a second service usage activity because Rao teaches intercepting network packets from ***one or more applications***, as discussed for claim 165, limitation [165b]. *See supra* Limitation [165b].

303. A POSITA would have found it obvious, based on the teachings of Rao, to apply at least a portion of the policy to a second software component based on a second user input. For example, Rao teaches that a user may specify policies based on a number of different aspects, including policies targeting particular applications by their names, their types, the types of protocols they use, the destinations of associated network packets, the sizes of associated network packets, the times when associated network packets are received, and whether they run in the foreground or background, and how the network packets of those targeted applications should be prioritized. Rao ¶¶182, 191, 193. In view of Rao's disclosures, it would have been obvious to a POSITA to receive a second user input specifying an additional aspect of Rao's prioritization policy pertinent to background applications that applies to a second application. For example, it would have been obvious to receive a second

user input that specifies that network packets for background applications received later in time than other, similar packets should be given a lower priority in the queues. As another example, a second input may specify that smaller network packets should be prioritized higher than larger packets, or than packets from a particular background activity or using a particular protocol should be prioritized higher or lower than other background activity packets. Indeed, Rao teaches these options expressly. *Id.* ¶¶182, 191, 193.

304. A POSITA would have been motivated to apply and/or modify Rao in this manner because it would have allowed a user to prioritize network packets based on different variables, including the network packets' destinations, sizes, times received, associated protocols, and/or originating applications. *See id.* ¶¶182, 191, 193. This would have increased the usability and functionality of Rao's system by providing a user with more control over implementation of its policies and network packets.

50. Claim 169

a. [169a] "The non-transitory computer-readable storage medium recited in claim 1, wherein the service usage activity is a first service usage activity, and wherein the one or more prospective or successful communications over the wireless network are first one or more prospective or successful communications over the wireless network, and wherein, when executed by the one or more processors of the wireless end-user device, the machine-executable instructions further cause the one or more processors to:"

305. Rao teaches this limitation for the reasons explained above in claim 1, sections [1a]-[1g]. *See supra* Claim 1. As discussed above, Rao teaches a service usage activity and one or more prospective or successful communications over a wireless network, and a POSITA would have understood that these may be a "first" service usage activity and "first" one or more prospective or successful communications over a wireless network. *See supra* Claim 1.

b. [169b] "identify a second service usage activity of the wireless end-user device, the second service usage activity being associated with the first software component, the second service usage activity comprising second one or more prospective or successful communications over the wireless network;"

306. Rao teaches or at least renders this limitation obvious.

307. For the reasons explained in connection with claim 1, limitation [1b], Rao teaches identify a service usage activity of the wireless end-user device, the service usage activity being associated with the first software component, and the

service usage activity comprising one or more prospective or successful communications over the wireless network. *See supra* Limitation [1b].

308. Rao further teaches that the service usage activity may be a "second" service usage activity from the first software component. For example, Rao teaches "intercepting, by the client, the ***one or more network packets*** transparently to the one or more applications on the client." Rao ¶¶41-46, 184-85, Fig. 5B (Step 555). Rao's disclosure of intercepting more than one network packet from the same application on the client teaches or renders obvious identifying a first and second service usage activity associated with a first software component. For example, a POSITA would have understood that a software component may conduct a first service usage activity and then a second service usage activity, which may respectively include a first and second network packet or first and second sets of network packets. A POSITA would have understood that Rao's remote access client 120 would intercept the second (set of) packet(s) (e.g., second service usage activity) in the same way as it intercepts the first, *see* Rao ¶¶41-46, 102, 105, 184-86, Fig. 5B, and that Rao thus teaches this limitation for the reasons discussed in Claim 1.

c. [169c] "determine whether the second service usage activity is the background activity; and if it is determined that the second service usage activity is the background activity, apply at least a portion of the policy."

309. Rao teaches or at least renders this limitation obvious.

310. For the reasons explained in connection with claim 1, limitations [1d] and [1g], Rao teaches determining whether a service usage activity is a background activity and, if it is determined that the service usage activity is the background activity, apply at least a portion of the policy. *See supra* Limitations [1d], [1g].

311. Rao teaches making this determination to facilitate its disclosed prioritization scheme, which Rao expressly applies to multiple network packets (e.g., first and second service usage activities). *See, e.g.*, Rao ¶¶189-90; *see also supra* Limitation [169b]; Claim 165. Rao thus discloses or renders obvious making a corresponding background determination and applying the policy to a second service usage activity in the same way as it makes the background determination and applies the policy to the first. Accordingly, a POSITA would have understood that, for the same reasons discussed in connection with claim 1, Rao teaches this limitation.

51. Claim 171

a. "The wireless end-user device embodying the non-transitory computer-readable storage medium recited in claim 1."

312. Rao teaches this limitation.

313. As discussed in connection with claim 1, limitation [1a], Rao's client 105 is a computing device that includes memory, storage, and a central processing unit. Rao ¶¶116-21; *see supra* Limitation [1a]. Rao teaches that the

> remote access client 120, or any portion thereof . . . may comprise an application, module, service, computer program, software component,

> web service, web component, library, function, process, task, thread, or any other type and/or form of ***executable instruction*** which is designed to and capable of executing the functionality of the present invention.

Rao ¶116. Rao teaches that client 105 may be an end-user device, as discussed with respect to claim 1, limitation [1a], with "sufficient processor power and memory capacity to perform [Rao's] operations." Rao, ¶130. As explained in connection with claim 1, Rao's client 105 embodies each limitation of claim 1. *See supra* Claim 1.

314. Rao therefore teaches that wireless end-user device embodies the non-transitory computer-readable storage medium recited in claim 1.

52. Claim 172

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein the network element comprises a service controller, a server, a cloud element, or a billing element."

315. Rao teaches this limitation.

316. As discussed in connection with claim 1, limitation [1e], Rao teaches that its policies 520 may be "provided by or downloaded via the ***gateway 340***" over network 104. Rao ¶183; *see also id.* ¶93, Fig. 1A, 1B, 1C; *supra* Limitation [1e]. Rao teaches that gateway 340 "may comprise any type and/or form of gateway, such as a remote access ***server***, that may be used to connect one or more computing devices on one network to other networks." Rao ¶92. Rao therefore teaches a network element that comprises "a server." *See id.*, Figs. 1A, 1B (showing server 102c), 2A.

B. Rao in View of Fadell Renders Obvious Claims 1, 2, 7, 27, 30-33, 36-38, 40-43, 46, 63, 65-78, 91-96, 99, 102-38, 140-56, 158-64, 166-68, 170, 173, and 174 Under 35 U.S.C. § 103

1. Motivation to Combine Rao and Fadell

317. A POSITA would have found it obvious to combine Rao and Fadell. For example, Rao and Fadell disclose substantially similar and complementary methods for controlling network communications.

318. Rao teaches optimizing communications over a wired or wireless network, including via "application-aware prioritization of client-side network communications." *See, e.g.*, Rao ¶¶80, 179-95, Figs. 5A, 5B. Rao teaches a "remote access client" that captures network packets and assigns priorities to them in accordance with policies that are applied based on one or more characteristics of the applications that generated the network packets (e.g., the applications' names, sizes, memory usage, or execution times, how often the applications are used, and/or whether the applications execute in the foreground or background of a client). *See id.* ¶¶86-89, 97-105, 179-95, Figs. 1A-1C, 5A, 5B. Rao teaches that its prioritization techniques "may improve or increase the performance, operational characteristics, and user experience on the client based on the applications running on the client." *Id.* ¶80. Rao also contemplates applying its techniques over various wired and wireless networks. *Id.* ¶95.

319. Fadell similarly teaches a "resource utilization component" that monitors resource usage, alerts/notifies users when their resource usage reaches or comes close to certain limits or thresholds and provides for network communication control and notifications when data usage approaches a threshold or data limit. Fadell ¶¶21-22, 27, 47-72, Figs. 1, 3-6. The resource utilization component allows processes and associated communications to be enabled, disabled, cancelled, delayed, or rescheduled based on, for example, their importance, the type of data, application, or protocol involved, and/or the resources available. *Id.* ¶¶21-22, 27, 47-72.

320. Fadell contemplates operation on networks that include "any suitable communications network or data network to and from which electronic device 102 may transfer data," *id.* ¶¶23-26, and, contemplates a network "to which access is on a pay to use basis," *id.* ¶23; *see also id.* ¶¶16, 42-46 (disclosing a "data provider" that may "allocate to each consumer particular amounts of received data."). Fadell teaches that its resource usage notifications "assist the consumer in avoiding excess fees or penalties, the consumer may receive (e.g., from the data provider or from the resource utilization component)." *Id.* ¶51.

321. A POSITA would have understood that Rao and Fadell disclose analogous art, both to the claims of the '541 patent and to each other, and a POSITA would have looked to Fadell to improve Rao given the similarities and disclosed

benefits of each reference. For example, a POSITA would have combined the functionality of Rao and Fadell (e.g., of Rao's remote access client and Fadell's resource utilization component) to apply a policy that applies a prioritization to network packets from a background activity and notifies a user when resource usage approaches a threshold.

322. For example, in the combined system, when the resource usage threshold is met, network packets from the background activity would be queued and deprioritized (as suggested by Rao, *see, e.g.*, Rao ¶¶180-95), and the user would be notified of the resource usage threshold and afforded options for how to proceed (as suggested by Fadell, *see, e.g.*, Fadell ¶¶47-72, Figs. 1, 3-6). In one example, when the user meets a resource usage threshold (e.g., a monthly data limit for a paid-access network), the policy would begin intercepting and queuing background requests for email from an email application, auto-update processes, RSS feeds, and/or similar background activity, and the user would be notified of the resource usage threshold. Indeed, both Rao and Fadell teach these types of background activities. *See, e.g.*, Rao ¶¶179, 182, 188-89, 192; Fadell ¶¶60, 64, 66. Both contemplate actions relative to background activity: Rao applying a priority in queues, Rao ¶¶182, 188-89, 192, and Fadell contemplating "reschedul[ing] or cancel[ing] processes requesting data of lesser importance." Fadell ¶60.

323. A POSITA would have been motivated to combine Rao with Fadell to queue and deprioritize background activity while alerting the user because doing so would have improved the Rao's system by enabling a policy that limits (potentially unwanted or unnecessary) background activity and notifies the user when resource usage limits are reached. This would have enabled a user to selectively control when background activity is deprioritized and held in queues to avoid data usage overages. This would have been particularly advantageous when communicating over a network that is "pay to use" and/or operated by data providers, as taught by Fadell. Fadell ¶¶16, 23, 42-46. The combined system would have provided the user with information about resource usage when limits are approaching and/or reached, as taught by Fadell. *Id.* ¶¶47-72, Figs. 1, 3-6. In this way, the user would be able to continue chosen (e.g., high-priority) activities while avoiding or minimizing costs attendant on exceeding allowed data usage, as taught by Rao and Fadell. A POSITA would have been very familiar with, e.g., data usage caps in wireless networks at the time, for example, the most commonly used cellular networks in the United States were regularly limited to monthly data caps.

324. Both Rao and Fadell disclose limiting background activity. Rao ¶¶182, 188, 189; Fadell ¶60 ("the consumer may instead or in addition reschedule or cancel processes requesting data of ***lesser importance***. For example, a consumer may cancel or delay auto-update processes (e.g., virus scan updates), automatic requests

for new mail, RSS feed detectors, automatically updating web pages or screens (e.g., Gamecast screens or live blogs for following live sporting or news events), or any other suitable process."). While Fadell teaches limiting background activity in response to its notifications, Rao teaches doing so based on the activity being background activity. A POSITA would have found it obvious to implement the Rao-Fadell system with a policy that queues and assigns a priority to background activity and provides a notification to allow the user to choose how to proceed.

325. Rao teaches deprioritizing background activity relative to real-time data usage, including VoIP communications, and also teaches deprioritizing background activity relative to other applications, including foreground applications and other applications. Rao ¶¶4 (listing "instant messaging"), 80 (prioritizing certain network packets "ahead of network communications from other applications"). Rao further teaches that client 105 that may be "a smart phone, or any type of mobile computing or telecommunication device." *Id.* ¶198; *see also id.* ¶130 (disclosing a computing device 102 that may be a "handheld computer" or "mobile telephone").

326. Rao therefore would have benefited from the teachings of Fadell in providing a policy that not only queues and applies a prioritization to background activity, but does so when resource usage limits are approaching and informs the user through a notification, as taught by Fadell. This would have been particularly beneficial for users of cellular and smartphone devices, as contemplated by Rao and

Fadell, which operate over networks run by cellular network providers that may specify resource usage limits. Fadell ¶¶2-7, 16-18. In this environment, a user would avoid data overages and thus unnecessary and unwanted expenses by rescheduling or delaying background activity and allow the user other options like purchasing additional data or switching networks, as taught by Fadell. *Id.* ¶¶2-7, 16-18, 56, 57, 63-65.

327. The combination of Rao and Fadell would have been nothing more than the simple combination of known elements to obtain predictable results. For example, the combination of Fadell's resource usage thresholds and notifications with Rao's network packet prioritization techniques would have yielded the predictable result of a system that applies a prioritization of network packets associated with background activity and notifies the user when resource usage limits are reaching a threshold. The combination also would have been nothing more than the use of the known technique of monitoring resource usage limits and notifying the user to improve Rao in the same way and applying prioritization to background activity to avoid data overages. A POSITA would have had a reasonable expectation of success in combining Rao with Fadell because both disclose monitoring network activity from handheld and mobile telephones, and both disclose policies relating to associated network traffic.

328. Additional considerations supporting a POSITA's motivation to combine Rao and Fadell are provided below.

2. Claim 1

a. [1a] "A non-transitory computer-readable storage medium storing machine-executable instructions that, when executed by one or more processors of a wireless end-user device, cause the one or more processors to:"

329. To the extent it is determined the preamble is limiting, Rao teaches a non-transitory computer-readable storage medium storing machine-executable instructions that, when executed by one or more processors of a wireless end-user device, cause the one or more processor to perform operations for the reasons discussed above in Section VIII.A.2.a.

330. Fadell also teaches these limitations. For example, Fadell teaches a wireless end-user device that may include "a cellular telephone (e.g., an iPhone® available from Apple Inc.)." Fadell ¶29; *see also id.* ¶37 ("iPhone").

331. Fadell further teaches a "resource utilization component 110" that may be "embedded in electronic device 120." *Id.* ¶ 21; *see also id.* ¶¶21, 22, 27. The electronic device "may include ***processor 202, storage 204, memory 206***, communications circuitry 208, [and] input/output circuitry 210," as well as other components like "a display, bus, or input mechanism." *Id.* ¶30. Processor 202 may include "any processing circuitry operative to control the operations and performance" of the electronic device and "***may be used to run*** operating system

software, firmware, . . . and/or ***any other application***," including an application "associated with [the] resource utilization component." *Id.* ¶31. Resource utilization component 110 is thus composed of machine-executable instructions stored in a non-transitory computer-readable storage medium of a wireless end-user device.

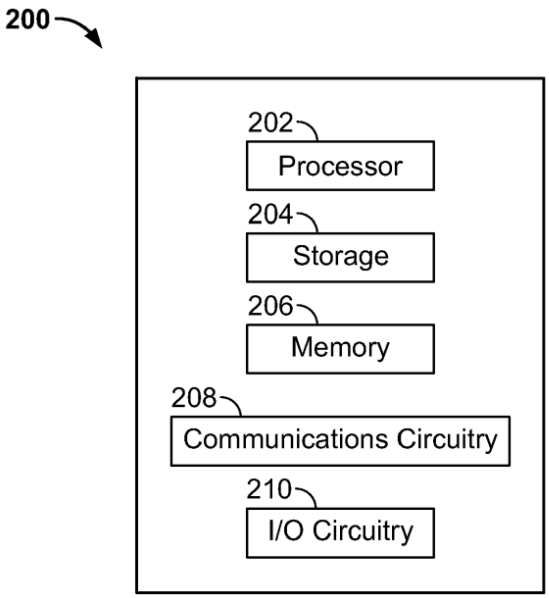


FIG. 2

Id., Fig. 2.

332. In the combined Rao-Fadell system, it would have been obvious to implement the wireless end-user device as a cellular phone or handheld computer, such as the iPhone taught by Fadell, which communicate wirelessly over one or more networks that includes a cellular network. *See id.* ¶¶29, 37. As disclosed by both Rao and Fadell, this wireless end-user device would include memory, storage, and a processor, and the processor would execute the instructions associated with the

disclosed software/applications, such as Rao's remote access client 120 and Fadell's resource utilization component 110, stored on the device. In combining Rao and Fadell, a POSITA would have found it obvious to include functionality associated with both Rao's remote access client 120 with Fadell's resource utilization component 110 in the instructions. As discussed above, both Rao and Fadell describe policies for resource utilization. Rao specifically explains that the policies described in connection with its remote access client 120 are non-exclusive. *See* Rao ¶182 ("One ordinarily skilled in the art will recognize and appreciate the multitude of ways to define client-side application priorities."). A POSITA would have found it obvious to use both Rao's the prioritization policies and Fadell's resource usage notification policies in a combined policy in the combined system.

b. [1b] "identify a service usage activity of the wireless end-user device, the service usage activity being associated with a first software component of a plurality of software components on the wireless end-user device,"

333. Rao teaches identifying a service usage activity of the wireless end-user device, the service usage activity being associated with a first software component of a plurality of software components on the wireless end-user device for the reasons discussed above in Section VIII.A.2.b. *See supra* Section VIII.A.2.b.

334. To the extent it is argued that Rao does not disclose this limitation, Fadell does. For example, Fadell teaches that resource utilization component 110

may "monitor . . . utilization, provide alerts at certain thresholds, and/or perform utilization shifting actions" to help subscribers manage their usage of resources (e.g., data, bandwidth) allocated by data providers. Fadell ¶17; *see, e.g.*, *id.* ¶¶18-20, 22, 31, 46-67, 71-72. The resource utilization component "may measure the amount of data transferred to or from electronic device 120 (e.g., uploads or downloads), the bandwidth used by electronic device 120, or any other suitable quantity for measuring network resource use." *Id.* ¶22. Resource utilization component "***may act as a gateway*** to electronic device 120 to access the resources of network 102," where the network may include wireless networks. *Id.* ¶27; *see also id.* ¶¶28, 23-25.

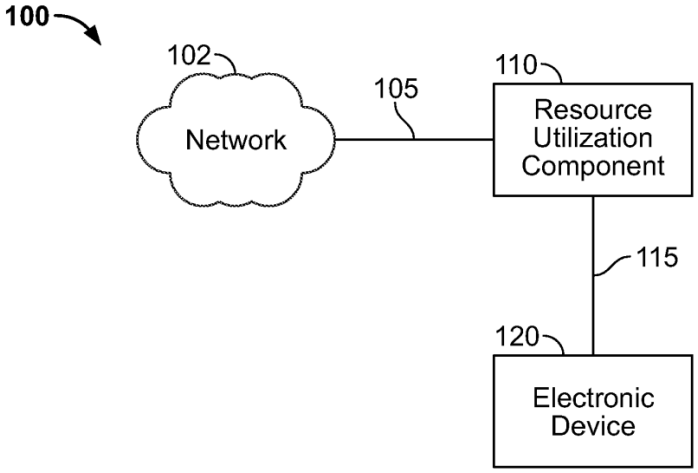


FIG. 1

Id., Fig. 1.

335. Fadell explains that, based on this monitoring activity, the resource utilization component can issue alerts presenting "option[s] 412 for restricting resource usage to stay within the resource allocation." *Id.* ¶56. This additional

functionality would have motivated a POSITA to ensure this feature was present in the combined Rao-Fadell system because it would have given a user greater control over resource usage and options for proceeding. For example, a user could elect to restrict certain activity to prevent inadvertent overages or to purchase more resources when a threshold is met.

336. Fadell's disclosures of data requests made and/or transfers over a wireless communications path teaches "a service usage activity of the wireless end-user device," as claimed. *See, e.g.*, *id.* ¶¶22, 26-29, 32, 46-47, 62. A POSITA also would have understood that, in order to monitor and limit resource usage, Fadell's resource utilization component would identify data requests and/or transfers. This may also include associating particular data requests and/or transfers with particular data types, applications, and/or protocols. *See id.* ¶¶18, 56, 59-61, 64.

337. Fadell therefore teaches identifying a service usage activity associated with a software component of a plurality of software components on a wireless end-user device, and a POSITA would have been motivated to include the resource utilization component in the combined system, combining Rao's prioritization policies and Fadell's resource usage notification policies in a combined policy such that the combined system would include functionality associated with both Rao's remote access client 120 and Fadell's resource utilization component 110.

c. [1c] "the service usage activity comprising one or more prospective or successful communications over a wireless network;"

338. Rao teaches that the service usage activity comprises one or more prospective or successful communications over a wireless network for the reasons discussed above in Section VIII.A.2.c. *See supra* Section VIII.A.2.c.

339. Fadell likewise teaches this limitation. For example, Fadell teaches that "[e]lectronic device 120 may connect to network 102 using . . . any suitable wired or wireless communications path." Fadell ¶ 28; *see also id.* ¶¶26, 29, 32, 62. "Network 102 may support any suitable communications protocol for transmitting data within network 102 or . . . to or from electronic devices 120 that are coupled to the network," including wireless network protocols like "IEEE 802.11, IEEE 802.16," TCP, UDP, and HTTP. *Id.* ¶24. Fadell further teaches that communications between electronic devices 120 and network 102 may be routed through the resource utilization component. *Id.* ¶¶27-28.

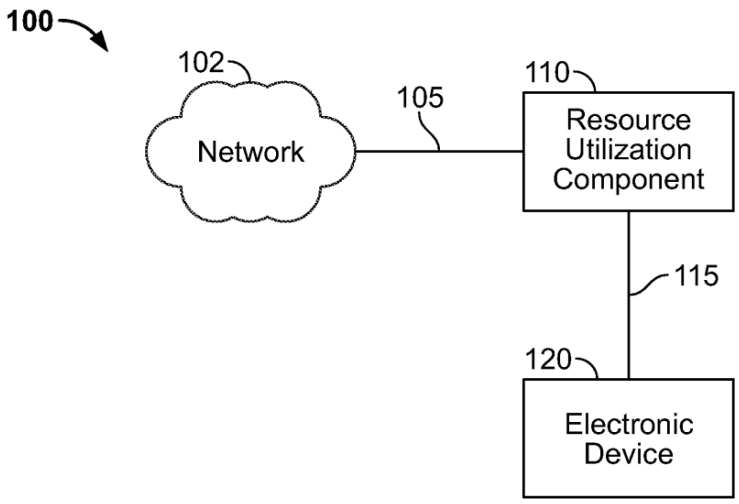


FIG. 1

Id., Fig. 1.

340. Fadell's monitoring of data requests and/or transfers to and/or from network 102, which may support wireless communications to and from electronic devices, teaches identifying a service usage activity that comprises "one or more prospective or successful communications over a wireless network." *See, e.g.*, *id.* ¶¶24, 26-28, 46-47.

341. Accordingly, a POSITA would have understood the combined Rao-Fadell system to disclose this limitation.

d. [1d] "determine whether the service usage activity comprises a background activity;"

342. Rao teaches determining whether the service usage activity comprises a background activity for the reasons discussed above in Section VIII.A.2.d, and a POSITA would have been motivated to implement these teachings in the combined

Rao-Fadell system in order to provide a policy that specifies a prioritization for network packets and notifies a user when a resource usage threshold is reached. A POSITA would have understood that to apply prioritization to background activity, as suggested by both Rao and Fadell and discussed above, the combined system would determine whether a particular service usage activity comprises a background activity.

e. [1e] "determine at least an aspect of a policy based on a user input obtained through a user interface of the wireless end-user device or based on information from a network element,"

343. Rao teaches determining at least an aspect of a policy based on a user input obtained through a user interface of the wireless end-user device or based on information from a network element for the reasons discussed above in Section VIII.A.2.e. *See supra* Section VIII.A.2.e. A POSITA would have incorporated this functionality, which is tied to Rao's remote access client 120, in the combined system to maintain the benefits disclosed by Rao.

344. To the extent it is argued that Rao does not teach this limitation, it would have been obvious to combine Rao with Fadell to provide a policy that specifies a prioritization to network packets and notifies a user when a resource usage threshold is reached. The combined Rao-Fadell system would determine at least an aspect of a policy based on a user input obtained through a user interface of

the wireless end-user device or based on information from a network element, as disclosed by Rao (*see supra* Section VIII.A.2.e) and/or Fadell, as discussed below.

345. Fadell teaches that a user may receive, either from the data provider or from the resource utilization component, "reminders or alarms that the user is approaching, has reached, or has exceeded his allocated data provider resources." Fadell ¶¶51-53; *see also id.* ¶¶48-70. The reminders or alerts "assist the consumer in avoiding excess fees or penalties." *Id.* ¶51. These may be related to "a particular range of the allocated data processor resources (e.g., within a particular amount of allocated transferred data, or within a particular percentage of the allocated bandwidth) or that the consumer has reached an initial limit or threshold that is less than the allocated resource limit (e.g., the user has consumed 75% of the allocated resources)." *Id.* A POSITA would have understood from these disclosures that Fadell teaches a "policy" and an "aspect of a policy." For example, Fadell's providing notifications at a threshold teaches a "policy" and the existence of a threshold value teaches an "aspect" of the policy.

346. Fadell teaches determining at least an aspect of a policy both "based on information from a network element" or "based on a user input obtained through a user interface of the wireless end-user device." For example, Fadell teaches that information related to the user's resource use may be transmitted to the user "by any suitable component, including for example a router or network component

downstream from the resource utilization component," e.g., from a network element. *Id.* ¶50. Fadell further teaches that "the consumer may define the range (e.g., by providing a suitable input)" of the allocated data processor resources. *Id.* ¶51. To input the range, Fadell teaches that its electronic device may include "suitable mechanism[s] or component[s] for allowing a user to provide inputs to input/output circuitry 210," which "may receive and convert" any number of inputs into data that can be "provided to . . . any other component of" the electronic device. *Id.* ¶¶36-37, 51. A POSITA would have understood from these disclosures that Fadell teaches a user interface of a wireless end-user device for receiving user input to determine at least an aspect of a policy.

347. When the threshold is met, Fadell teaches providing several exemplary notifications to the user so that the user can provide input via the user interface of the wireless end-user device. For example, Fadell teaches screen 300 to provide "data resource usage information," screen 400 to provide "selectable options for several actions that the consumer may take in response to being informed that the consumer is within the predetermined range of the allocated resource limit," and screen 500 to "prompt[] a user to switch networks." *Id.* ¶¶50-70.

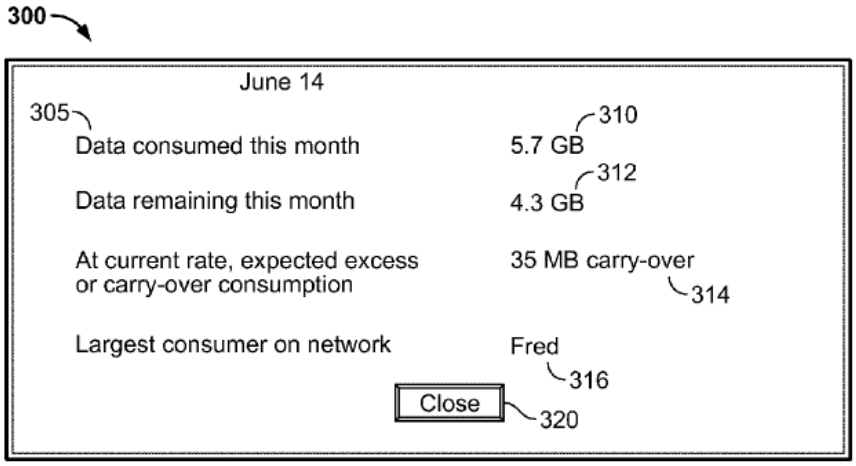


FIG. 3

Id., Fig. 3 (depicting screen 300).

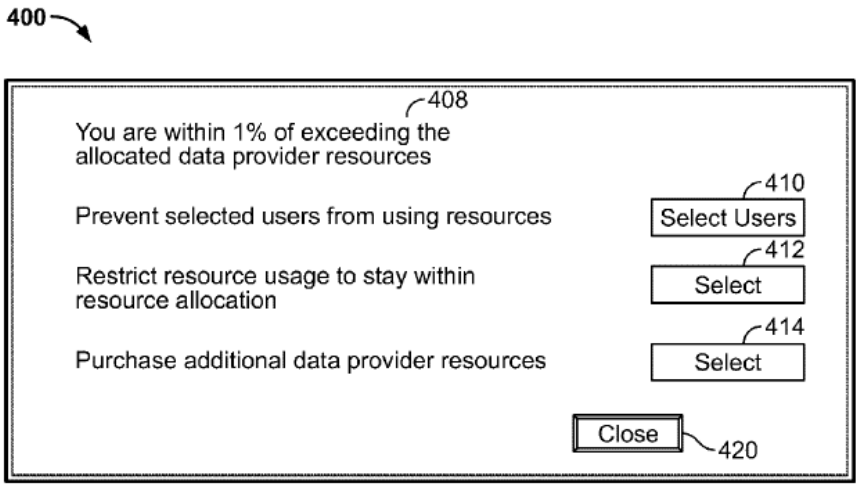


FIG. 4

Id., Fig. 4 (depicting screen 400).

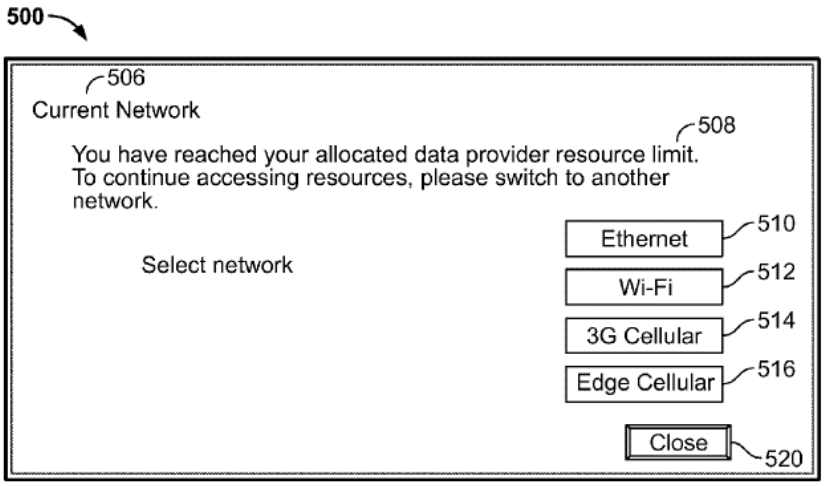


FIG. 5

Id., Fig. 5 (depicting screen 500).

348. A POSITA would have combined Fadell's resource usage notifications with Rao's queuing and prioritizing network packets to provide a system with a combined policy for controlling network activity and alerting a user when resource usage limits approach a threshold. For example, it would have been obvious to combine Rao and Fadell to queue and assign a lower priority to background activity, such as that associated with email requests or automatic updates, when background activity is detected as resource usage nears a threshold. *See* Rao ¶¶86-89, 97-105, 179-95, Figs. 1A-1C, 5A, 5B; Fadell ¶¶49, 51, 54-56, 71, 72. At the same time, it would have been obvious to alert the user of the usage limit threshold being met or approached via Fadell's notifications 300-500. *See* Fadell ¶¶21-22, 27, 47-72, Figs. 1, 3-6. A POSITA would have combined Rao with Fadell in this way for the reasons explained above in Section VIII.B.1. For example, a POSITA would have combined

Rao with Fadell for the reasons explained in Fadell: to "assist the consumer in avoiding excess fees or penalties, the consumer may receive (e.g., from the data provider or from the resource utilization component)." Fadell ¶51. Indeed, a POSITA would have been motivated to combine Rao and Fadell in this way to allow a user to control resource usage limit or thresholds, avoid overage charges, and to prioritize foreground activity when resource usage limits are being reached. Indeed, Fadell teaches a similar method as Rao by disclosing that a user may "cancel or delay" less important background processes (and thus, their associated service usage activities) when resource usage limits are approaching. Fadell ¶¶ 60-61. Fadell also explains the importance of doing so when operating over networks that are on a pay to use basis." *Id.* ¶23; *see also id.* ¶¶16, 42-46.

349. It would have been obvious to implement a policy as in Rao to queue and assign a prioritization to background activity at the same time as providing Fadell's notifications. As explained above in Section VIII.B.1, doing so would have been nothing more than the combination of known elements in the prior art according to understood principles to yield predictable results. The combination would have improved the system of Rao, as discussed above in Section VIII.B.1, and would have been nothing more than the use of known techniques of monitoring resource usage limits and notifying the user to improve Rao in the same way, with predictable results.

350. Accordingly, a POSITA would have understood the combined Rao-Fadell system to disclose this limitation.

f. [1f] "the policy to be applied if the service usage activity is the background activity, the policy at least for controlling the service usage activity,"

351. Rao teaches the policy to be applied if the service usage activity is the background activity, the policy at least for controlling the service usage activity for the reasons discussed above in Section VIII.A.2.f. *See supra* Section VIII.A.2.f.

352. To the extent it is argued Rao does not expressly disclose applying a policy if the service usage activity is the background activity, it would have been obvious to modify Rao to apply such a policy. For example, a POSITA would have found it obvious to modify Rao to apply a prioritization to network packets in queues 540*a*-540*n* if they were received from applications running in the background (e.g., from background activity). In doing so, the determined aspect of Rao's policy would have been, for example, for remote access client 120 to identify characteristics of network packets and to specifically focus on background applications. The policy would have been to apply a prioritization (e.g., a lower priority) to network packets if the network packet is determined to be from background activity.

353. A POSITA would have found it obvious to modify Rao in this manner because Rao teaches doing so. For example, Rao teaches that its policies can be "conditional[]," that they can include prioritization rules based on "the characteristic

of the application 338*a*-338*n* generating them, e.g., a foreground application [or not]," and that certain network packets may be "intercepted but not prioritized" because a policy does not apply to those packets. Rao ¶¶182, 193; *see also id.* ¶¶188, 189, 40-42. A POSITA also would have been motivated to modify Rao in this way because it would have improved Rao's system and furthered its objectives. For example, applying a policy that assigns a priority if the network packet is background activity would have simplified Rao's system by placing background activity at a lower priority than active application without requiring a user to consider or set other prioritization factors (e.g., for individual applications). This would have reduced network congestion caused by potentially unnecessary or unwanted background activity, improved available bandwidth for applications in the foreground, and thereby improved the system's efficiency and speed while minimizing the burden on the user. For example, service usage activity associated with background requests for email, RSS feeds, software updates would be deprioritized over applications users are actively using. Indeed, Rao recognizes this benefit and teaches deprioritizing this type of background activity. In one example, Rao teaches deprioritizing such background activity compared to real-time (VoIP) communication to avoid "increasing the latency and reducing the quality of the voice communication." *Id.* ¶3. Rao also recognizes this benefit with respect to deprioritizing background activity relative to "other applications." *Id.* ¶80

(disclosing that this "may improve or increase the performance, operational characteristics, and user experience on the client based on the applications running on the client."). A POSITA therefore would have found it obvious to modify Rao to apply a policy of deprioritizing background activity over foreground activity if a network packet is determined to be background activity.

354. In the combined Rao-Fadell system, it would have been obvious to implement Rao's policy of assigning a priority to network packets based on the packets being background activity when a resource usage limit or threshold is reached and a user is notified, as taught by Fadell. Fadell ¶¶49-72, Figs. 3-6. As discussed above, a POSITA would have been motivated to apply a lower prioritization to background activity and notify a user when a resource usage limit or threshold is reached to limit resource usage. This would prevent inadvertent overages, reduce costs for the consumer, and provide Fadell's notifications that include options for proceeding. A POSITA would have combined Fadell and Rao for the reasons discussed above in Section VIII.B.1.

355. Accordingly, a POSITA would have understood the combined Rao-Fadell system to disclose this limitation.

g. [1g] "and if it is determined that the service usage activity is the background activity, apply the policy."

356. Rao teaches that if it is determined that the service usage activity is the background activity, apply the policy. For example, Rao teaches this limitation by

applying a priority to network packets associated with background activity and sending those packets according to the applied priority.

357. For example, Rao teaches that remote access client 120 "indicates a priority for intercepted and queued network packets based on the application 338*a*-338*n* associated with the packet." Rao ¶189; Fig. 5 (Step 570). Rao teaches that "the agent 326 uses the policies 520 to ***apply a priority*** to network packets of applications 338*a*-338*n* in accordance with the prioritization rules specified or indicated by the policies 520," including "characteristics of the application 338*a*-338*n*, such as running in the foreground or ***background***, to indicate priority for a network packet of the application 338*a*-338*n*." *Id.* ¶189. Agent 326 then "indicates the priority to the filter 322 for management of network packet queues 540*a*-540*n* ***to apply*** the indicated priorities." *Id.* ¶¶189-93. The network packets are then communicated from the queues "according to the determined priorities for the network packets." *Id.* ¶¶194-95, Fig. 5 (Step 575).

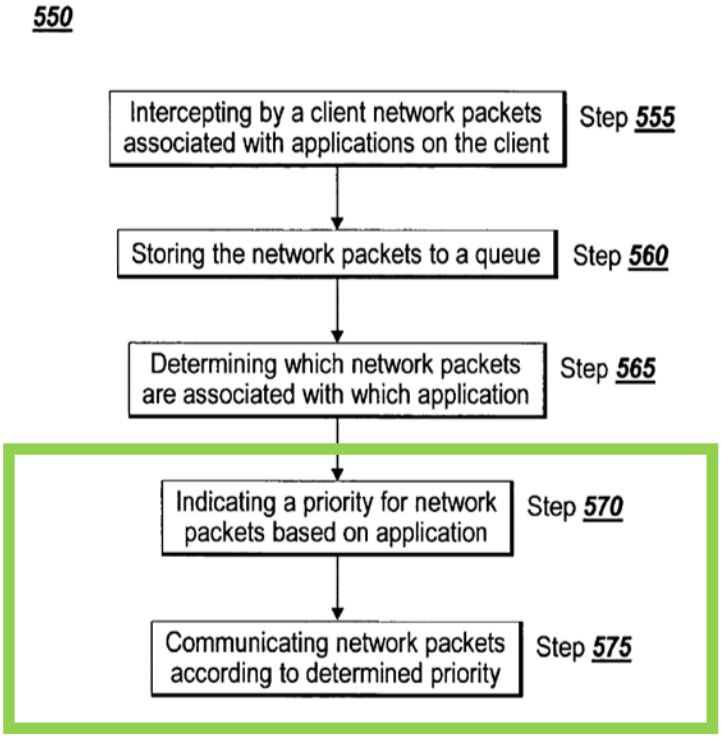


Fig. 5B

Id., Fig. 5B (annotating Steps 570, 575).

358. Rao applying prioritization to network packets determined to be from an application running in the background and communicating those packets according to the applied prioritization teaches applying the policy "if it is determined that the service usage activity is the background activity," as claimed.

359. To the extent it is argued Rao does not expressly disclose applying a policy ***if*** it is determined the service usage activity is the background activity, it would have been obvious to modify Rao to apply such a policy for the reasons discussed above in claim 1, limitation [1f]. *See supra* Limitation [1f]. For example, a POSITA would have found it obvious to modify Rao to apply a prioritization to

network packets in queues 540*a*-540*n* if they were received from applications running in the background (e.g., from background activity).

360. In the combined Rao-Fadell system, it would have been obvious to apply Rao's prioritization to network packets based on the packets determined background activity at least when a resource usage limit threshold is reached. As discussed, in the combined Rao-Fadell system when resource usage thresholds are met, it would have been obvious to apply a prioritization (e.g., a lower priority) to network packets if the network packet is determined to be from background activity and to notify a user of resource usage limit or thresholds. A POSITA would have applied and/or modified Rao in this manner and been motivated to do so for the reasons discussed above in claim 1, limitation [1f]. *See supra* Limitation [1f].

361. For example, the combined system would monitor resource usage limits and when a resource usage threshold is met, the system would intercept and define a prioritization to network packets associated with background activity, alert the user of a resource usage threshold via one of Fadell's screens 300-500, and assign a lower priority to queued background-activity packets. *See, e.g.*, Rao ¶¶180-95, Fig. 5B; Fadell ¶¶50-71, Figs. 3-6; *see supra* Limitation [1f]. This could occur when the threshold is met and every time a packet is intercepted and determined to be background activity. In each instance, a user may be provided one or more of Fadell's screens 300-500, allowing the user notice and the ability to control how to

proceed. Fadell ¶¶50-71, Figs. 3-6. For example, a user might elect, as Fadell teaches, to "reschedule or cancel processes requesting data of lesser importance" via screen 400 and cause intercepted and/or future intercepted background activity packets to remain in a queue, as taught by Rao, for a period of time or indefinitely. *Id.* ¶¶57-60.

362. As discussed above, a POSITA would have been motivated to apply a lower prioritization to background activity when a resource usage limit threshold is reached to limit resource usage near the limit. This would prevent inadvertent overages and reduce costs for the consumer, and provide Fadell's notifications that include options for proceeding, as disclosed by Fadell. Fadell ¶51. It would also deprioritize applications of lesser importance when resource usage thresholds are met, preserving available data for active, foreground processes, as taught by Rao and Fadell. Rao ¶¶4, 80; Fadell ¶60.

363. Accordingly, a POSITA would have understood the combined Rao-Fadell system to disclose this limitation.

3. Claim 2

a. [2a] "The non-transitory computer-readable storage medium recited in claim 1, wherein the first software component comprises at least a portion of an application component or at least a portion of an operating system component, and"

364. Rao-Fadell teaches this limitation.

365. For example, as discussed above, Rao teaches that client 105 may "execute ***one or more applications 338a-338n*** which access the network 104 via the agent 326 and filter 322 of the remote access client 120." Rao ¶179; *see also id.* ¶¶87-91, 180-95; *supra* Section VIII.A.2.b. Likewise, as discussed above for limitation [1b], Fadell teaches applications that are a first software component. *See supra* Limitation [1b]. Each application (i.e., first software component) ordinarily and obviously comprises at least a portion of an application component.

b. [2b] "wherein the one or more prospective or successful communications over the wireless network comprise an update to the first software component."

366. Rao-Fadell teaches this limitation.

367. As discussed above, Rao-Fadell teaches a "service usage activity comprising one or more prospective or successful communications over [a] wireless network." *See supra* Section VIII.A.2.c; *see supra* Limitation [1c]. Fadell further teaches that these prospective or successful communications can include "auto-update processes." Fadell ¶60; *see also id.* ¶61 (discussing the rescheduling of "scheduled auto-update[s]"). A POSITA would have been motivated and found it obvious to implement Fadell's auto-update processes for one or more applications 338*a*-338*n* to keep these applications up-to-date, as was commonly known in the art. This would have ensured continued usability of the application, including allowing a developer to address any vulnerabilities, including security or usability issues, and

provide ongoing improvements to the application. A POSITA would also have understood that, in the combined Rao-Fadell system, Fadell's auto-update processes would involve the transfer of network packets, and that therefore these auto-update processes would be among the "service usage activit[ies] comprising one or more prospective or successful communications over [a] wireless network" taught by Rao.

368. In the combined Rao-Fadell system, a POSITA would have been motivated and found it obvious to determine whether auto-update processes that update applications 338*a*-338*n* are background activities and apply Rao's prioritization policy to assign low priorities to network packets associated with those processes if they are determined to be background activities when a resource usage limit or threshold is reached. *See supra* Limitation [1e]. Fadell notes that these auto-update processes may be of "lesser importance" and that a consumer may wish to downgrade their priority by "reschedul[ing]," "cancel[ling]," or "delay[ing]" such processes to "remain within . . . allocated resource limits" and prevent inadvertent overages, thereby reducing costs for the consumer. Fadell ¶¶60-61.

4. Claim 7

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein identify a service usage activity of the wireless end-user device comprises identify an intention to launch or start the first software component."

369. Rao-Fadell teaches this limitation.

370. For example, Fadell teaches that the user "may limit the types of data provided in a single interface. For example, the consumer, when loading a web page that includes video or audio, may not automatically start playing back the video or audio but await an instruction from the user (e.g., a selection of the video or audio)." Fadell ¶59.

371. A POSITA would have understood that, to offer users the choice of whether to start playing back video or audio in one of Fadell's applications, Fadell must identify an intention to launch or start a component that provides the video or audio (e.g., a video or audio plug-in for the web browser). *See id.* Fadell thus teaches identifying a service usage activity (e.g., associated with streaming the audio or video) of the wireless end-user device by identifying an intention to launch or start a first software component (e.g., the audio or video plug-in). A POSITA would have recognized that, as Fadell teaches, waiting for the user to indicate an "interest in the media (instead of indeterminately providing audio)" would conserve resources and allow the user to avoid unnecessary data expenditure. *Id.*

372. Further, based on the disclosures of Fadell, a POSITA would have recognized that an application may prompt other components to engage in background activity (e.g., automatic updates, virus scan updates, RSS feed detectors). *See* Fadell ¶¶56, 60. A POSITA would have been motivated to apply

Fadell's teachings to identify an intention to launch or start these components and offer the user the opportunity to decide whether to start that process.

373. In implementing the combined Rao-Fadell system, a POSITA would have recognized that these teachings would advance the goal of allowing the user better control over their data usage and would allow the user to reduce the data provider resources used. A POSITA would have been motivated to identify the launch or start of such processes because they otherwise would consume data resources and bandwidth, potentially without the user's knowledge (e.g., in the background and automatically), and allow a user to prevent such processes from launching or starting. Combining Fadell's teachings in this way with Rao would have been nothing more than combining known elements in the prior art according to understood principles to yield predictable results.

5. Claim 27

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein the policy is based on at least an aspect of a service plan."

374. Rao-Fadell teaches this limitation.

375. As discussed above, Rao-Fadell teaches a policy that prioritizes network packets and notifies a user when a resource usage limit or threshold is reached. *See supra* Limitations [1e]-[1g].

376. Fadell additionally teaches that data providers may impose resource (e.g., data, bandwidth) usage limits or thresholds through various "resource consumption tiers or plans." Fadell ¶43; *see also id.* ¶¶16 ("[T]he data provider may provide[] tiers or subscriptions by which a subscriber . . . may use up to a limit of data provider resources for a fixed fee, and pay an additional per resource consumed fee in excess of the limit."), 18, 44, 51, 53, 56, 63, 70, 72. For example, "the data provider may provide ***periodic plans*** by which a user may be entitled to a particular amount of data resources (e.g., a particular amount of received or transmitted data) for a particular period (e.g., one month)" or "provide different ***resource consumption tiers*** based on a different measurable quantity of data provider resources consumed" (e.g., bandwidth). *Id.* ¶43.

377. Fadell further explains that "[t]he data provider may prevent users from exceeding . . . resource usage set by ***the selected tier or plan***" and/or "charge a premium for the consumption of resources in excess of those allowed by ***the selected plan***," *id.* ¶43, and that Fadell's resource utilization component may "perform utilization shifting actions such as application control and scheduling" to help users avoid hitting or exceeding their resource allocation limits and/or being charged extra fees or penalties for doing so, *id.* ¶17, *see id.* ¶¶18, 51, 53, 56-57, 63, 65, 72.

378. A POSITA would have been motivated and found it obvious to apply the Rao-Fadell system to avoid hitting or exceeding resource usage limits or

thresholds imposed by Fadell's "tiers" and "plans," as doing so would permit users to avoid being charged extra fees or penalties by data service providers. *See supra* Limitations [1f]-[1g].

379. A POSITA would have understood that Fadell's "tiers" and "plans" are "service plans," as claimed. A POSITA would have also recognized that the resource usage limits or thresholds in the Rao-Fadell system, to the extent they are imposed by Fadell's "tiers" or "plans," are "aspect[s] of . . . service plan[s]," and that Rao-Fadell's disclosure of a policy that prioritizes network packets and notifies a user when such a resource usage limit or threshold is reached also teaches a policy based on at least an aspect of a service plan.

6. Claim 30

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein the wireless end-user device is part of a device group, and wherein the policy is associated with the device group."

380. Rao-Fadell teaches this limitation.

381. Rao-Fadell teaches the non-transitory computer-readable storage medium recited in claim 1. *See supra* Claim 1.

382. Rao-Fadell further teaches that the wireless end-user device is part of a device group, and the policy is associated with the device group.

383. For example, Fadell teaches that its resource utilization component can "manage data transfers to different devices owned or operated by a same user (e.g.,

different computers and mobile devices within a same network managed by a consumer of data provider services)." Fadell ¶67. Fadell explains that data resources may be allocated on a user-by-user basis for use among devices. *Id*. ¶¶67-69. A POSITA would have understood that the "devices owned or operated by a same user" constitute a device group at least because these devices, as disclosed by Fadell, share an allocation of data resources.

384. As discussed previously, Rao-Fadell teaches a policy. *See supra* Limitations [1e]-[1g]. In view of Fadell's teaching that data resources may be shared among devices on a per-user basis, a POSITA would have recognized that this policy would apply to all the devices of that user (e.g., all the devices in the group). Absent this type of per-group policy, a user might inadvertently exceed their data allocation. For example, heavy resource consumption by one device in the user group (e.g., a child downloading video) might bring the total group resource usage close to the threshold. A POSITA would recognize the benefits of considering all of the group devices' resource use in evaluating the threshold, particularly in view of Fadell's express suggestion to do so. *See, e.g.*, Fadell, Claim 21, ¶67.

385. In the combined Rao-Fadell system, a POSITA would have been motivated and found it obvious to associate the policy with a group of user-owned devices, as suggested and described by Fadell. The policy would remain unchanged and it would apply to all the devices. For example, the policy would apply a lower

priority to network packets from background applications for each device when total data consumption reaches the allocated limit, and notify the user regarding the approaching data limit. *See supra* Limitation [1e]. A POSITA would have been motivated to apply the common policy to the device group to prevent inadvertent overages and reduce related costs. A POSITA would further have been motivated to apply the common policy to all the devices in the device group to effectively manage the data resources and identify any device consuming a larger portion of the available resources, as suggested by Fadell. *See* Fadell ¶¶69-70. A POSITA would have been able to apply these teachings with a reasonable expectation of success as evidenced by Fadell's express suggestions.

7. Claim 31

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein the policy is based on a type of the wireless network."

386. Rao-Fadell teaches this limitation.

387. As discussed above, Rao-Fadell teaches a policy that prioritizes network packets and notifies a user when a resource usage limit or threshold is reached. *See supra* Limitations [1e]-[1g]. Rao-Fadell also teaches that these resource usage limits or thresholds may be imposed on users based on the "resource consumption tiers or plans" (i.e., service plans) to which the users subscribe. Fadell ¶43; *see supra* Claim 27.

388. Fadell further teaches that, in certain embodiments, a data provider may impose "different [resource] limits based on the particular network used." Fadell ¶62; *see id.* ¶44.

> For example, a data provider may allow a first amount of resources to be consumed through a cable modem, a second amount of resources to be consumed through a DSL line, a third amount of resources to be consumed over a 3G cellular network, and a fourth amount of resources to be consumed over an EDGE network.

Id. ¶44. As another example, "the consumer may have a large resource limit associated with [a] Wi-Fi connection, and no resource limit associated with [a] cellular connection." *Id.* ¶62.

389. In the combined Rao-Fadell system, a POSITA would have been motivated and found it obvious to modify Rao-Fadell's prioritization and notification policy to apply the policy in a network-dependent manner. For instance, a POSITA would have found it obvious to prioritize network packets associated with background activities and notify a user to avoid exceeding a low(er) resource usage limit associated with a first network, and but do so in other networks based on different resource limitations, as Fadell suggests. Indeed, Fadell teaches this differential application of policies by noting that certain background tasks (e.g., "receiving email") may be reserved for certain types of networks. *See, e.g.*, *id.* ¶¶19, 62, 64. Modifying the prioritization and notification policy of the combined system in this manner would allow a user to optimize his or her use of network resources

within available limits, and a POSITA would have had a reasonable expectation of success in implementing Rao-Fadell in this way based on Fadell's suggestion.

8. Claim 32

a. "The non-transitory computer-readable storage medium recited in claim 31, wherein the type of the wireless network is cellular, 2G, 3G, 4G, home, roaming, wireless fidelity (WiFi), or a combination of these."

390. Rao-Fadell teaches this limitation.

391. As explained above, Rao-Fadell teaches a policy that is based on a type of wireless network. *See supra* Claim 31. Fadell further teaches that data providers may impose different resource usage limits or thresholds for each of the following network types (at a minimum): ethernet networks, 3G and other cellular networks, EDGE networks, and Wi-Fi networks. Fadell ¶¶44, 62; *see also id.* ¶¶19, 64, Fig. 5.

392. As discussed above, in the combined Rao-Fadell system, a POSITA would have been motivated and found it obvious to modify Rao-Fadell's prioritization and notification policy to ensure that they applied in a network-dependent manner. *See supra* Claim 31. A POSITA would have been further motivated and found it obvious to ensure that the network-dependent policy of the combined system accounted for at least the resource usage limits of ethernet networks, 3G and other cellular networks, EDGE networks, and Wi-Fi networks, as

Fadell teaches, *see* Fadell ¶¶19, 44, 62, 64, Fig. 5, again to ensure that users could optimize their use of network resources within available limits.

9. Claim 33

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein the policy is based on a roaming condition of the wireless end-user device, a cost associated with communicating over the wireless network, or a combination of these."

393. Rao-Fadell teaches this limitation.

394. As discussed above, Rao-Fadell teaches a policy that prioritizes network packets and notifies a user when a resource usage limit or threshold is reached. *See supra* Limitations [1e]-[1g]. Rao-Fadell also teaches that these resource usage limits or thresholds may be imposed on users based on the "resource consumption tiers or plans" (i.e., service plans) to which the users subscribe. Fadell ¶43; *see supra* Claim 27.

395. Fadell teaches that data providers' "resource consumption tiers or plans" may charge a fixed fee for a user's use of the data provider's resource(s) up to a certain limit or threshold, and then charge "an additional per resource consumed fee in excess of the limit" or threshold. Fadell ¶16; *see also id.* ¶¶18, 43 (noting that a data provider may charge "fixed fee[s]" up to certain resource usage limits or thresholds, then "premium[s] for the consumption of resources in excess of those allowed by the selected plan[s]"), 51, 53, 57, 63, 65, 72.

396. A POSITA would have recognized that, in combining Rao and Fadell to produce a system that identifies background activities and applies the prioritization and notification policy to help a user avoid exceeding a resource usage limit or threshold imposed by a service plan, *see supra* Limitations [1d]-[1g], claim 27, the system would assist avoiding costs (i.e., fees, penalties) from the data provider when consuming in excess of a service plan. *See* Fadell ¶51. Accordingly, the combined policy in Rao-Fadell would have been based on a cost associated with communicating over the wireless network.

397. A POSITA would have been motivated to apply the policy of Rao-Fadell to avoid costs based on Fadell's teaching and suggestion of doing so. Fadell discloses that its resource utilization component is capable of "perform[ing] utilization shifting actions" to help a user "manag[e] their usage under [data providers'] pricing mechanisms." Fadell ¶17, *see also id.* ¶¶18 ("[T]he resource utilization component may provide several options or automate certain actions to assist a subscriber in managing his resource utilization so as to mitigate subscription costs."), 51 (noting that the resource utilization component may send "reminders or alarms" "[t]o assist the consumer in avoiding excess fees or penalties").

10. Claim 36

a. [36a] "The non-transitory computer-readable storage medium recited in claim 1, wherein the at least an aspect of the policy is based on the user input obtained through the user interface of the wireless end-user device, and"

398. As discussed above, Rao-Fadell teaches that the at least an aspect of the policy is based on the user input obtained through the user interface of the wireless end-user device. *See supra* Limitation [1e].

b. [36b] "wherein the user input identifies a network parameter or a network type."

399. Rao-Fadell teaches this limitation.

400. As discussed above, Rao-Fadell teaches that the at least an aspect of the policy is based on the user input obtained through the user interface of the wireless end-user device. *See supra* Limitation [1e]. Additionally, based on Rao-Fadell's disclosures, a POSITA would have been motivated and found it obvious to modify Rao-Fadell's prioritization and notification policy in the combined Rao-Fadell system to ensure that they applied in a network-dependent manner. *See supra* Claim 31.

401. Fadell's screen 500 provides users options to select various types of networks, including "Ethernet option 510, Wi- Fi option 512, 3G cellular network option 514 and EDGE cellular network option 516." Fadell ¶63. Screen 500 also includes "any suitable information associated with each identified network," such as

the "amount of resources available for each network" and "the penalty for exceeding the resources on each network." *Id*. A user's selection of a network type on screen 500 provides the user's preference for a specific network type. A POSITA would have found it obvious to modify Rao-Fadell to receive user input identifying a type of network (e.g., ethernet network, 3G or other cellular network, EDGE network, Wi-Fi network) to apply a network-dependent prioritization and notification policy in Rao-Fadell. Fadell ¶¶19, 44, 62, 64, Fig. 5; *see* claim 31. This would have allowed a user to optimize use of network resources available on a given network. Fadell's disclosures teach and suggests this, as Fadell's resource utilization component receives user selections of network types and automatically acts in response to those selections. Fadell ¶¶63-64, Fig. 5. In doing so, A POSITA would have found it obvious to prioritize network packets associated with background activities and notify a user to avoid exceeding a low(er) resource usage limit associated with a first network, but not do so in other networks based on different resource limitations, as Fadell teaches and suggests. Fadell ¶¶19, 62, 64. Fadell itself teaches such a differential application of policies by noting that certain background tasks (e.g., "receiving email") may be reserved for certain types of networks. *E.g.*, Fadell ¶¶19, 64. A POSITA would have had a reasonable expectation of success in the modification.

11. Claim 37

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein the policy is based on a usage limit or a threshold."

402. Rao-Fadell teaches this limitation.

403. As discussed above, Rao-Fadell teaches a policy that prioritizes network packets and notifies a user when a resource usage limit or threshold is reached. *See supra* Limitations [1e]-[1g].

404. That a POSITA would have combined Rao and Fadell to produce such a policy is underscored by Fadell's extensive discussion of data providers' imposition of resource usage limits or thresholds on users and the variety of "utilization shifting actions" (e.g., issuance of notifications, application control, scheduling) that may be taken when a user's resource usage approaches or reaches such limits or thresholds. Fadell ¶17; *see id.* ¶¶16, 18 ("When the resource utilization component determines that the subscriber is within a particular range of the data provider resource limit, or has reached a particular threshold, the resource utilization component may provide several options or automate certain actions to assist a subscriber in managing his resource utilization . . . ."), 19, 22, 42 (providing examples of resource usage limit or thresholds that a data provider may set), 43-45, 48-56, 58-59, 61-63, 71-72.

12. Claim 38

a. [38a] "The non-transitory computer-readable storage medium recited in claim 1, wherein the policy is based on a limit,"

405. Rao-Fadell teaches this limitation. As discussed above, Rao-Fadell teaches a policy that prioritizes network packets and notifies a user when a resource usage limit or threshold is reached. *See supra* Limitations [1e]-[1g]; Claim 37.

b. [38b] "wherein the limit is based <u>on the user input</u> obtained through the user interface of the wireless end-user device, a user preference, <u>an indication of a threshold</u>, a total traffic, a type of traffic, a destination, a port, a frequency of access, an access behavior, or a combination of these."

406. Rao-Fadell teaches this limitation.

407. As discussed above, Rao-Fadell teaches a policy that prioritizes network packets and notifies a user when a resource usage limit or threshold is reached. *See supra* Limitations [1e]-[1g]; Claim 37.

408. Rao-Fadell also teaches that the resource usage limit or threshold may be specified by a user input obtained through a user interface of the wireless end-user device. *See supra* Limitation [1e]; *see also* Fadell ¶51 (noting that "the consumer may define [a] range (e.g., by providing a suitable input)" of the allocated resources within which certain actions should be taken to manage the user's resource consumption). A POSITA would recognize that the user input of a threshold through

the user interface of the wireless end-user device would also qualify as an "indication of a threshold."

13. Claim 40

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein the policy comprises one or more filters, wherein the one or more filters provide filtering based on: a characteristic of the wireless network, a service plan applicable to the wireless end-user device, a characteristic of the first software component, a time of day, a network busy state, or a combination of these."

409. Rao-Fadell teaches this limitation.

410. Rao-Fadell teaches the non-transitory computer-readable storage medium recited in claim 1. *See supra* Claim 1.

411. Rao-Fadell further teaches wherein the policy comprises one or more filters, wherein the one or more filters provide filtering based on at least a service plan applicable to the wireless end-user device.

412. For example, as discussed, Rao teaches that to practice its prioritization, "client 105 also runs a filter 322" and "the filter 322 and the agent 326 form the remote access client 120 for routing packets via a network." Rao ¶99. Rao also teaches that "filter 322 may drop or accept the network packets depending on their content. "[A]gent 326 indicates the priority to the filter 322 for management of network packet queues 540*a*-540*n* to apply the indicated priorities" and "communicate[s] the priority of network packets to the filter 322 by any suitable

means and/or mechanism." *Id.* ¶190, 191. "Based on the indicated priorities for applications 338*a*-338*n*, in some embodiments, the filter 322 may place, arrange, or coordinate network packets into queues 540*a*-540*n* in support of the priorities." *Id.* ¶191.

413. In the combined system, as discussed in connection with Claim 1, filter 322 filters based on the service plan applicable to the wireless end-user device. For example, the filter applies a prioritization (e.g., a lower priority) to network packets if the network packet is determined to be from background activity based on the resource usage threshold for the service plan applicable to the wireless end-user device. *See supra* Limitation [1g], claim 27. Because the service plan's resource usage threshold triggers the prioritization, the filtering is based on a service plan applicable to the wireless end-user device.

414. A POSITA would have been motivated to implement the combined system in this way given the teachings of Rao, which discloses filtering to implement prioritization. *See, e.g.*, Rao ¶¶102, 189-91. A POSITA would have had a reasonable expectation of success in implementing such a policy in view of Rao's suggestion.

14. Claim 41

a. [41a] "The non-transitory computer-readable storage medium recited in claim 1, wherein the wireless network is a first wireless network, and wherein the service usage activity is a first service usage activity,"

415. Rao-Fadell teaches this limitation for the reasons explained in connection with claim 1. *See supra* Claim 1.

b. [41b] "and wherein the policy assists the one or more processors to control the first service usage activity when the wireless end-user device is connected to the first wireless network"

416. Rao-Fadell teaches this limitation for the reasons explained in connection with claim 1. *See supra* Claim 1. For example, the policy in the Rao-Fadell system assists with controlling the first service usage activity when the wireless end-user device is connected to the first wireless network by intercepting, queuing, and assigning a priority to network packets associated with background activity. *See supra* Limitations [1c]-[1g]. A POSITA would have understood that, by intercepting, queuing, and assigning a priority to these network packets, Rao-Fadell is controlling the network packets because they are being first put into queues and assigned a priority before transmission over a network. *See supra* Limitations [1c]-[1g]. This corresponds with claim 42, which defines control as including "restrict[ing]" a service usage activity.

c. [41c] "and refrain from controlling a second service usage activity when the wireless end-user device is connected to a second wireless network, the second service usage activity being associated with the first software component."

417. Rao-Fadell renders this limitation obvious.

418. For example, Fadell teaches screen 500 for prompting a user to "switch networks" when the user's allocated data resource limit "for the current network (identified by indication 506) has been reached." Fadell ¶63, Fig. 5. Fadell teaches, for example, allowing a user to choose to switch to ***Wi-Fi network***. *Id.* In response to receiving a selection for that network, "the consumer may direct communications circuitry to switch to the selected network and perform the data transfer operation requested by the consumer." *Id.* Fadell therefore teaches switching from a first wireless network that is data-limited and may trigger expenses when a limit is reached (e.g., a cellular network) to a second wireless network that is not data limited or is at least less limited (e.g., a Wi-Fi network).

419. A POSITA would have found it obvious to apply these teachings in the Rao-Fadell system to, for example, cease intercepting, queuing, and assigning a priority to network packets associated with background activity (e.g., a second service usage activity associated with the first software component) when the user switches from using a cellular wireless network to a Wi-Fi wireless network. The result would have been a system that applies a policy to control a first service usage

activity over a first wireless network, but "refrain[s] from controlling a second service usage activity when the wireless end-user device is connected to a second wireless network."

420. A POSITA would have understood that one benefit of the Rao-Fadell system's policy is preventing data use overages and associated charges by monitoring data usage on resource-limited networks, such as cellular networks. Faddell teaches this. Fadell ¶¶23 ("a pay-to-use network may include a network to which access is provided by . . . a cellular service provider"), 43-44 (discussing data plans). In the case of a user switching to a Wi-Fi network from a cellular network, a POSITA would have understood that the same data restrictions (e.g., data limits and overage charges) may not be present or may differ on a Wi-Fi network. *See Id.* ¶19. Thus, a POSITA would have found it obvious to apply the Rao-Fadell policy over a cellular network (e.g., a first wireless network) but refrain from applying the policy over a Wi-Fi network (e.g., a second wireless network), as there would be less of a benefit of doing so. A POSITA would also understand that available bandwidth is likely higher over a Wi-Fi network and be further motivated to refrain from controlling background activity in the same manner as over a cellular network. Furthermore, background activity, like software updates and email updates, may proceed over Wi-Fi and keep software up to date, with less restriction, while not having to compete for limited data resources like in a cellular network.

421. A POSITA would have applied the policy in the combined system in this way based on Fadell's teaching and suggestion to do so. A POSITA also would have understood that doing so would have been nothing more than combining known prior art elements with predictable results—in this case, applying Fadell's network switching to control Rao's background activity queuing and prioritization so that the combined system uses Fadell's network switching as a mechanism to selectively control background activity based on the network. A POSITA would have been motivated to combine these teachings because it would have provided network-centric control to the policy and enabled selective control of background activity communications based on the network. This would have assisted users avoiding data overage charges over cellular networks, while allowing important software updates and other background activity (e.g., email updates, etc.) to proceed while on Wi-Fi networks without prioritization-based delay.

15. Claim 42

a. "The non-transitory computer-readable storage medium recited in claim 41, wherein control the first service usage activity comprises prevent, restrict, or block the first service usage activity."

422. Rao-Fadell teaches at least restricting the first service usage activity by intercepting, queueing, and assigning a priority to network packets associated with background activity, that has the effect of restricting the first service usage activity

until higher priority packets have been processed, as discussed in connection with claims 1 and 41. *See supra* Limitations [1c]-[1g]; Claim 41.

423. Rao-Fadell further teaches preventing or blocking the first service usage activity. It would have been obvious to a POSITA that placing network packets in a lower priority queue teaches at least preventing or blocking the first service usage activity because the packets associated with that service usage activity are delayed until they are ready to be communicated based on their priority (a temporary prevention/block). This is because, a POSITA would understand, higher priority packet would consume the network resource and prevent the lower priority packet from accessing the network. *See, e.g.*, Oestvall, ¶¶15 (noting that "untrusted third party applications . . . are prevented from running in the background and are suspended"), 23 (explaining that its system may "simply place any interrupts from the background untrusted application 4 to the back of its queue and never allow them to be executed").

16. Claim 43

a. "The non-transitory computer-readable storage medium recited in claim 41, wherein the second wireless network is a wireless fidelity (WiFi) network or a home network."

424. Rao-Fadell teaches a second wireless network that is a wireless fidelity (WiFi) network for the reasons discussed in connection with claims 41 and 1. *See supra* Claim 41; Limitations [1b], [1c]; *see also* EX-1001 (Certificate of Correction).

17. Claim 46

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein determine whether the service usage activity comprises a background activity comprises determine whether the service usage activity is a software update."

425. Rao-Fadell teaches this limitation.

426. For example, Rao teaches determining whether the service usage activity comprises a background activity for the reasons explained in claim 1. *See supra* Limitation [1d]. Fadell additionally teaches "reschedul[ing] or cancel[ing] processes requesting data of lesser importance." Fadell ¶60. This includes "cancel[ing] or delay[ing] auto-update processes (e.g., virus scan updates), automatic requests for new mail, RSS feed detectors, automatically updating web pages or screens (e.g., Gamecast screens or live blogs for following live sporting or news events), or any other suitable process." *Id.* ¶60. This also includes "reschedul[ing] a scheduled auto-update, or delay refreshing an application screen." *Id.* ¶61. At a minimum, "auto-update processes" and "scheduled auto-updates" disclose a "software update."

427. A POSITA would have understood that Rao's background activity corresponds to Fadell's disclosure of tasks of "lesser importance." *See* Rao ¶¶40-41, 182, 188-89; Fadell ¶¶60-61. A POSITA also would have understood that both disclose restricting these processes. *See* Rao ¶¶40-41, 182, 188-89; Fadell ¶¶60-61.

A POSITA would have applied these teachings to identify background activity that includes software updates in the combined Rao-Fadell system. A POSITA would have been motivated to do so based at least on Fadell's teaching and suggestion that software updates are exemplary background activity, and based on a POSITA's general knowledge that software updates are a type of background activity that would have been intercepted in the combined system.

428. A POSITA also would have been motivated to identify background activity that includes software updates for the reason Fadell and Rao teach: these are "less[] important[t]" tasks than active processes requiring data resources. Fadell ¶¶60-61; Rao ¶3. Intercepting and assigning a priority to background activity that includes software updates would have benefited the user because these software update processes generally start in the background, without the user initiating them and sometimes without notice, and compete with active applications for both data resources and bandwidth. In the combined Rao-Fadell system, a user would benefit from the additional control over software updates when data usage approaches the limit because a user could prioritize active applications in their place, without having to compete for limited resources. This would have involved nothing more than combining known elements of the prior art with an expectation of success.

429. Moreover, each of claims 44-59 recites a known option for how to determine "whether the service usage activity comprises a background activity." In

my opinion, a POSITA would have understood that each such option was a well-known technique for making such a determination (as evidenced by the prior art of record), and a POSITA would have appreciated the benefits of employing each option (as discussed herein). Indeed, a POSITA would have understood that the options recited in claims 44-59 were each one solution selected from a finite number of well-known, identified, predictable solutions that a POSITA could implement with a reasonable expectation of success.

18. Claim 63

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein apply the policy comprises at least assist in preventing an update associated with the first software component."

430. Rao-Fadell teaches that a software update may be a background activity for the reasons discussed in connection with claim 46. *See supra* Claim 46.

431. In the combined system, a background activity including an auto-update (e.g., "an update associated with the first software component") would be intercepted, placed in a queue, and assigned a priority. *See supra* Claims 46, 1. It would have been obvious to a POSITA that placing network packets in a lower priority queue teaches at least assisting in preventing an update associated with the first software component because the packets associated with that update are delayed until they are ready to be communicated based on their priority (a temporary prevention). This is because, a POSITA would understand, a higher priority packet

would consume the network resource and prevent the lower priority packet from accessing the network at that time. *See, e.g.*, Oestvall, ¶¶15 (noting that "untrusted third party applications . . . are prevented from running in the background and are suspended"), 23 (explaining that its system may "simply place any interrupts from the background untrusted application 4 to the back of its queue and never allow them to be executed").

19. Claim 65

a. [65a] "The non-transitory computer-readable storage medium recited in claim 1, wherein the information from the network element is first information,"

432. As discussed above, Rao-Fadell teaches that at least an aspect of the policy is based on the information from the network element. *See supra* Limitation [1e]. A POSITA would have recognized that this information from the network element may be first information.

b. [65b] "and wherein apply the policy comprises provide second information to the first software component."

433. Rao-Fadell teaches this limitation.

434. As described below, Fadell teaches informing the software component that processes were being rescheduled, canceled, delayed, slowed down, enabled, disabled, or switched to other networks to remain within/below resource usage limits or thresholds (which may be second information). *E.g.*, Fadell ¶¶53, 56, 60-61, 64, Fig. 4.

435. Fadell teaches that a notification may include options for exceeding the resource limit or "restricting resource usage to stay within the resource allocation." Fadell ¶¶53, 56, Fig. 4. "In response to receiving a selection of option 412, . . . [Fadell's] resource utilization component may restrict the amount of resources used." *Id.* ¶56. Fadell teaches that the resource utilization component may restrict resource usage in any number of ways, such as by rescheduling, canceling, delaying, slowing down, enabling, or disabling "processes requesting data of lesser importance" (e.g., "auto-update processes," "automatic requests for new mail," "automatic[] updat[es to] web pages or screens"). *Id.* ¶¶60-61; *see also id.* ¶¶56, 58 (noting that "any suitable action to reduce or manage data consumption may be performed"), 59. As another example, the resource utilization component may "switch" processes "between available networks" to avoid exceeding data providers' resource allocations. *Id.* ¶64 ("The resource utilization component may . . . switch to particular networks for specific tasks or based on particular applications (e.g., use Wi-Fi for media transfers, 3G for regular web browsing, and EDGE for checking and receiving e-mail)."); *see also id.* ¶¶19, 62 ("[T]he consumer may automatically switch [a] data transfer to a different communications network to avoid exceeding a data provider resource limit."). Fadell notes that the resource utilization component may take these actions automatically. *See id.* ¶¶18 ("[T]he resource utilization component may . . . automate certain actions to assist a subscriber in managing his

resource utilization so as to mitigate subscription costs."), 52, 62, 64 ("[T]he resource utilization component may dynamically and automatically switch between available networks . . . .").

436. In the combined Rao-Fadell system, a POSITA would have been motivated and found it obvious to apply these teachings of Fadell to enable users to better control their resource usage and stay within/below resource usage limits or thresholds. For example, by providing one or more inputs in response to Fadell's notifications, a user could choose, as Fadell teaches, to have the combined system reschedule, cancel, delay, slow down, enable, disable, and/or switch to other networks to run processes of "lesser importance," which correspond with Rao's background activity, that are associated with network packets intercepted and prioritized under Rao's prioritization policy. A POSITA would have recognized that a user's choice to reschedule, cancel, delay, etc., is "second information."

437. In the combined Rao-Fadell system, a POSITA would have further been motivated and found it obvious to ensure that, in response to a selection of option 412, the applications 338*a*-338*n* associated with less important processes were informed that those processes were being rescheduled, canceled, delayed, slowed down, enabled, disabled, or switched to other networks to remain within/below resource usage limits or thresholds.

438. Providing this "second" information to any applications 338*a*-338*n* whose processes were rescheduled, canceled, delayed, slowed down, enabled, or disabled would have ensured that said applications (as appropriate) kept sending, stopped sending, or delayed or rescheduled their sending of network packets to the remote access client 120 to avoid generating gaps or backlogs in Rao-Fadell's network communications queues. And for any applications 338*a*-338*n* whose processes were being redirected to other networks, providing "second" information (e.g., which network was available to support further communications, which protocol should be used) would be needed so that the applications could properly reformat and reroute their network packets.

439. This would have required no more than the exercise of routine skill for a POSITA, who would have understood how to facilitate communication between applications, operating systems, and/or other software components and would have found it obvious to implement these teachings in any of a variety of ways, including, e.g., via proxies, APIs, and network APIs, *see, e.g.*, Rao ¶¶106, 116 (disclosing that agent 326 and filter 322 may be applications or software components), 190 (disclosing that agent 326 and filter 322 "may communicate . . . via an application programming interface (API), such [as] an IOCTL interface," or other suitable means); *see also* Wyld, 7:30-33 (noting that an API can permit interactions between applications and other software components), particularly given that Fadell already

teaches that applications may receive information in this manner, *see* Fadell ¶56 (indicating that applications may receive information that causes them to change their data transfers "to use less resource intensive Codecs or to reduce the size or resolution of displayed media" in response to a selection of option 412).

20. Claim 66

a. "The non-transitory computer-readable storage medium recited in claim 65, wherein provide second information to the first software component comprises provide the second information through an application programming interface."

440. Rao-Fadell teaches this limitation.

441. As discussed above, a POSITA would have been motivated and found it obvious to ensure that, in the combined Rao-Fadell system, the applications 338*a*-338*n* associated with background activity were informed that those processes were being rescheduled, canceled, delayed, slowed down, enabled, disabled, or switched to other networks to remain within/below resource usage limits or thresholds. Fadell ¶60; *see supra* Limitation [65b].

442. A POSITA would have further been motivated and found it obvious to ensure that this "second" information was conveyed to applications 338*a*-338*n* through one or more application programming interfaces (APIs), which, at the time, were routinely implemented means for facilitating communications between applications and other software components. *See, e.g.*, Wyld, 7:30-33 (noting that an

API can permit interactions between applications and other software components). Importantly, use of an API for this purpose is taught or suggested by Rao, which teaches that agent 326 and filter 322—which may be applications or software components, *see* Rao ¶116—can communicate "via an application programming interface (API), such [as] an IOCTL interface," *id.* ¶190; *see also id.* ¶106. A POSITA would have viewed such an API to communicate information to be one of a small, finite number of known solutions for communicating information between system components and would have been motivated to implement the Rao-Fadell combined system in this manner.

443. Indeed, Rao would have even directed a POSITA to particular types of IOCTL APIs that they could use, noting that such APIs may be, for example, "any IOCTL libraries and function calls provided by the Microsoft Windows family of operating systems" or "provided by any portion of the operating system running on the client 105." *Id.* ¶106.

21. Claim 67

a. "The non-transitory computer-readable storage medium recited in claim 65, wherein, when executed by the one or more processors of the wireless end-user device, the machine-executable instructions further cause the one or more processors to: provide third information to a second software component on the wireless end-user device, the third information being different from the second information."

444. Rao-Fadell teaches this limitation.

445. As explained above, Rao-Fadell teaches a non-transitory computer-readable storage medium storing machine-executable instructions that, when executed by one or more processors of a wireless end-user device, cause the one or more processors to perform operations. *See supra* Limitation [1a]. Rao-Fadell further teaches that the machine-executable instructions further cause the one or more processors to provide third information to a second software component on the wireless end-user device, the third information being different from the second information.

446. As discussed above, a POSITA would have been motivated and found it obvious to ensure that, in the combined Rao-Fadell system, the applications 338*a*-338*n* associated with "processes requesting data of lesser importance" (e.g., Rao's background activity) were informed that those processes were being rescheduled, canceled, delayed, slowed down, enabled, disabled, or switched to other networks to remain within/below resource usage limits or thresholds (e.g., second information). Fadell ¶60; *see supra* Limitation [65b].

447. Fadell explains that its resource utilization component may take different actions with respect to different processes, *e.g.*, Fadell ¶¶56, 59, 60, and a POSITA would have understood that, e.g., disabling/enabling particular processes (or applications) may be directed by the user at different times, or through the election of different options. For the same reasons it would have been obvious to

provide "second information" to a first software component, *see supra* Limitation [65b], it would have likewise been obvious to provide a second software component associated with a different service usage activity that processes were, e.g., being allowed or resumed (e.g.," third information").

448. As noted above, this would have required no more than the exercise of routine skill for a POSITA, who would have understood how to facilitate communication between applications, operating systems, and/or other software components, *see, e.g.*, Rao ¶¶106, 116, 190; *see also* Wyld, 7:30-33, particularly given that Fadell already teaches that applications may receive information in this manner, *see* Fadell ¶56; *see also supra* Limitation [65b].

22. Claim 68

a. "The non-transitory computer-readable storage medium recited in claim 67, wherein provide third information to a second software component on the wireless end-user device comprises provide the third information through an application programming interface."

449. Rao-Fadell teaches this limitation.

450. As discussed above, a POSITA would have been motivated and found it obvious to ensure that applications 338*a*-338*n* associated with different "processes requesting data of lesser importance" (i.e., Rao's background activity) received different information (i.e., "second" and "third" information) specific to whether their processes were being rescheduled, canceled, delayed, slowed down, enabled,

disabled, or switched to other networks to remain within/below resource usage limits or thresholds. *See supra* Claim 67.

451. A POSITA would have further been motivated and found it obvious to ensure that the "second" information directed to certain of applications 338*a*-338*n* (e.g., application 338*a*) and the "third" information directed to others of applications 338*a*-338*n* (e.g., application 338*b*) was conveyed through one or more application programming interfaces (APIs), which, at the time, were routinely implemented means for facilitating communications between applications and other software components. *See, e.g.*, Wyld, 7:30-33 (noting that an API can permit interactions between applications and other software components); *see also supra* Claim 66. Importantly, use of an API for this purpose is taught or suggested by Rao, which teaches that agent 326 and filter 322—which may be applications or software components, *see* Rao ¶116—can communicate "via an application programming interface (API), such [as] an IOCTL interface," *id.* ¶190; *see also id.* ¶106, *supra* Claim 66. A POSITA would have viewed such an API to communicate information to be one of a small, finite number of known solutions for communicating information between system components and would have been motivated to implement the Rao-Fadell combined system in this manner.

452. Rao would have even directed a POSITA to particular types of IOCTL APIs that they could use, noting that such APIs may be, for example, "any IOCTL

libraries and function calls provided by the Microsoft Windows family of operating systems" or "provided by any portion of the operating system running on the client 105." *Id.* ¶106; *see also supra* Claim 66.

23. Claim 69

a. "The non-transitory computer-readable storage medium recited in claim 67, wherein the third information enables the second software component to communicate over the wireless network."

453. Rao-Fadell teaches this limitation.

454. As discussed above, a POSITA would have been motivated and found it obvious to ensure that applications 338*a*-338*n* associated with different "processes requesting data of lesser importance" (i.e., Rao's background activity) received different information (i.e., "second" and "third" information) specific to whether their processes were being rescheduled, canceled, delayed, slowed down, enabled, disabled, or switched to other networks to remain within/below resource usage limits or thresholds. *See supra* Claim 67.

455. For example, depending on the amount of resources available, one background process associated with a first application 338*a* (e.g., a first software component) might be disabled (e.g., second information), while another, more important background process associated with a second application 338*b* (e.g., second software component) might be enabled (e.g., third information).

456. To avoid generating gaps or backlogs in the combined system's network communications queues, a POSITA would have ensured that the first application 338*a* received information indicating that it should stop sending network packets (to avoid backlogs; e.g., "second information") and the second application 338*b* received information indicating that it should keep sending network packets (to avoid gaps; e.g., "third information"). As noted above, this would have required no more than the exercise of routine skill for a POSITA, who would have understood how to facilitate communication between applications, operating systems, and/or other software components, *see, e.g.*, Rao ¶¶116, 190; *see also* Wyld, 7:30-33, particularly given that Fadell already teaches that applications may receive information in this manner, *see* Fadell ¶56; *see also supra* Claims 65, 67.

457. A POSITA would have understood that the "third" information received by the second application 338*b* in this scenario indicating that it should keep sending network packets (to avoid gaps), would enable the second application 338*b* to communicate over network 104 (i.e., the wireless network). *See supra* Limitation [1c]; Claim 67. For example, the "third" information could include an API message to the second application confirming the socket is open, such that the network packets may be sent.

24. Claim 70

a. [70a] "The non-transitory computer-readable storage medium recited in claim 65, wherein the wireless network is a first wireless network, and"

458. Rao-Fadell teaches this limitation.

459. As discussed above, Rao-Fadell teaches that the service usage activity comprises one or more prospective or successful communications over a wireless network. *See supra* Limitation [1c]. A POSITA would recognize that this wireless network may be a first wireless network.

b. [70b] "wherein the second information comprises a network access condition of the first wireless network, a network busy state associated with the first wireless network, a network availability state associated with the first wireless network, a network busy state associated with a second wireless network, a network availability state associated with the second wireless network, or information about the policy."

460. Rao-Fadell teaches this limitation.

461. As discussed above, a POSITA would have been motivated and found it obvious to ensure that, in the combined Rao-Fadell system, the applications 338*a*-338*n* associated with "processes requesting data of lesser importance" (i.e., Rao's background activity) were informed that those processes were being rescheduled, canceled, delayed, slowed down, enabled, disabled, or switched to other networks to remain within/below resource usage limits or thresholds. Fadell ¶60; *see supra* Limitation [65b]. The combined system therefore teaches that the second

information comprises information about the policy (e.g., that the processes were being rescheduled, canceled, delayed, etc. as a result of the policy's application).

462. Fadell further teaches that, in response to a user's selection of option 412, its resource utilization component may "dynamically and automatically switch between available networks" to run processes. Fadell ¶64; *see also id.* ¶¶19, 62. Fadell explains that the resource utilization component may do this using various criteria, such as "the speed of available networks" or "the available resources on each network," such that it automatically switches processes to the "fastest network" or the "network with the most resources available." *Id.* ¶64.

463. In the combined Rao-Fadell system, a POSITA would have been motivated and would have found it obvious to apply Fadells' teachings to enable users to optimize their resource usage within/below resource usage limits or thresholds. For example, a user could rely on the combined system, in response to a selection of option 412, to switch to target networks that were the fastest, most available, or otherwise the "most efficient or effective" for the processes in question, as Fadell teaches. *Id.* ¶64.

464. As discussed above, a POSITA would have understood that any application 338*a*-338*n* whose processes were being redirected to other networks by the Rao-Fadell system would need certain types of "second" information to successfully reformat and reroute its network packets from the old, first network to

the second, target network, as Fadell teaches. *See id.* ¶¶19, 62, 64; *see supra* Limitation [65b]. At a minimum, the "second" information would need to identify the target network. To the extent the Rao-Fadell system was configured to automatically switch processes to the "most efficient or effective network," as Fadell teaches, Fadell ¶64, this identification would obviously be an indication that the target network, e.g., was available and was the fastest or had the most resources available. A POSITA would therefore recognize that the "second" information relayed in the Rao-Fadell system would comprise a network availability state associated with the target network, as claimed.

25. Claim 71

a. "The non-transitory computer-readable storage medium recited in claim 65, wherein the second information comprises a setting for assisting the first software component in restricting, allowing, blocking, throttling, deferring, time-scheduling, or queuing the service usage activity."

465. Rao-Fadell teaches this limitation. For example, the combined Rao-Fadell system describes that the second information may comprise a setting for rescheduling (e.g., deferring or time-scheduling) the service usage activity.

466. As discussed above, a POSITA would have been motivated and found it obvious to ensure that, in the combined Rao-Fadell system, the applications 338*a*-338*n* associated with background activity were informed that those processes were being, e.g., rescheduled, canceled, delayed, slowed down, enabled, disabled, or

switched to other networks to remain within/below resource usage limits or thresholds. Fadell ¶60; *see supra* Limitation [65b].

467. Fadell further teaches that, in response to a user's selection of option 412, its resource utilization component may "reschedule" "processes requesting data of lesser importance" (e.g., "auto-update processes," "automatic requests for new mail," "automatic[] updat[es to] web pages or screens") and/or "data transferring intensive processes" (e.g., "bandwidth intensive processes"). Fadell ¶¶60-61. For example, the resource utilization component may "reschedule . . . scheduled tasks based on detected data usage (e.g., reschedule a scheduled auto-update . . .)" to times "when fewer data processing resources are used," like "mid-day or late night." *Id.* ¶61.

468. In the combined Rao-Fadell system, a POSITA would have been motivated and found it obvious to apply these teachings of Fadell to enable users to better control their resource usage and stay within/below resource usage limits or thresholds. For example, a user could rely on the combined system, in response to a selection of option 412, to reschedule or delay processes of "lesser importance" (e.g., Rao's background activity) to particular times of day with less network traffic.

469. As discussed above, a POSITA would have understood that any application 338*a*-338*n* whose processes were being rescheduled by the Rao-Fadell system would need to be informed (through "second" information) that it should

reschedule the communication of network packets to remote access client 120 to avoid generating a backlog in the combined system's network communication queues. *See supra* Limitation [65b]. A POSITA would further recognize that, for rescheduling purposes, the application 338*a*-338*n* would need to receive the "second" information a time (e.g., "mid-day or late night") at which it should resume sending network packets, as Fadell teaches. *See* Fadell ¶61. A POSITA would therefore recognize that the "second" information relayed in the Rao-Fadell system would comprise a time, and that time would constitute a setting for assisting the application in time-scheduling its network communications (e.g., the service usage activity). Scheduling the network communications for a later time would also constitute "deferring" the service usage activity.

26. Claim 72

a. "The non-transitory computer-readable storage medium recited in claim 71, wherein the setting is based on a characteristic of the wireless network, a network busy state associated with the wireless network, a time, a service plan associated with the wireless end-user device, a classification of the service usage activity, or a combination of these."

470. Rao-Fadell teaches this limitation. For example, Rao-Fadell teaches that the setting comprising the second information can be based on a time.

471. As discussed above, a POSITA would have been motivated and found it obvious to ensure that the combined Rao-Fadell system, upon rescheduling

"processes requesting data of lesser importance" (e.g., Rao's background activity) associated with applications 338*a*-338*n* to remain within/below resource usage limits or thresholds, informed the applications (through "second" information) that they should reschedule the communication of network packets to remote access client 120 for a particular time to avoid generating a backlog in the combined system's network communication queues. *See supra* Claims 65, 71. As noted above, this "second" information would comprise a time and that time would constitute a setting for assisting the application in time-scheduling its network communications (e.g., the service usage activity). *See supra* Claim 71.

27. Claim 73

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein apply the policy comprises inform the first software component whether the first software component is allowed to access the wireless network."

472. Rao-Fadell teaches this limitation.

473. As discussed above, a POSITA would have been motivated and found it obvious to ensure that applications 338*a*-338*n* associated with different "processes requesting data of lesser importance" (i.e., Rao's background activity) received information specific to whether their processes were being rescheduled, canceled, delayed, slowed down, enabled, disabled, or switched to other networks to remain within/below resource usage limits or thresholds. *See supra* Claim 67.

474. For example, depending on the amount of resources available to the client, a background process (e.g., a more important background process) associated with an application 338*a* might be or remain enabled. *See* Fadell ¶60; *see supra* Claim 67. To avoid generating gaps in the Rao-Fadell system's network communications queues, a POSITA would have ensured that this application 338*a* received information indicating that it should start or keep sending network packets to remote access client 120. *See supra* Claim 67. As noted above, this would have required no more than the exercise of routine skill for a POSITA, who would have understood how to facilitate communication between applications, operating systems, and/or other software components, *see, e.g.*, Rao ¶¶116, 190; *see also* Wyld, 7:30-33, particularly given that Fadell already teaches that applications may receive information in this manner, *see* Fadell ¶56; *see also supra* Claims 65, 67.

475. A POSITA would have understood that the information received by application 338*a* in this scenario—which would enable it to communicate over network 104 (i.e., the wireless network)—would ordinarily and obviously also indicate that the application was allowed to access the wireless network. *See supra* Limitation [1c]; Claim 67.

28. Claim 74

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein apply the policy comprises inform the first software component whether the wireless network is available."

476. Rao-Fadell teaches this limitation.

477. As discussed above, a POSITA would have been motivated and found it obvious to ensure that, in the combined Rao-Fadell system, the applications 338*a*-338*n* associated with "processes requesting data of lesser importance" (i.e., Rao's background activity) were informed that those processes were being rescheduled, canceled, delayed, slowed down, enabled, disabled, or switched to other networks to remain within/below resource usage limits or thresholds. Fadell ¶60; *see supra* Limitation [65b].

478. As discussed above, Fadell further teaches that, in response to a user's selection of option 412, its resource utilization component may "dynamically and automatically switch between available networks" to run processes upon approaching or reaching resource limits. Fadell ¶64; *see also id.* ¶¶19, 62; *see supra* Limitation [70b]. For example, "[i]n response to detecting that the consumer is nearing [a first network] resource limit, the consumer may switch ongoing and subsequent data transfers to [a second] network" automatically to "avoid exceeding a data provider resource limit." Fadell ¶62.

479. In the combined Rao-Fadell system, a POSITA would have been motivated and found it obvious to apply these teachings of Fadell to enable users to optimize their resource usage within/below resource usage limits or thresholds. For example, a user could rely on the combined system, in response to a selection of option 412, to switch from unavailable networks to available networks to continue executing certain processes without hitting or exceeding resource limits or thresholds, as Fadell teaches. *See id.* ¶¶19, 62, 64.

480. It would have been obvious to a POSITA to inform an application 338*a*-338*n* associated with "processes requesting data of lesser importance" (i.e., Rao's background activity) that those processes were being switched to one or more other networks to remain within/below resource usage limits or thresholds. *Id*. ¶64. And it would further have been obvious to inform the application associated with the processes being switched that the wireless network is not available (e.g., because the user no longer has adequate resources to allow them to use the network). A POSITA would therefore have recognized that, in applying its prioritization and notification policy, the Rao-Fadell system would have informed an application 338*a*-338*n* whether the wireless network was available.

29. Claim 75

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein apply the policy comprises inform the first software component of a traffic control to be implemented or applied by the first software component."

481. Rao-Fadell teaches this limitation.

482. For example, as discussed above, a POSITA would have been motivated and found it obvious to ensure that, in the combined Rao-Fadell system, the applications 338*a*-338*n* associated with "processes requesting data of lesser importance" (i.e., Rao's background activity) were informed that those processes were being rescheduled, canceled, delayed, slowed down, enabled, disabled, or switched to other networks to remain within/below resource usage limits or thresholds. Fadell ¶60; *see supra* Limitation [65b].

483. As explained previously, for any applications 338*a*-338*n* whose processes were rescheduled, canceled, delayed, slowed down, enabled, or disabled, the Rao-Fadell system would provide this information to ensure that said applications (as appropriate) kept sending, stopped sending, or delayed or rescheduled their sending of network packets to the remote access client 120 to avoid generating gaps or backlogs in Rao-Fadell's network communications queues. *See supra* Limitation [65b].

484. The Rao-Fadell system would have similarly notified any applications 338*a*-338*n* whose processes were being redirected to other networks and provided information (e.g., identified target networks) to facilitate the applications' reformatting and rerouting of network packets. *See supra* Claims 65, 70, 74. This would have required no more than the exercise of routine skill for a POSITA, who would have understood how to facilitate communication between applications, operating systems, and/or other software components, *see, e.g.*, Rao ¶¶106, 116, 190; *see also* Wyld, 7:30-33, particularly given that Fadell already teaches that applications may receive information in this manner, *see* Fadell ¶56.

485. A POSITA would have understood that information received by the applications 338*a*-338*n* in any of the above scenarios would have caused them to implement or apply one or more "traffic controls"—i.e., would have caused them to continue, stop, delay, or reschedule their sending of network packets or to reformat and reroute their network packets so that they could be transmitted over an alternate network.

30. Claim 76

a. [76a] "The non-transitory computer-readable storage medium recited in claim 1, wherein the information from the network element is first information, and"

486. Rao-Fadell teaches this limitation.

487. As discussed above, Rao-Fadell teaches that at least an aspect of the policy is based on the information from the network element. *See supra* Limitation [1e]. A POSITA would recognize that this information from the network element may be first information.

b. [76b] "wherein apply the policy comprises obtain second information from the first software component."

488. Rao-Fadell teaches this limitation.

489. For example, Fadell explains that, because data resources may be allocated on a per-user basis, its resource utilization component can "manage data transfers to different devices owned or operated by a same user (e.g., different computers and mobile devices within a same network managed by a consumer of data provider services)." Fadell ¶¶67-69; *see supra* Claim 30. Fadell further teaches that "log-in or authentication information provided to access the network" may be used to identify "each user of the network" for purposes of determining the amount of resources available to the one or more devices (and enforcing any user-specific resource limits or thresholds). Fadell ¶67.

490. A POSITA would have recognized that this "log-in or authentication information" may be supplied by users on an application-specific basis. *Id.* For example, a user could supply one set of log-in credentials (e.g., a user ID and/or password) to receive updates and send messages via an email application, and

another set entirely to access certain websites. A POSITA would have therefore recognized that two separate users could be logged into and accessing resources—e.g., through applications 338*a* and 338*b*, respectively—on the same device.

491. Understanding this, a POSITA would have been motivated and found it obvious to apply the above-described teachings of Fadell in the context of the Rao-Fadell system. Specifically, a POSITA would have ensured that, in applying Rao-Fadell's user-specific resource management prioritization and notification policy to network packets associated with one or more applications 338*a*-338*n* running on a device, the combined system confirmed, through the receipt of application-specific login credentials (i.e., "second information"), that the user associated with the user-specific policy was indeed the one using the one or more applications 338*a*-338*n* so that the policy would not be improperly applied to another user (and either disrupt or permit network communications inappropriately based on the resource limits or thresholds applicable to that other user). This would have ensured that resource usage was properly adjusted (as necessary) on a per-user basis. This also would have required no more than the exercise of routine skill for a POSITA to implement given Fadell's suggestions to do so and the POSITA's general understanding that user-specific login credentials may be used to authorize or deny network access (e.g., access to the Internet). *See, e.g.*, Freund, 22:1-6.

492. A POSITA also would have recognized that the remote access client 120 of the combined Rao-Fadell system would have received these application-specific login credentials from any applications 338*a*-338*n* the user logged into.

31. Claim 77

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein apply the policy comprises at least assist in intercepting, controlling, blocking, modifying, removing, or replacing a notification associated with the first software component or the service usage activity, the notification for presentation through a user interface of the wireless end-user device."

493. Rao-Fadell teaches this limitation.

494. As discussed above, in the combined Rao-Fadell system, when a resource usage limit or threshold is met, background network packets are intercepted, queued, and assigned a priority, as taught by Rao, and the user is provided a notification, as taught by Fadell. *See supra* Limitations [1e]-[1g]. A POSITA would have recognized that providing a notification to a user, as taught by Fadell, obviously requires the system to "control[]" the notification (i.e., by preparing it for and presenting it to the user).

495. A POSITA would have recognized that the notifications described by Fadell are associated with the service usage activity. Fadell further teaches that the notification may be "any suitable type of report, notice, reminder or alarm *related to data provider resource consumption*." Fadell ¶¶49, 29. As examples, Fadell provides

screen 300, which provides "data resource usage information"; screen 400, which provides "selectable options for several actions that the consumer may take in response to being informed that the consumer is within [a] predetermined range of [an] allocated resource limit"; and screen 500, which "prompt[s] a user to switch networks." *Id.* ¶¶50, 55, 63.

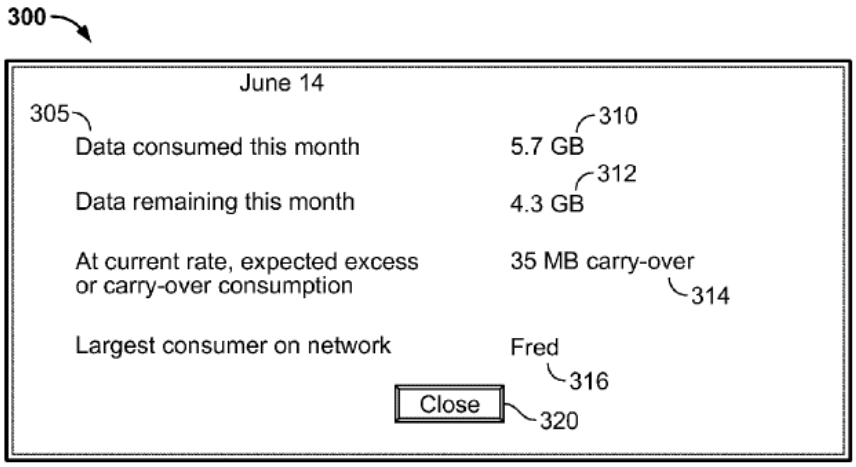


FIG. 3

Id., Fig. 3 (depicting screen 300 that shows "data consumed this month" and "data remaining this month," among other information).

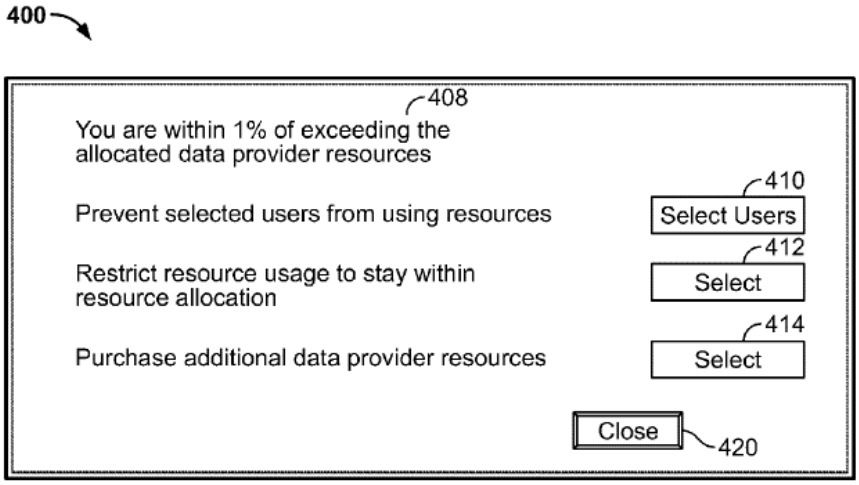


FIG. 4

Id., Fig. 4 (depicting screen 400).

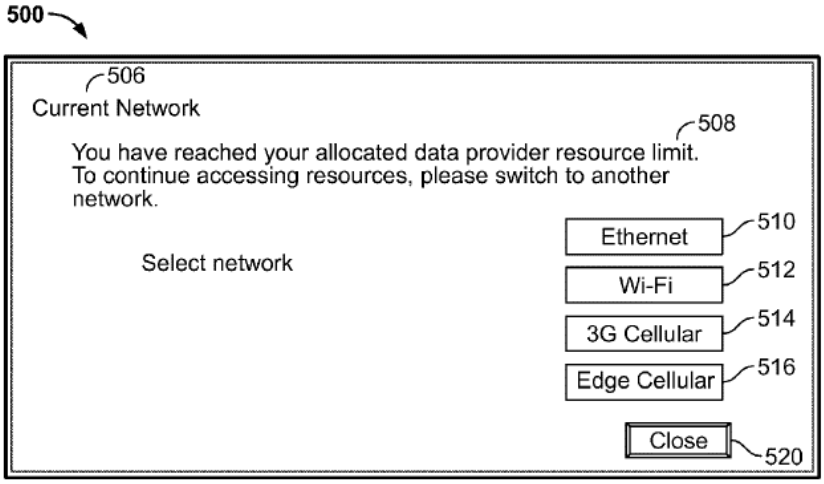


FIG. 5

Id., Fig. 5 (depicting screen 500).

496. A POSITA would have therefore understood that Fadell's notifications are associated with the network packets (the service usage activity) both given their content and because they are provided when the user's service usage activity meets the resource limit or threshold.

497. Additionally, a POSITA would have understood Fadell's notifications are for presentation through the user interface of the wireless end-user device. Fadell discloses that "[i]nput/output circuitry 210 may be operative to convert (and encode/decode, if necessary) analog signals and other signals into digital data" ad "may receive and convert physical contact inputs (e.g., from a multi-touch screen), physical movements (e.g., from a mouse), analog audio signals (e.g., from a microphone), or any other input." Fadell, ¶36. Fadell also explains that "[i]n some embodiments, I/O circuitry 210 may include display circuitry (e.g., a screen or projection system) for providing a display visible to the user. For example, display circuitry 212 may include a screen (e.g., an LCD screen) that is incorporated in electronic device 200 and associated drivers, graphics processors or other integrated circuits." *Id.*, ¶39; *see also id.*, ¶¶38, 50. "The display circuitry may be operative to display content (e.g., media playback information, application screens for applications implemented on the electronic device, information regarding ongoing communications operations, information regarding incoming communications requests, or device operation screens) under the direction of processor 202." *Id.*

498. Thus, Fadell teaches that its "screens" are transmitted to the user and discloses display circuitry to display "device operation screens" as part of the device's input/output circuitry. Fadell, ¶¶36-39, 50. A POSITA would have

understood Fadell's notifications are for presentation through the user interface of the wireless end-user device.

499. As discussed with respect to claim 1, a POSITA would have combined Fadell's resource usage notifications with Rao's queuing and prioritizing network packets for background activity to provide a system with a combined policy that controls network activity and alerts a user, via a notification, when resource usage approaches a limit or threshold.

500. A POSITA would have been motivated to cause the notification to be presented through a user interface of the wireless end-user device in view of Fadell's examples and its suggestion to do so. *See, e.g.*, Fadell ¶49, Figs. 3-5. Doing so would have transmitted the notification to the user, as suggested by Fadell, *id.*, and would have required no more than the exercise of routine skill for a POSITA to implement given both Rao's and Fadell's suggestions of a user interface, *see supra* Limitation [1e], and the ubiquity of such user interfaces at the time of the alleged invention.

32. Claim 78

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein apply the policy comprises at least assist in intercepting, controlling, blocking, modifying, removing, or replacing a notification for presentation through a user interface of the wireless end-user device."

501. Rao-Fadell teaches this limitation.

502. As discussed above in Claim 77, Rao-Fadell teaches that applying the policy comprises at least assisting in controlling a notification associated with the service usage activity. For the same reasons, Rao-Fadell also teaches that applying the policy comprises at least assist in controlling a notification for presentation through a user interface of the wireless end-user device. For example, as I explained for Claim 77, in the Rao-Fadell system, a notification that is associated with the service usage activity is presented to a user via the wireless end-user device's display screens—and the provision of such notification requires the system to control the notification. A POSITA would have been motivated to combine Rao and Fadell to achieve this limitation for the reasons discussed in connection with claims 1 and 77.

33. Claim 91

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein apply the policy comprises cause a notification to be presented through a user interface of the wireless end-user device."

503. Rao-Fadell teaches this limitation for the reasons explained in claim 1. *See supra* Limitations [1e]-[1g]. As discussed, in the combined Rao-Fadell system, when a resource usage threshold is met, background network packets are intercepted, queued, and assigned a priority, as taught by Rao, and the user is provided a notification, as taught by Fadell. *See, e.g.*, Fadell ¶¶49-70, Figs. 3-5.

504. Fadell teaches that a consumer may "receive any suitable type of report, notice, reminder or alarm related to data provider resource consumption." *Id.* ¶49.

For example, Fadell teaches screen 300 to provide "data resource usage information," screen 400 to provide "selectable options for several actions that the consumer may take in response to being informed that the consumer is within the predetermined range of the allocated resource limit," and screen 500 "prompting a user to switch networks." *Id.* ¶¶49, 54, 51.

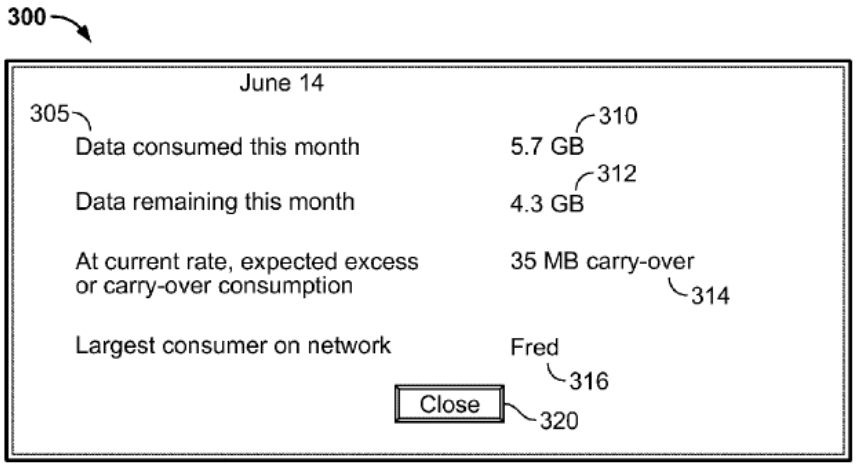


FIG. 3

Id., Fig. 3 (depicting screen 300).

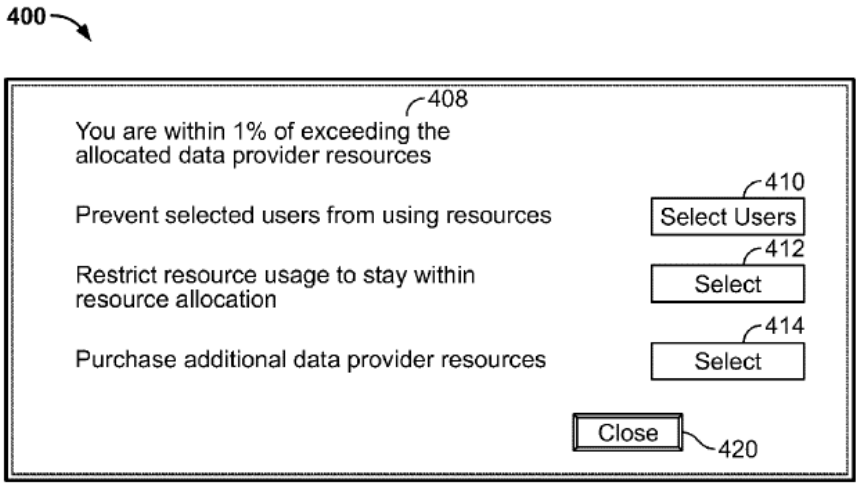


FIG. 4

Id., Fig. 4 (depicting screen 400).

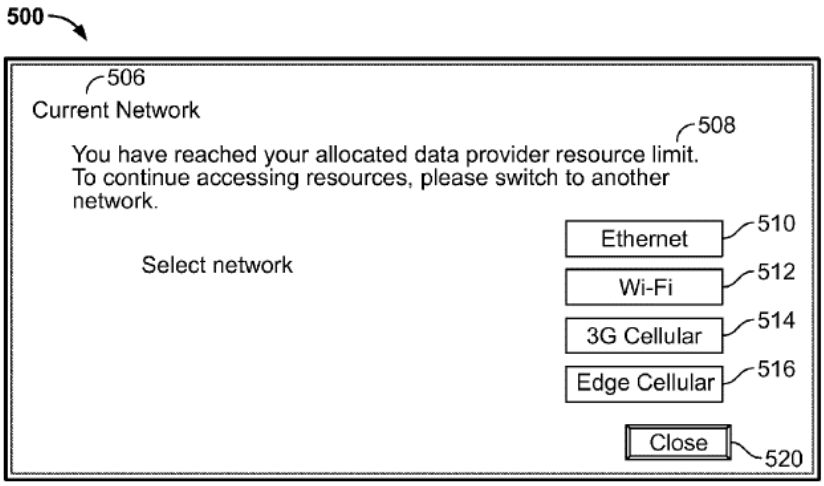


FIG. 5

Id., Fig. 5 (depicting screen 500).

505. As discussed in claim 1, a POSITA would have combined Fadell's resource usage notifications with Rao's queuing and prioritizing network packets for background activity to provide a system with a combined policy that controls network activity and causes a notification to be presented to a user when resource usage limits approach a threshold via a notification. *See supra* Claim 1.

506. A POSITA would have been motivated to cause the notification to be presented through a user interface of the wireless end-user device in view of Fadell's examples and its suggestion to do so. *See, e.g.*, Fadell ¶49, Figs. 3-5. Doing so would have allowed the user to have selectable options (e.g., time-scheduling or selecting a new network) using the user interface, as suggested by Fadell, *id.*, and would have required no more than the exercise of routine skill for a POSITA to implement given

both Rao's and Fadell's suggestion of a user interface, *see supra* Limitation [1e], and their ubiquity at the time of the alleged invention.

34. Claim 92

a. "The non-transitory computer-readable storage medium recited in claim 91, wherein the notification provides information about the policy."

507. Rao-Fadell teaches this limitation. For example, Fadell's notifications provide information about the policy.

508. For example, Fadell teaches that a user may receive notice of "the amount (e.g., in absolute terms, relative to allocated amount, or combinations of these) of resources consumed for a tier subscription period," the expected consumption for a particular period, and/or expected penalties for data overages. Fadell ¶49. For example, screen 300 provides this information, as shown below in Figure 3. *Id.* ¶¶50-53, Fig. 3. Screen 300 also provides the "expected excess consumption or carry-over for the period (e.g., month)." *Id.* ¶50.

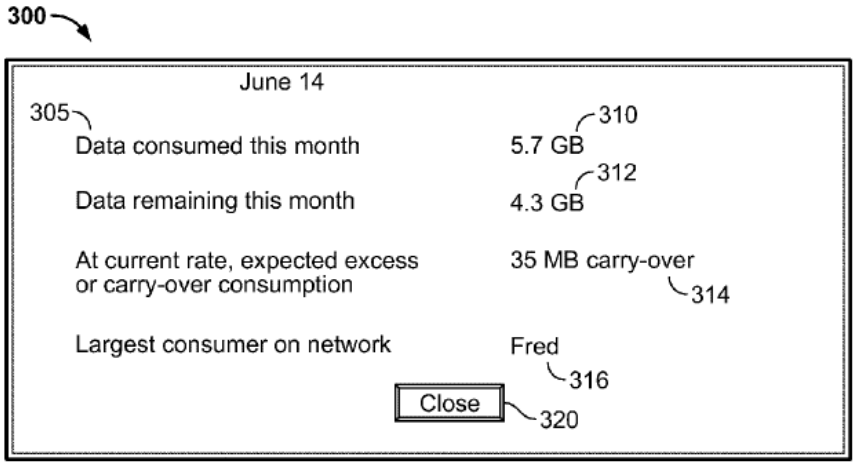


FIG. 3

Id., Fig. 3 (depicting screen 300).

509. Fadell also teaches screen 400 "indicating that the consumer has reached a limit in data provider resources." *Id.* ¶¶54-62, Fig. 4. Screen 400 notifies the consumer that the consumer is "within a predetermined range of the allocated data provider resource limit," where "[t]he predetermined range may be set by the consumer." *Id.* ¶54, Fig. 4.

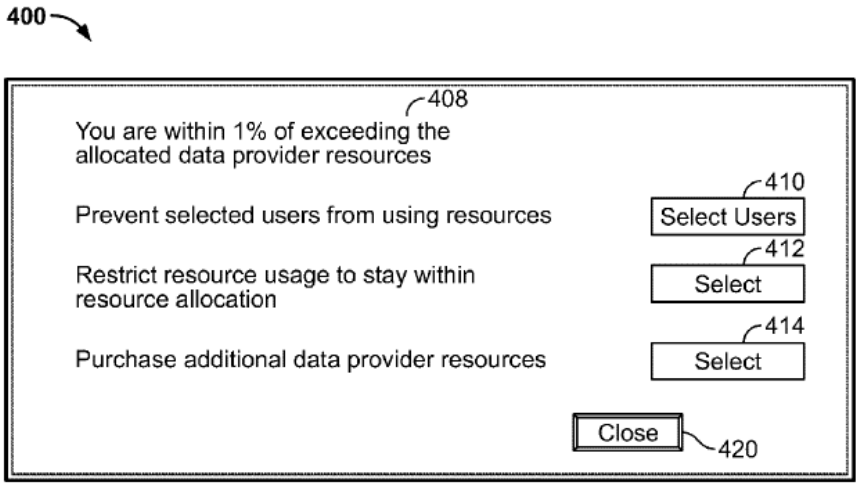


FIG. 4

Id., Fig. 4 (depicting screen 400); *see also, e.g.*, *id.*, Fig. 5 (depicting screen 500, providing information on "data provider resource limit").

510. A POSITA would have understood that Fadell's disclosure of notifications related to data consumed during a period, including, e.g., screens 300, 400, and 500, teaches a notification that provides information about the policy in the Rao-Fadell system. *See supra* Claim 1. For example, the policy in the combined system intercepts background network packets and defines a prioritization for the packets and notifies the user when a resource usage threshold is reached. Fadell's notifications provide information about, for example, the resource usage threshold set by the user within the policy.

511. A POSITA would have been motivated to cause the notification of Fadell to provide information about the policy in the combined system in view of Fadell's examples and its suggestion to do so. *See, e.g.*, Fadell ¶49, Figs. 3-5. Doing so would have allowed the user to understand the policy that is being implemented, select how to proceed, and to better understand and control resource usage to prevent data overages and associated charges. *See id.* ¶¶49, 51, 52. This would have required no more than the exercise of routine skill for a POSITA to implement given both Rao's and Fadell's suggestion of a user interface, *see supra* Limitation [1e], Fadell's disclosure of such notifications, and the well-known nature of these concepts at the time of the alleged invention.

35. Claim 93

a. "The non-transitory computer-readable storage medium recited in claim 91, wherein the notification provides information about an option to set, control, override, or modify the at least an aspect of the policy or a second aspect of the policy."

512. Rao-Fadell teaches this limitation.

513. For example, Fadell teaches that screen 400 "include[s] selectable options for several actions that the consumer may take in response to being informed that the consumer is within the predetermined range of the allocated resource limit." Fadell ¶¶53-62, Fig. 4. Screen 400 includes option 410 for preventing or allowing users or devices from using data provider resources, option 412 for restricting resource usage to stay within the resource allocation, and option 414 for purchasing additional data provider resources. *Id.* ¶¶53-57, Fig. 4.

514. In response to a selection of option 412 to restrict usage, Fadell teaches that the resource utilization component may limit "the types of data transmitted over the network may . . . to eliminate or reduce data transfers of large file types (e.g., media files)," "data transfers may be restricted based on the protocol or application requesting the data transfer," "data transfers may be restricted based on the identity of the consumer requesting the transfer," or "data transfers of media files may be changed to use less resource intensive Codecs or to reduce the size or resolution of displayed media." *Id.* ¶56.

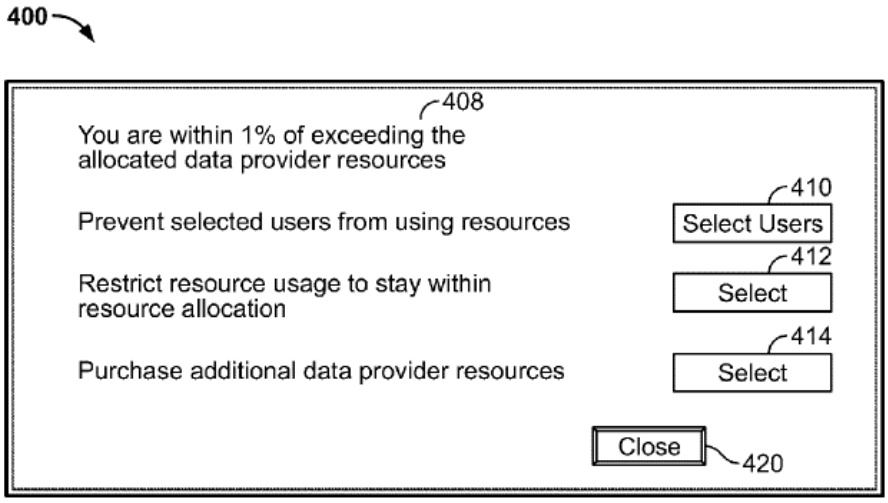


FIG. 4

Id., Fig. 4 (depicting screen 400).

515. A POSITA would have understood that Fadell's options 410, 412, and 414 of screen 400 each disclose or would have rendered obvious a notification that provides an option to set, control, override, or modify an aspect of the policy in the Rao-Fadell combination. For example, Fadell's preventing users and resources from using data (options 410, 412) teaches setting, controlling, and/or modifying an aspect of a policy in the Rao-Fadell system because it teaches setting, controlling, or modifying how network packets are handled from queues in the combined system.

516. A POSITA would have implemented Fadell in the combined system such that intercepted and queued packets are prevented from being communicated from the queues based on their origin from certain users, or alternatively prevented altogether, based on the user selecting option 410 or 412. A POSITA would have understood that such controls would set, control, and/or modify an aspect of the

policy that includes how and/or under what circumstances network packets are communicated from the queues. A POSITA would have been motivated to implement the Rao-Fadell system in this manner because it would have provided users greater control of data usage, prevented data overages, and given users options for how to use data in the combined system.

517. Fadell's option 414 to purchase additional data also teaches setting, controlling, overriding, and/or modifying an aspect of the policy in the Rao-Fadell system. Fadell ¶57. For example, purchasing additional data with option 414 would have set, controlled, overridden, or modified the data threshold set by the user, an aspect of the Rao-Fadell policy. A POSITA would have been motivated to implement the Rao-Fadell system in this way because it would have provided users greater control of data usage, prevented data overage charges, and given users options for avoiding data overages in the combined system.

518. And Fadell similarly teaches that the alert "may include an option for allowing the consumer to exceed the allocated resources. For example, the alert may include an option permitting the resource utilization component to transmit or receive data in excess of the resources allocated to the consumer." Fadell ¶53. A POSITA would understand this to be an override of at least an aspect of the policy and would have implemented the combined system in this way for similar reasons.

519. A POSITA would have been motivated to cause the notification of Fadell to provide information about options to set, control, override, or modify an aspect of the policy in the combined system in view of Fadell's examples and its suggestion to do so. *See, e.g.*, Fadell ¶¶49, 50-72, Figs. 3-6. Providing these options in the combined system would have allowed the user to determine how the policy is implemented, select how to proceed, and to better understand and control resource usage to prevent data overages and associated charges. *See id.* ¶¶49, 51, 52. This would have required no more than the exercise of routine skill for a POSITA to implement given both Rao's and Fadell's suggestion of a user interface, *see supra* Limitation [1e], Fadell's disclosure of such notifications and policy control, and the well-known nature of these concepts at the time of the alleged invention.

36. Claim 94

a. "The non-transitory computer-readable storage medium recited in claim 91, wherein, when executed by the one or more processors of the wireless end-user device, the machine-executable instructions further cause the one or more processors to obtain an indication of a user response to the notification."

520. Rao-Fadell teaches this limitation.

521. For example, Fadell teaches options 320 in screen 300, one or more of options 410, 412, 414, or 420 in screen 400, and/or one or more options 510, 512, 514, 516, and 520 in screen 500. Fadell ¶¶49, 50-70, Figs. 3-5. Fadell teaches that

screen 300 provides notice of data provider resources used and "may include Close option 320 to remove or hide screen 300." *Id.* ¶50.

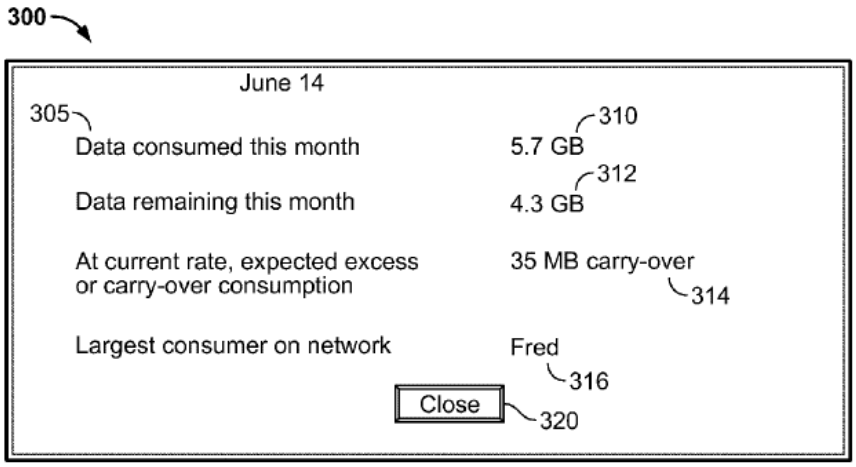


FIG. 3

Id., Fig. 3 (depicting Close option 320).

522. Fadell also teaches screen 400 "indicating that the consumer has reached a limit in data provider resources." *Id.* ¶¶54-62, Fig. 4. Screen 400 includes options 410, 412, and 414 that each may be selected to provide options for proceeding in response to the notification. *Id.* Screen 400 "may be removed by selecting close option 420." *Id.* ¶57.

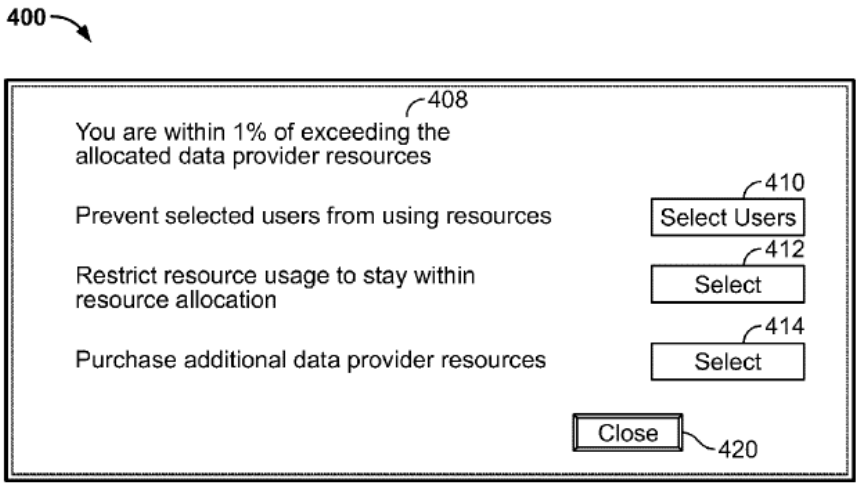


FIG. 4

Id., Fig. 4 (depicting screen 400).

523. Fadell also teaches screen 500 that may "may identify other networks available to the consumer for which allocated data provider resources remain." *Id.* ¶¶63-70. Screen 500 provides several options, including option 510, 512, 514, and 516 to select different networks, and "close option 520" to remove screen 500.

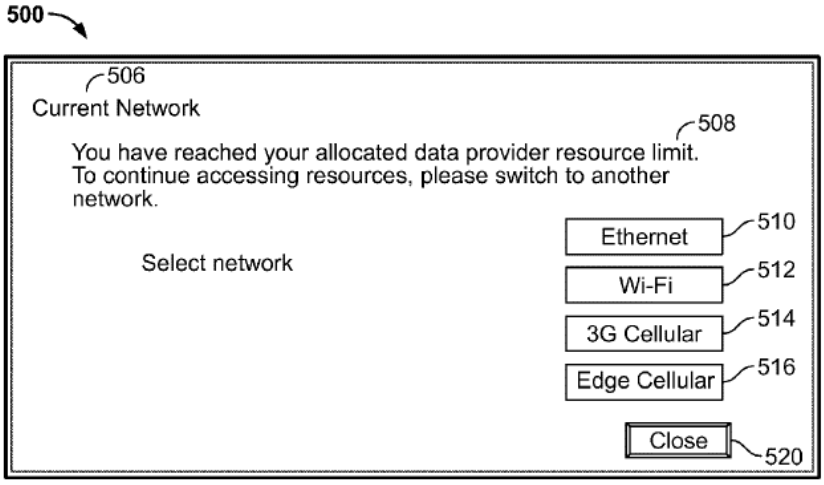


FIG. 5

Id., Fig. 5 (depicting screen 500).

524. A POSITA would have understood that each of the options in screens 300, 400, and 500 comprise instructions that cause the processors in the end-user device of the combined Rao-Fadell system to obtain an indication of a user response to the notification. Each option is selectable on the device and selection is an indication of a user response to the notification that is received by the device in order to trigger a response by the device, including, for example, closing the screen, switching networks, and/or restricting resource usage or users.

525. A POSITA would have been motivated to cause the notification of Fadell to obtain an indication of a user response to the notification in the combined system in view of Fadell's examples and its suggestion to do so. *See, e.g.*, Fadell ¶¶49, 50-70, Figs. 3-5. Providing options to receive a user response in the combined system would have allowed the system to register that a user received the notification via screen 300, 400, and/or 500, and allowed the user to select how to proceed, determine how the policy is being implemented, and enable the user to understand and control resource usage to prevent data overages and associated charges. *See id.* ¶¶49, 51, 52. This would have required no more than the exercise of routine skill for a POSITA to implement given both Rao's and Fadell's suggestion of a user interface, *see supra* Limitation [1e], Fadell's disclosure of such notification-based, user-selectable options, and the well-known nature of these concepts at the time of the alleged invention.

37. Claim 95

a. "The non-transitory computer-readable storage medium recited in claim 91, wherein the notification provides a warning or an alert."

526. Rao-Fadell teaches this limitation.

527. For example, Fadell's notifications, including screen 300, 400, and 500, disclose this limitation for the reasons explained in claim 91. *See supra* Claim 91. For example, Fadell teaches that a consumer may "receive any suitable type of report, notice, reminder or alarm related to data provider resource consumption," Fadell ¶49, and teaches exemplary screens 300, 400, and 500, *id.* ¶¶49-70, Figs. 3-5; *see also id.* ¶¶71-72, Fig. 6. Fadell also refers to its exemplary notifications as "provid[ing] notices or ***warnings*** to electronic device 120 when particular resource use thresholds are met." *Id.* ¶22. Fadell describes screen 300 as "an ***alert*** indicating the current status of the consumer's resource use." *Id.* ¶¶51-53.

528. A POSITA would have understood that Fadell's "warnings" and "alert[s]," including screens 300, 400, and 500, disclose notifications that provide "a warning or an alert," at least because Fadell teaches them as such. A POSITA would also have understood that screens 300, 400, and 500 provide a warning or an alert because they warn and/or alert a user about the user's resource usage when a threshold is approaching or is reached. *Id.* ¶¶49-72, Figs. 3-6. A POSITA would have

been motivated to combine Rao and Fadell to achieve this limitation for the reasons discussed in connection with claims 1 and 91.

38. Claim 96

a. "The non-transitory computer-readable storage medium recited in claim 91, wherein the notification provides information about a service plan limit."

529. Rao-Fadell teaches this limitation.

530. For example, Fadell's notifications, including screens 300, 400, and 500, disclose providing information about a service plan limit for the reasons discussed in claims 1 and 91. *See supra* Claims 1, 91; Fadell ¶¶49-72, Figs. 3-6.

531. For example, Fadell teaches that its notifications provide "a notice of the amount (e.g., in absolute terms, relative to allocated amount, or combinations of these) of resources consumed for a tier ***subscription period***." Fadell ¶49. Fadell teaches that its notifications, including screen 300, assist in avoiding "excess fees or penalties, the consumer may receive (e.g., from the ***data provider*** or from the resource utilization component) reminders or alarms that the user is approaching, has reached, or has exceeded his allocated data provider resources." *Id.* ¶51. This includes determining "that the consumer has reached an ***initial limit or threshold*** that is less than the ***allocated resource limit*** (e.g., the user has consumed 75% of the allocated resources)" and providing an alert. *Id.* Fadell also teaches that screen 400 indicates "that the consumer has reached a ***limit in data provider resources***," *id.* ¶54,

and that screen 500 indicates "to the user that the allocated ***data provider resource limit*** for the current network," *id.* ¶63.

532. A POSITA would have understood that Fadell's disclosure of notifications providing information about a data provider limit or threshold teaches "information about a service plan limit," as Fadell teaches that "data provider may provide periodic plans by which a user may be entitled to a particular amount of data provider resources (e.g., a particular amount of received or transmitted data) for a particular period (e.g., one month)." *Id.* ¶¶43-44.

533. Fadell therefore teaches this limitation in the combined Rao-Fadell system. A POSITA would have been motivated to display a notification with information about a service plan limit in the Rao-Fadell system because, as discussed in connection with claims 1 and 91, it would have enabled a user to understand his or her data usage, prevent inadvertent overages and unwanted fees, and decide how to proceed when a limit or threshold is met.

39. Claim 99

a. "The non-transitory computer-readable storage medium recited in claim 91, wherein the policy is based on a limit, and wherein, when executed by the one or more processors of the wireless end-user device, the machine-executable instructions further cause the one or more processors to determine that a data usage associated with the service usage activity is not less than the limit, and wherein cause a notification to be presented through a user interface of the wireless end-user device comprises trigger presentation of the notification based on the determination that the data usage associated with the service usage activity is not less than the limit."

534. Rao-Fadell teaches this limitation. For example, Rao and Fadell disclose the non-transitory computer-readable storage medium recited in claim 91. *See supra* Claim 91.

535. Fadell further teaches a policy based on a limit by disclosing that, "in response to determining that the consumer is within a ***particular range*** of the allocated data processor resources (e.g., within a particular amount of allocated transferred data, or within a particular percentage of the allocated bandwidth) or that the consumer has reached an ***initial limit or threshold*** that is less than the allocated resource limit (e.g., the user has consumed 75% of the allocated resources), the consumer may receive an alert indicating the current status of the consumer's resource use." Fadell ¶51; *see also id.* ¶¶49-72, Figs. 3-6. Fadell also teaches a "data provider resource limit," and an "estimation of expected data usage for the remaining

period" describing the user's expected overage of the limit. *Id.* ¶¶49-72. Fadell thus teaches that a policy is based on a "limit."

536. Fadell also teaches the processors of the wireless end-user device determining that a data (resource) usage associated with the service usage activity is not less than a limit and triggering the presentation of a notification through a user interface based on the determination that the data usage associated with the service usage activity is not less than the limit.

537. For example, Fadell teaches providing screen 300 and/or 400 in response to determining that data usage exceeds (i.e., is not less than) a limit, threshold, or is within a range of a data provider resource limit for a given period. *See, e.g.*, *id.* ¶¶49-52, 54-56, 63. Fadell also teaches providing screen 500 in response to determining that data provider resource limit "has been reached." *Id.* ¶¶ 63-70, Fig. 5.

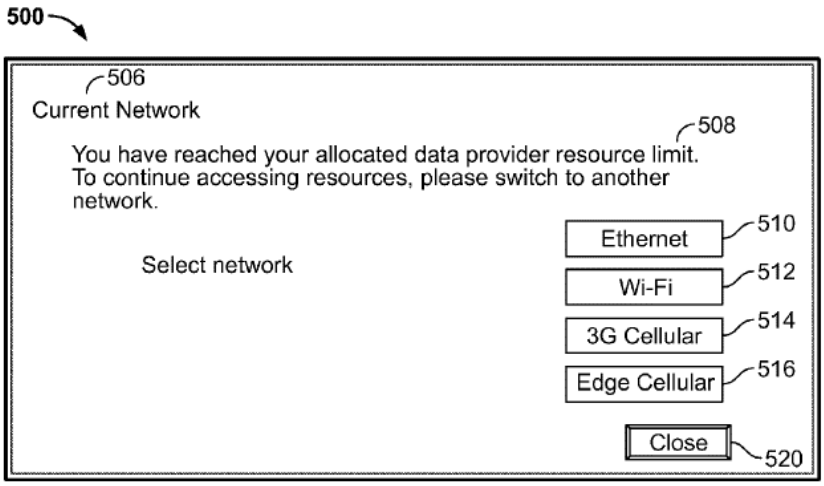


FIG. 5

Id., Fig. 5 (depicting screen 500).

538. In each instance (e.g., for screens 300, 400, and 500), Fadell determines that data usage associated with network communication is "not less than a limit" or exceeds a limit and triggers the presentation of a notification indicating the limit and in certain embodiments providing options to the user.

539. Fadell therefore teaches this limitation in the combined Rao-Fadell system. A POSITA would have incorporated Fadell's limit, including the initial limit or threshold set by a user and/or a data provider resource limit, into the policy of the Rao-Fadell system to trigger Fadell's notifications when data usage has reached the threshold, limit, or range for the reasons discussed in connection with claims 1 and 91. For example, a POSITA would have been motivated to do so to enable a user to understand his or her data usage, prevent inadvertent overages and unwanted fees, and decide how to proceed when a limit or threshold is met.

540. A POSITA further would have been motivated to cause such limit-based notifications in the combined system in view of Fadell's examples and its suggestion to do so. *See, e.g.*, Fadell ¶¶49, 50-70, Figs. 3-5. Providing information and options relative to a resource usage limit would have allowed a user to select how to proceed, determine how the policy is being implemented, and enable the user to understand and control data usage to prevent data overages and associated charges. *See id.* ¶¶49, 51, 52. This would have required no more than the exercise of

routine skill for a POSITA to implement given both Rao's and Fadell's suggestion of a user interface, *see supra* Limitation [1e], Fadell's disclosure of such notifications, and the well-known nature of these concepts at the time of the alleged invention.

40. Claim 102

a. "The non-transitory computer-readable storage medium recited in claim 91, wherein the notification indicates that one or more service usage activities are subject to the policy."

541. Rao-Fadell teaches this limitation.

542. Fadell teaches this limitation for the reasons discussed in claim 91. For example, Fadell's notifications, including screens 300, 400, and 500, indicate that particular resource usage has reached a limit or exceeded a limit, and provides options for a user. Fadell ¶¶49, 50-70, Figs. 3-5. A POSITA would have understood that, by providing notifications related to data usage, Fadell teaches providing a notification that indicates a service usage activity (e.g., a network communication) is subject to the policy. That is, a POSITA would have understood that screens 300, 400, 500 indicate that a resource usage limit or threshold has been reached, and therefore "one or more service usage activities" (e.g., Fadell's data transfers and/or Rao's network packets) are subject to the policy in the Rao-Fadell system. Fadell's option 412 to restrict resource usage based on the types of data transmitted, protocol, or user requesting the transfer, also indicates one or more service usage activities

(e.g., related to the restricted usage) are subject to the policy. *Id.* ¶56, Fig. 4. It also would have been obvious for the notification in the Rao-Fadell system to tell the user that certain background communications are being deprioritized because of the resource usage limit, as taught by Rao.

543. A POSITA would have incorporated Fadell's resource usage notifications into Rao for the reasons discussed in connection with claims 1 and 91. For example, a POSITA would have been motivated to do so to enable a user to understand his or her data usage, prevent inadvertent overages and unwanted fees, and decide how to proceed when a limit or threshold is met. A POSITA further would have been motivated to cause such use-based notifications in the combined system in view of Fadell's examples and its suggestion to do so. *See, e.g.*, Fadell ¶¶49, 50-70, Figs. 3-5. Providing notifications that indicate a network communication or service usage activity is subject to a policy would have allowed a user to select how to proceed, determine how the policy is being implemented, and enable the user to understand and control resource usage to prevent data overages and associated charges. *See id.* ¶¶49, 51, 52. Providing such notifications would have required no more than the exercise of routine skill for a POSITA to implement given both Rao's and Fadell's suggestion of a user interface, *see supra* Limitation [1e], Fadell's disclosure of such notifications, and the well-known nature of these concepts at the time of the alleged invention.

41. Claim 103

a. "The non-transitory computer-readable storage medium recited in claim 91, wherein the notification provides information about a second network."

544. Rao-Fadell teaches this limitation.

545. For example, as discussed in connection with claims 1 and 91, Fadell teaches screen 500 that "prompt[s] a user to switch networks." Fadell ¶¶63-70, Fig. 5. Fadell teaches that screen 500 may include options 510, 512, 514, and 516 to switch to Ethernet, Wi-Fi, a 3G cellular network 514, or an EDGE cellular network, respectively. *Id.* ¶63, Fig. 5. The options given by Fadell, "may identify networks by unique identifiers, such as by name (e.g., so that several networks of the same type, such as Wi-Fi, may be available for selection)." Fadell ¶63. The network name and type are both information about a second network.

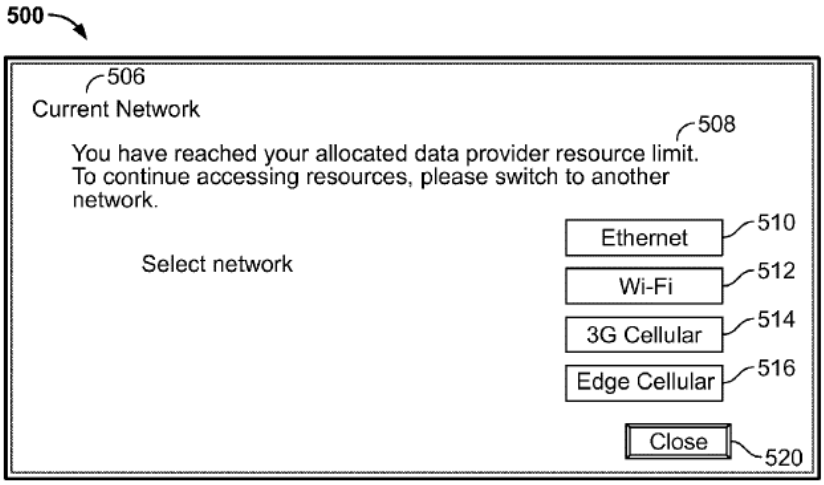


FIG. 5

Id., Fig. 5 (depicting screen 500).

546. A POSITA would have understood that Fadell's screen 500 teaches a notification that provides information about a second network, where the second network may be one or more of Ethernet, Wi-Fi, 3G cellular, or an Edge cellular network. A POSITA would have incorporated Fadell's screen 500 into Rao for the reasons discussed in connection with claims 1 and 91. For example, a POSITA would have been motivated to do so to enable a user to understand his or her data usage, prevent inadvertent overages and unwanted fees, and decide how to proceed when a limit or threshold is met. This includes switching networks when a data limit is reached on a first network.

547. A POSITA further would have been motivated to provide screen 500 when a data limit is reached in the combined system in view of Fadell's examples and its suggestion to do so. *See, e.g.*, Fadell ¶¶63-70, Fig. 5. Providing such notifications would have required no more than the exercise of routine skill for a POSITA to implement given both Rao's and Fadell's suggestion of a user interface, *see supra* Limitation [1e], Fadell's disclosure of such notifications, and the well-known nature of these concepts at the time of the alleged invention.

42. Claim 104

a. "The non-transitory computer-readable storage medium recited in claim 91, wherein the notification comprises an offer for a service plan upgrade or downgrade."

548. Rao-Fadell teaches this limitation.

549. For example, as discussed in connection with claims 1 and 91, for example, Fadell teaches in screen 400 "option 414 for purchasing additional data provider resources." Fadell ¶57, Fig. 4. Fadell teaches that, "in response to receiving a selection of option 414, the data provider may receive authorization to charge for additional resources." *Id.* ¶57.

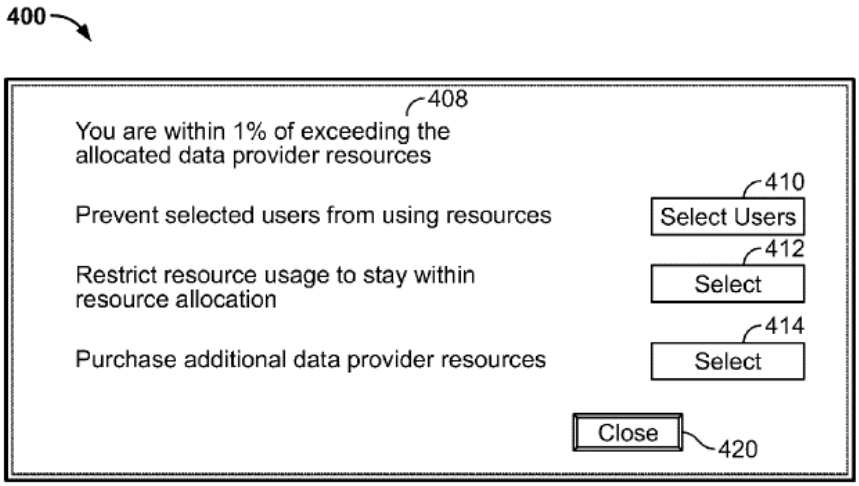


FIG. 4

Id., Fig. 4 (depicting screen 400).

550. A POSITA would have understood option 414, including screen 400's associated depiction of "Purchase additional data provider resources" for option 414, *id.*, teaches an offer for a service plan upgrade. Indeed, Fadell discloses that a data

provider, in response to selecting option 414, provides additional resources that otherwise would exceed a given plan. *Id.* ¶57; *see also id.* ¶¶43, 44 (discussing "resource consumption tiers or plans"). By providing additional resources to be purchased over and above a given plan, the data provider is providing a service plan upgrade.

551. A POSITA would have combined Fadell's screen 400 and its options for upgrading a service plan into the combined Rao-Fadell system. For example, a POSITA further would have been motivated to provide screen 400 in the combined system in view of Fadell's examples and its suggestion to do so and would have had a reasonable expectation of success in doing so. *See, e.g.*, *id.* ¶¶54-62, Fig. 4. Providing such options via screen 400 would have required no more than the exercise of routine skill for a POSITA to implement given both Rao's and Fadell's suggestion of a user interface, *see supra* Limitation [1e], Fadell's disclosure of such notifications, and Rao and Fadell's ubiquity at the time of the alleged invention. This would have given a user additional control over the Rao-Fadell policy, and enabled a user to understand his or her data usage, prevent inadvertent overages and unwanted fees, and decide how to proceed based on a given data usage plan. This includes purchasing additional data or restricting further data usage, which a POSITA would have understood, would give the user the option to continue normal activity (e.g., without needing to restrict or reschedule activities).

43. Claim 105

a. "The non-transitory computer-readable storage medium recited in claim 91, wherein apply the policy further comprises obtain an indication of a user preference in response to the notification."

552. Rao-Fadell teaches this limitation for the reasons discussed in connection with claim 94. For example, Fadell teaches options 320 in screen 300, one or more of options 410, 412, 414, or 420 in screen 400, and/or one or more options 510, 512, 514, 516, and 520 in screen 500. Fadell ¶¶49, 50-70, Figs. 3-5. Fadell teaches that screen 300 provides notice of data provider resources used and "may include Close option 320 to remove or hide screen 300." *Id.* ¶50.

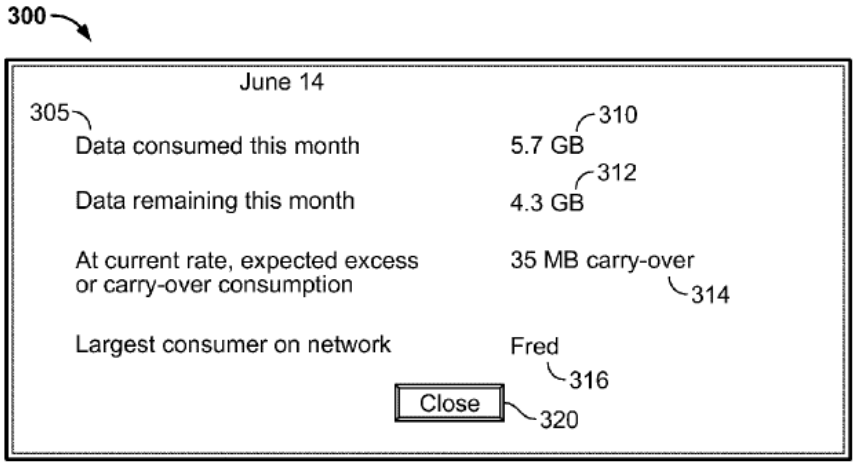


FIG. 3

Id., Fig. 3 (depicting Close option 320).

553. Fadell also teaches screen 400 "indicating that the consumer has reached a limit in data provider resources." *Id.* ¶¶54-62, Fig. 4. Screen 400 includes options 410, 412, and 414 that each may be selected to provide options for

proceeding in response to the notification. *Id.* Screen 400 "may be removed by selecting close option 420." *Id.* ¶57.

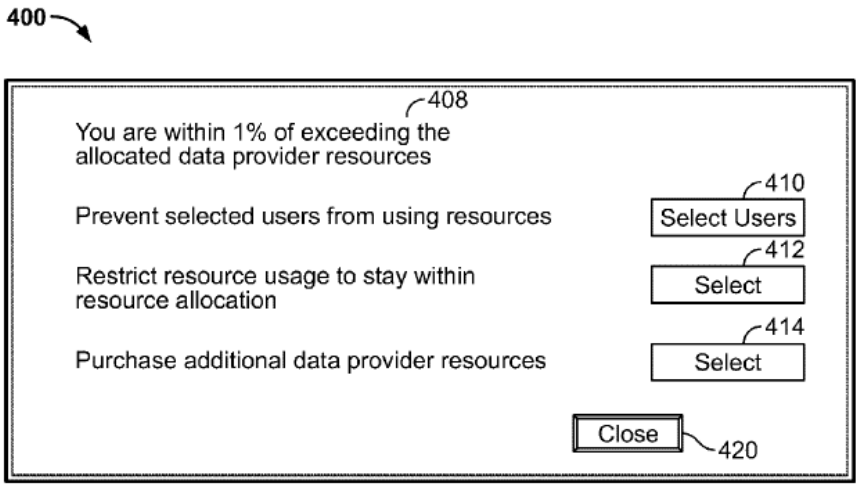


FIG. 4

Id., Fig. 4 (depicting screen 400).

554. Fadell also teaches screen 500 that may "may identify other networks available to the consumer for which allocated data provider resources remain." *Id.* ¶¶63-70. Screen 500 provides several options, including option 510, 512, 514, and 516 to select different networks, and "close option 520" to remove screen 500.

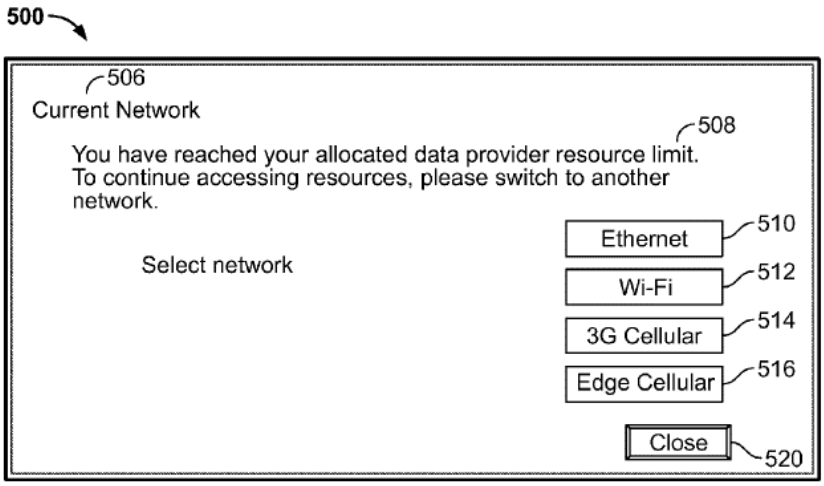


FIG. 5

Id., Fig. 5 (depicting screen 500).

555. A POSITA would have understood that each of the options in screens 300, 400, and 500 comprise obtaining an indication of a "user preference" in response to the notification in Fadell. For example, closing the notification via options 320, 420, and 520 indicate a preference to close the notification. Options for restricting use in screen 400 and switching networks in scree 500 indicate options to restrict resource usage and to switch networks, respectively. A POSITA would have implemented Fadell's screens 300, 400, and 500, including their options to capture a user preference, into the combined Rao-Fadell system. As discussed in connection with claim 1, a POSITA would have implemented Fadell's notifications in policy that displays one or more of screens 300, 400, and 500 when a data limit or threshold is met, and further capture, queue, and prioritize network packets associated with background activity. *See supra* Limitations [1e]-[1g].

556. A POSITA would have been motivated to cause the notification of Fadell to obtain an indication of a user preference in response to the notification in the combined system in view of Fadell's examples and its suggestion to do so. *See, e.g.*, Fadell ¶¶49, 50-70, Figs. 3-5. Obtaining preferences from the user would capture how the user would like to proceed at or near a data limit, control implementation of the policy in the combined system, and enable the user to prevent data overages and associated charges. *See id.* ¶¶49, 51, 52. This would have required no more than the exercise of routine skill for a POSITA to implement given both Rao's and Fadell's suggestion of a user interface, *see supra* Limitation [1e], Fadell's disclosure of such notification-based, user-selectable options, and the well-known nature of these concepts at the time of the alleged invention.

44. Claim 106

a. "The non-transitory computer-readable storage medium recited in claim 105, wherein the indication of the user preference comprises a user directive to associate the policy with a second software component."

557. Rao-Fadell teaches this limitation.

558. For example, Fadell teaches that screen 400 includes option 412 to restrict resource usage such that "data transfers may be restricted based on the protocol or ***application*** requesting the data transfer." Fadell ¶56, Fig. 4. Fadell teaches that "the consumer may limit requests for data based on the type of request"

using screen 400 and option 412, including "limit[ing] data requests based on the data type of the request (e.g., as identified by a packet header or other metadata associated with the request), ***based on the application*** requesting the data (e.g., ***a media application such as iTunes or QuickTime)***, the protocol used for the transfer (e.g., BitTorrent), or any other suitable criteria." *Id.* ¶59.

559. A POSITA would have understood that, by receiving an indication to restrict resource usage based on a particular application via screen 400, Fadell teaches receiving an indication of a user preference that includes a user directive to associate the policy with a second software component. In the combined Rao-Fadell system, a POSITA would have applied Fadell's indication through screen 400 to restrict certain applications by applying the Rao-Fadell policy of intercepting, queuing, and defining a prioritization to network packets associated with the selected application, in the same or similar manner as applied to background activity.

560. A POSITA would have been motivated to cause the notification of Fadell to obtain an indication of a user preference that directs the Rao-Fadell policy to a particular application in view of Fadell's examples and its suggestion to do so, and would have expected success based on Fadell's teachings. *See, e.g.*, *id.* ¶¶49, 57-62, Fig. 4. Obtaining a preference from the user with a directive to apply a policy to a particular application by intercepting, queuing, and prioritizing its network packets would enable a user to control implementation of the policy in the combined

system, target particular applications, and enable the user to prevent data overages and associated charges. *See id.* ¶¶49, 51, 52. For example, a user may understand that particular applications, including a second software component that is a separate component or application from background activity of a first software component (*see* claim 1), may consume considerable resources and wish to restrict usage of that application when at a resource usage limit or threshold. *See id.* ¶53. This would have required no more than the exercise of routine skill for a POSITA to implement given both Rao's and Fadell's suggestion of a user interface, *see supra* Limitation [1e], Fadell's disclosure of such notification-based, user-selectable options, and the well-known nature of these concepts at the time of the alleged invention.

45. Claim 107

a. "The non-transitory computer-readable storage medium recited in claim 105, wherein the indication of the user preference comprises a user directive to allow or block the service usage activity."

561. Rao-Fadell discloses this limitation.

562. For example, Fadell teaches that screen 400 includes option 412 for "restricting resource usage to stay within the resource allocation." Fadell ¶56, Fig. 4. Fadell teaches several methods of restricting data usage, including "eliminat[ing] or reduc[ing] data transfers of large file types," restricting data transfers "based on the protocol or application," or "based on the identity of the consumer requesting the transfer." *Id.* ¶56; *see also id.* ¶59 (same). Fadell also teaches enabling the user to

"***prevent*** the download of media data, but ***allow or permit*** the download of web pages or other non-media intensive transfers." *Id.* ¶59. Users may also restrict resource usage via screen 400 by "reschedul[ing] or cancel[ing] processes requesting data of ***lesser importance***" using screen 400, including "auto-update processes (e.g., virus scan updates), automatic requests for new mail, RSS feed detectors, automatically updating web pages or screens (e.g., Gamecast screens or live blogs for following live sporting or news events)." *Id.* ¶60. Users may also allow the data transfer by purchasing additional data resources from the provider. *Id.* ¶53.

563. Fadell's restricting resource usage by eliminating or reducing large file transfers, particular applications, and/or particular users via screen 400 teaches receiving an indication of a user preference that includes a user directive to "block" a service usage activity. *Id.* ¶56. Fadell's canceling processes "of lesser importance" via screen 400 also teaches receiving an indication of a user preference that includes a user directive to "block" a service usage activity. Fadell's allowing or permitting the "download of web pages or other non-media intensive transfers" via screen 400 and rescheduling processes of "lesser importance" or purchase additional data resources similarly teaches receiving an indication of a user preference that includes a user directive to "permit" a service usage activity. *Id.* ¶¶59-60. The preference includes, for example, identifying the particular data transfer, and the directive is, for example, restricting, preventing, or canceling it.

564. A POSITA would have applied these teachings of Fadell to Rao in the combined Rao-Fadell system to enable a user to restrict or permit resource usage through screen 400. For example, screen 400 would enable a user to restrict or allow the network packets intercepted and prioritized in Rao based on Fadell's suggestion to reschedule or cancel processes of "lesser importance," which corresponds with Rao's background activity. In this way, the combined system would receive an indication of a user preference that includes a user directive to allow or block "the service usage activity."

565. A POSITA would have been motivated to cause Fadell's notification to obtain an indication of a user preference to restrict or permit the queued network packets associated with background activity in view of Fadell's examples and its suggestion to do so. *See, e.g.*, *id.* ¶¶49, 57-62, Fig. 4. This would enable a user to control implementation of the policy in the combined system and elect whether to allow or permit queued background activity to control resource usage and prevent overages and associated charges. *See id.* ¶¶49, 51, 52. This would have required no more than the exercise of routine skill for a POSITA to implement given both Rao's and Fadell's suggestion of a user interface, *see supra* Limitation [1e], Fadell's disclosure of such notification-based, user-selectable options, and the well-known nature of these concepts at the time of the alleged invention.

46. Claim 108

a. "The non-transitory computer-readable storage medium recited in claim 105, wherein the indication of the user preference identifies a traffic control setting associated with the policy."

566. Rao-Fadell teaches this limitation.

567. The '541 patent describes accepting "a user preference for network service usage activity" for a policy and implementing "traffic control techniques, such as throttle, delay, priority queue, time window, suspend, quarantine, kill, remove, and other well known traffic control techniques." EX-1001, 19:47-53. For the reasons explained in claim 107, Fadell's restricting or allowing resource usage via screen 400 teaches receiving an indication of a user preference that identifies a traffic control setting associated with the policy because Fadell teaches "prevent[ing]," "reschedul[ing]," or "cancel[ing]" resource usage. Fadell ¶¶56, 59-61, Fig. 4; *see supra* Claim 107. Fadell also teaches time-windowing resource usage. Fadell ¶61 (describing rescheduling and delay, and metering "based on the day or time of day").

568. Rao also teaches a traffic control setting by disclosing intercepting, queuing, and assigning a priority to network packets. Rao ¶¶179-95, Fig. 5A. This corresponds with the '541 patent's description of a traffic control technique that includes a "priority queue." EX-1001, 19:47-53.

569. A POSITA would have applied Fadell's and/or Rao's teachings in the combined Rao-Fadell system to enable a user to restrict, delay, queue, and/or permit resource usage through screen 400 when a data limit or threshold is reached. For example, screen 400 would enable a user to restrict or allow the network packets intercepted and prioritized in queues, and reschedule or cancel processes of "lesser importance," as taught by Fadell and Rao. In this way, the combined system would receive an indication of the user preference identifying a "traffic control setting" associated with the policy.

570. A POSITA would have been motivated to control the network packets in the Rao-Fadell system based on a user preference in view of Fadell's examples and its suggestion to do so. *See, e.g.*, Fadell ¶¶49, 57-62, Fig. 4. This would have enabled a user to control implementation of the policy in the combined system and elect whether to allow or permit queued background activity to prevent overages and associated charges. *See id.* ¶¶49, 51, 52. Doing so would have required no more than the exercise of routine skill for a POSITA to implement given both Rao's and Fadell's suggestion of a user interface, *see supra* Limitation [1e], Fadell's disclosure of such notification-based, user-selectable options, and the well-known nature of these concepts at the time of the alleged invention.

47. Claim 109

a. "The non-transitory computer-readable storage medium recited in claim 105, wherein the indication of the user preference comprises a user directive to allow the service usage activity under a specified condition."

571. Rao-Fadell teaches this limitation.

572. For example, Fadell teaches that screen 400 includes option 412 for "restricting resource usage to stay within the resource allocation." Fadell ¶56, Fig. 4; *see also id.* ¶59. As one example, Fadell teaches enabling the user to "prevent the download of media data, but ***allow or permit*** the download of web pages or other non-media intensive transfers." *Id.* ¶59. Users may also control resource usage via screen 400 by "reschedul[ing] . . . processes requesting data of ***lesser importance***," including "auto-update processes (e.g., virus scan updates), automatic requests for new mail, RSS feed detectors, automatically updating web pages or screens (e.g., Gamecast screens or live blogs for following live sporting or news events)." *Id.* ¶60.

573. Fadell's allowing or permitting the "download of web pages or other non-media intensive transfers" via screen 400 and rescheduling processes of "lesser importance" teaches receiving an indication of a user preference that includes a user directive to "permit" a service usage activity under a specified condition. *Id.* ¶¶56, 59-60. A POSITA would have understood that, by allowing certain applications like web pages and "non-media intensive transfers" to proceed, or by rescheduling lesser important tasks, a user is allowing the service usage activity under a specified

condition. The condition includes, for example, the specific application or identified network packets associated with a web browser or other applications requesting "non-media intensive transfers," and applying a time-based constraint on lesser important tasks. *Id.* ¶¶56, 59-60.

574. A POSITA would have applied these Fadell teachings to Rao in the combined Rao-Fadell system to enable a user to control and permit resource usage through screen 400. For example, screen 400 would enable a user to selectively allow and control network packets intercepted and prioritized in Rao based on Fadell's suggestion to limit data requests to particular applications and rescheduling processes of "lesser importance," which a POSITA would understand corresponds with Rao's background activity. In this way, the combined system would receive an indication of a user preference that includes a user directive to allow the "service usage activity" (e.g., the background activity) under a specified condition.

575. A POSITA would have been motivated to cause the notification of Fadell to obtain an indication of a user preference to permit the queued network packets associated with background activity in view of Fadell's examples and its suggestion to do so. *See, e.g.*, Fadell ¶¶49, 57-62, Fig. 4. This would enable a user to control implementation of the policy in the combined system and elect whether to allow or permit queued background activity and thus control resource usage and prevent overages and associated charges. *See id.* ¶¶49, 51, 52. This would have

required no more than the exercise of routine skill for a POSITA to implement given both Rao's and Fadell's suggestion of a user interface, *see supra* Limitation [1e], Fadell's disclosure of such notification-based, user-selectable options, and the well-known nature of these concepts at the time of the alleged invention.

48. Claim 110

a. "The non-transitory computer-readable storage medium recited in claim 105, wherein the indication of the user preference comprises a user directive to override or modify the policy."

576. Rao-Fadell teaches this limitation. For example, as explained in connection with claim 105, Rao-Fadell teaches obtaining an indication of a user preference in response to the notification. *See supra* Claim 105.

577. Rao-Fadell further teaches that the indication of a user preference comprises a user directive to override or modify the policy, as discussed in connection with claim 93. *See supra* Claim 93.

578. For example, Fadell teaches that an alert may "include an option for allowing the consumer to exceed the allocated resources," including "an option permitting the resource utilization component to transmit or receive data in excess of the resources allocated to the consumer." Fadell ¶53. In one embodiment, Fadell teaches screen 400, which "include[s] selectable options for several actions that the consumer may take in response to being informed that the consumer is within the predetermined range of the allocated resource limit." *Id.* ¶¶54-62, Fig. 4. Fadell

teaches that screen 400 may provide "a listing of users or devices" and "an option for ***allowing*** particular users or devices to access data provider resources." *Id.* ¶55. Fadell also teaches that screen 400 may include "option 414 for ***purchasing*** additional data provider resources." *Id.* ¶57. Fadell further teaches that allowing a user to "prevent the download of media data, but ***allow or permit*** the download of web pages or other non-media intensive transfers." *Id.* ¶59.

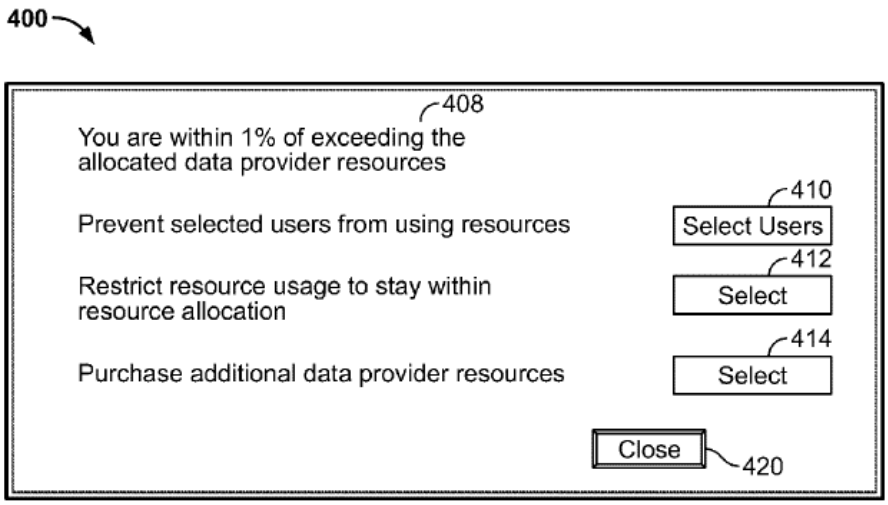


FIG. 4

Id., Fig. 4 (depicting screen 400).

579. A POSITA would have understood that Fadell's options including allowing particular users or devices to continue using data, options to purchase additional data, and options to allow or permit certain applications, teaches receiving an indication of a user preference that includes a user directive to override or modify the policy. For example, each option allows a user to modify or override a data limit or threshold, which is part of the policy in the combined Rao-Fadell system.

580. A POSITA would have implemented these elements of Fadell in the combined system such that network packets associated with certain applications or users may be exempted from being intercepted, queued, and prioritized, despite being background activity. A POSITA also would have implemented these elements to change the data limit or threshold for Fadell's notifications based on the purchase of additional data. Each of these options modifies or overrides the policy in the combined system. A POSITA would have been motivated to implement these options in the Rao-Fadell system because it would have provided users greater control of resource usage and given users options for implementing the policy in the combined system.

581. A POSITA would have been motivated to cause Fadell's notification to provide options to override or modify a policy in the combined system in view of Fadell's examples and its suggestion to do so. *See, e.g.*, Fadell ¶¶49, 50-72, Figs. 3-6. Providing these options in the combined system would have allowed the user to determine how the policy is implemented, select how to proceed, and to better understand and control resource usage to prevent data overages and associated charges. *See id.* ¶¶49, 51, 52. The selection of such an option would also constitute a user directive to override or modify the policy as claimed. Implementing these elements would have required no more than the exercise of routine skill for a POSITA to implement given both Rao's and Fadell's suggestion of a user interface,

see supra Limitation [1e], Fadell's disclosure of such notifications and policy control, and the well-known nature of these concepts at the time of the alleged invention.

49. Claim 111

a. "The non-transitory computer-readable storage medium recited in claim 91, wherein cause a notification to be presented through a user interface of the wireless end-user device comprises cause the notification to be presented based on occurrence of a trigger."

582. Rao-Fadell teaches this limitation for the reasons explained in claim 99. *See supra* Claim 99.

583. As explained in connection with claim 91, Rao-Fadell teaches wherein apply the policy comprises cause a notification to be presented through a user interface of the wireless end-user device. *See supra* Claim 91.

584. For example, Fadell teaches causing a notification to be presented based on the occurrence of a trigger by disclosing that, "in response to determining that the consumer is within a ***particular range*** of the allocated data processor resources (e.g., within a particular amount of allocated transferred data, or within a particular percentage of the allocated bandwidth) or that the consumer has reached an ***initial limit or threshold*** that is less than the allocated resource limit (e.g., the user has consumed 75% of the allocated resources), the consumer may receive an alert indicating the current status of the consumer's resource use." Fadell ¶51; *see*

also id. ¶¶49-72, Figs. 3-6. Fadell also teaches a "data provider resource limit." *Id.* ¶¶49-72. A POSITA would have understood that Fadell's limits and thresholds disclose triggers and a user hitting the limits and thresholds teaches is an "occurrence of a trigger."

585. Fadell teaches causing a notification to be presented based on the trigger. For example, Fadell teaches providing screen 300 and/or 400 in response to determining that resource usage exceeds a limit, threshold, or is within a range of a data provider resource limit for a given period. *See, e.g.*, *id.* ¶¶49-52, 54-56, 63. Fadell also teaches providing screen 500 in response to determining that data provider resource limit "has been reached." *Id.* ¶¶63-70, Fig. 5.

586. Fadell therefore teaches causing a notification to be presented based on occurrence of a trigger in the combined Rao-Fadell system. A POSITA would have incorporated Fadell's trigger, including its initial limit or threshold set by a user and/or a data provider resource limit, into the policy of the Rao-Fadell system to trigger Fadell's notifications when resource usage has reached the threshold, limit, or range for the reasons discussed in connection with claims 1 and 91. A POSITA would have been motivated to do so, for example, to enable a user to understand his or her data usage, prevent inadvertent overages and unwanted fees, and decide how to proceed when a limit or threshold is met.

587. A POSITA further would have been motivated to cause such trigger-based notifications in the combined system in view of Fadell's examples and its suggestion to do so. *See, e.g.*, *id.* ¶¶49, 50-70, Figs. 3-5. Providing notifications based on a resource usage trigger would have allowed a user to select how to proceed when resource limits are approaching or reached and enabled the user to understand and control resource usage to prevent data overages and associated charges. *See id.* ¶¶49, 51, 52. This would have required no more than the exercise of routine skill for a POSITA to implement given both Rao's and Fadell's suggestion of a user interface, *see supra* Limitation [1e], Fadell's disclosure of such notifications, and the well-known nature of these concepts at the time of the alleged invention.

50. Claim 112

a. "The non-transitory computer-readable storage medium recited in claim 111, wherein the trigger is: a measure of the service usage activity satisfies a first condition relative to a threshold, an aspect of the service usage activity satisfies a second condition, a change to the policy, or a message from the network element."

588. Rao-Fadell teaches this limitation.

589. As explained in connection with claim 111, Rao-Fadell teaches a trigger. *See supra* Claim 111. Rao-Fadell also teaches a measure of the service usage activity satisfies a first condition relative to a threshold.

590. For example, Fadell teaches that, "[t]o assist the consumer in avoiding excess fees or penalties, the consumer may receive . . . reminders or alarms that the user ***is approaching, has reached, or has exceeded his allocated data provider resources***." Fadell ¶51. For example, Fadell teaches that, "in response to determining that the consumer is within a ***particular range*** of the allocated data processor resources (e.g., within a ***particular amount*** of allocated transferred data, or within a ***particular percentage*** of the allocated bandwidth) or that the consumer has reached an ***initial limit or threshold*** that is less than the allocated resource limit (e.g., the user has consumed 75% of the allocated resources), the consumer may receive an alert indicating the current status of the consumer's resource use." *Id.*; *see also id.* ¶¶54-56 (discussing "predetermined range of the allocated data provider resource limit."), 71-72 (same). Fadell teaches displaying screen 400 in response to reaching the initial limit, threshold, or range. *Id.* ¶¶51-61, Fig. 4.

591. A POSITA would have understood that by reaching Fadell's initial limit, threshold, or range, Fadell teaches a measure of the service usage activity (e.g., data use associated with the background activity) satisfying a first condition relative to a threshold (e.g., using data up to the predetermined range). For example, in the instance where the service usage activity is background activity and the service usage activity meets or exceeds Fadell's initial limit, threshold, or range, the service usage activity would satisfy a first condition relative to a threshold.

592. In the combined Rao-Fadell system, a POSITA would have implemented Fadell's screen 400 to measure resource usage and trigger a notification based on network packets, including those associated with background activity, meeting Fadell's usage initial limit, threshold, or range. A POSITA would have incorporated these conditions in the Rao-Fadell system to trigger Fadell's notifications for the reasons discussed in connection with claims 1 and 91. A POSITA would have been motivated to do so, for example, to enable a user to understand his or her data usage, prevent inadvertent overages and unwanted fees, and decide how to proceed when a limit or threshold is met.

593. A POSITA further would have been motivated to cause such trigger-based notifications in the combined system in view of Fadell's examples and its suggestion to do so. *See, e.g.*, Fadell ¶¶49, 50-70, Figs. 3-5. Providing notifications based on a resource usage trigger would have allowed a user to select how to proceed when resource limits are approaching or reached and enable the user to understand and control resource usage to prevent data overages and associated charges. *See id.* ¶¶49, 51, 52. This would have required no more than the exercise of routine skill for a POSITA to implement given both Rao's and Fadell's suggestion of a user interface, *see supra* Limitation [1e], Fadell's disclosure of such notifications, and the well-known nature of these concepts at the time of the alleged invention.

51. Claim 113

a. "The non-transitory computer-readable storage medium recited in claim 91, wherein the notification enables a user associated with the wireless end-user device to obtain information about at least an aspect of the service usage activity or a service plan associated with the wireless end-user device."

594. Rao-Fadell teaches this limitation for the reasons explained in connection with claim 96. *See supra* Claim 96. For example, Fadell's notifications, including screens 300, 400, and 500, disclose providing information about at least an aspect of a service plan associated with the wireless end-user device (e.g., the service plan limit is at least an aspect of the service plan). *See supra* Claims 1, 91, 96; Fadell ¶¶49-72, 43, Figs. 3-6. Fadell teaches a service plan "associated" with the wireless end-user device by disclosing that resources are allocated to specific wireless-end user devices (or groups of wireless end-user devices). *See, e.g.*, Fadell ¶¶42, 43, 67.

52. Claim 114

a. "The non-transitory computer-readable storage medium recited in claim 91, wherein the notification presents a list of service usage activities or software components, the list of service usage activities or software components including the service usage activity or the first software component."

595. Rao-Fadell renders this limitation obvious.

596. For example, Fadell teaches a notification that presents a list of software components, the list including the first software component. Fadell teaches

that "[s]creen 400 may include option 412 for restricting resource usage to stay within the resource allocation." Fadell ¶56. In response to the selection of option 412, "data transfers may be restricted based on the protocol or ***application requesting the data transfer***." *Id.* Fadell also teaches that a user may "allow or permit the download of web pages or other non-media intensive transfers," or "limit data requests based on the data type of the request (e.g., as identified by a ***packet header*** or other metadata associated with the request), ***based on the application*** requesting the data (e.g., a media application such as iTunes or QuickTime), the protocol used for the transfer (e.g., BitTorrent), or any other suitable criteria. *Id.* ¶59.

597. A POSITA would have understood that, to restrict data transfers for specific applications, the user would be provided the option to select which applications to restrict or permit continued data transfer. To do so, it would have been obvious, based on Fadell's teachings and suggestion to do so, to provide a list of applications (e.g., "software components") in a list for the user to select and control via screen 400 after selecting option 412.

598. A POSITA would have been motivated to display a notification in the Rao-Fadell system with a list of applications, including the first software component that is background activity, because it would have enabled a user to control implementation of the policy, selectively control which applications can continue to use data and which cannot, and thus avoid inadvertent overages and unwanted fees.

Providing such a list also would have enabled a user to select which applications could engage in data transfers despite the user being at or near a data limit. This would have provided a user with control of the policy and enabled the user to prioritize certain applications or maintain their operation while restricting others. Providing such a list would have required no more than the exercise of routine skill for a POSITA, with expected results, and would have been obvious based on Fadell's disclosures and suggestion to isolate particular applications via screen 400.

53. Claim 115

a. "The non-transitory computer-readable storage medium recited in claim 91, wherein the notification presents an option to modify the policy."

599. Rao-Fadell teaches this limitation for the reasons discussed in connection with claim 110. *See supra* Claims 110, 105, 91. For the same reasons Rao-Fadell teaches obtaining an indication of a user preference in response to the notification that includes a user directive to modify the policy (e.g., claim 110), Rao-Fadell teaches the notification presenting an option to modify the policy.

600. Rao-Fadell teaches this limitation for the reasons discussed in connection with claim 93. *See supra* Claims 93, 91. For the same reasons Rao-Fadell teaches the notification providing information about a n option to modify the aspect or a second aspect of the policy (e.g., claim 93), Rao-Fadell teaches the notification presenting an option to modify the policy.

54. Claim 116

a. "The non-transitory computer-readable storage medium recited in claim 91, wherein the notification presents an indication of a measure of usage of the wireless network associated with the service usage activity."

601. Rao-Fadell teaches this limitation.

602. For example, Fadell teaches screen 400, a notification that informs the user "You are within 1% of exceeding the allocated data provider resources."

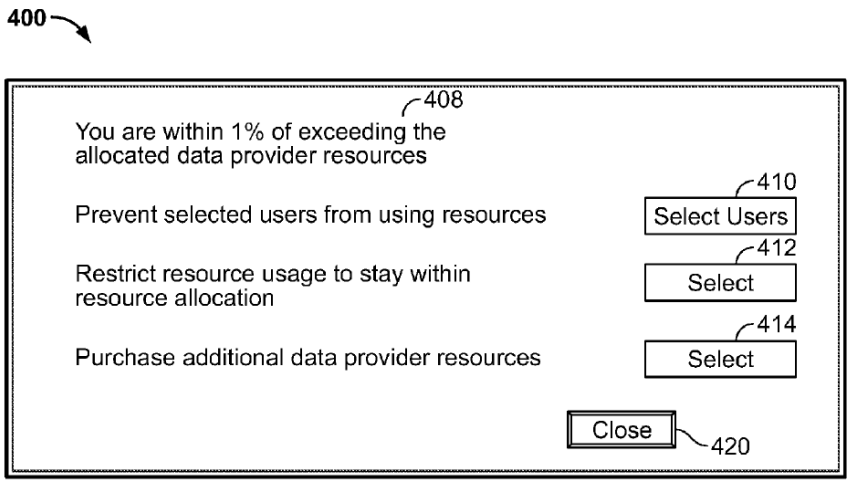


FIG. 4

Fadell, Fig. 4. Fadell explains that the particular percentage remaining (408) displayed may be "set by the consumer (e.g., using an appropriate screen or selectable option), the data provider, a network component, or any other suitable component." *Id.* ¶54; *see also id.* ¶51.

603. Fadell teaches that "[i]n response to receive the alert, the consumer may modify his resource consumption to avoid exceeding the allocated resource amount," in order to avoid costs and fees. *See id.* ¶¶51-52.

604. Fadell explains that, for example, "[s]creen 400 may include selectable options for several actions that the consumer may take in response to being informed that the consumer is within the predetermined range of the allocated resource limit," including restricting the amount of resources used, accepting a lower quality download (e.g., "a less resource intensive Codec for playing back" media), and exceeding the limit (including by purchasing additional resources). *Id.* ¶¶53, 56. Fadell further teaches that where a user chooses to exceed the resource limit "the option may only allow the consumer to exceed the resource limit by a particular amount before a new alert is provided or a new request for authorization or payment is displayed." *Id.* ¶53.

605. In view of these disclosures, a POSITA would have found it obvious to inform the user how much of their remaining resources would be consumed by a particular service usage activity (or how much the activity would cause them to exceed their resources). Fadell's teachings suggest providing this information, and notifying the user of this information would allow the user to make informed decisions regarding whether, for example, to reduce the size of a large data transfer, by informing the user of the resource cost of the larger and smaller resolution options. *See, e.g.*, *id.* ¶¶53, 56. For the same reasons, and for the reasons discussed in connection with claim 91 regarding the benefits of Fadell's notifications, a POSITA would have been motivated to include these features in the combined Rao-

Fadell system. Indeed, Rao teaches that "the remote access client 120 may determine any other ***characteristics or statistics*** of the application 338*a*-338*n* such as size, memory usage, total execution time, and/or frequency of use." Rao ¶188. Rao also teaches that its policies may be "specified in accordance to . . . the ***size of the payload*** of the network packet." *Id.* ¶182. In the combined system, it would have been obvious to based information in the notifications suggested by Fadell, for example screen 400, on the determined characteristics or statistics of the application associated with a network packet and/or about the network packet itself, as taught by Rao. As taught by Rao, such characteristics or statistics may include the size, memory usage, total execution time, and/or frequency of use of the associated application, or size and data usage required by the network packet intercepted by the system, which would readily allow a POSITA to provide the resource information discussed above.

606. A POSITA would have been motivated to provide a measure of usage of the wireless network when the service usage activity will exceed or does exceed a range or limit because it would have provided users with information related to network usage, allowed a user to decide whether to allow the network packet to be communicated from the queues, or modify the data plan to permit communication of the network packet without an overage charge. This would have given a user

greater control over the policy in the combined system and provided users with additional information from which to decide how to implement the policy.

55. Claim 117

a. "The non-transitory computer-readable storage medium recited in claim 91, wherein the notification is provided through an e-mail, a text message, a window, a setting, or a voice message."

607. Rao-Fadell teaches this limitation.

608. For example, as discussed in connection with claims 1 and 91, Fadell teaches providing a notification through a window by disclosing screens 300, 400, and 500. Fadell ¶¶49-70, Figs. 3-5. Each of these screens teaches a notification through a "window." *Id.* A POSITA would have displayed Fadell's screens via the user interface of the end-user device in the combined Rao-Fadell system. A POSITA would have been motivated to do so as discussed in claims 1 and 91. *See supra* Claims 1, 91.

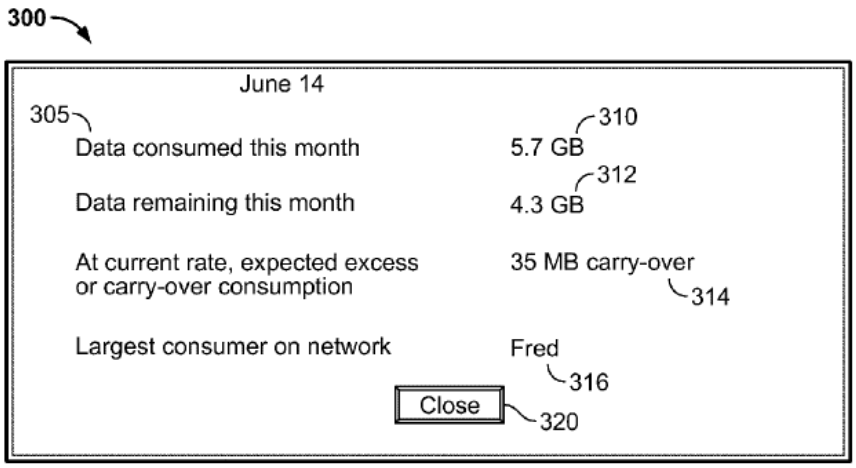


FIG. 3

Fadell, Fig. 3 (depicting screen 300).

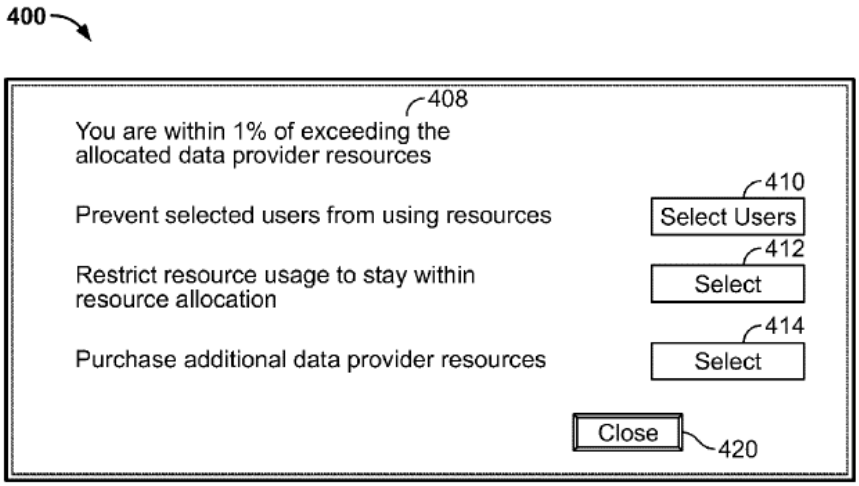


FIG. 4

Id., Fig. 4 (depicting screen 400).

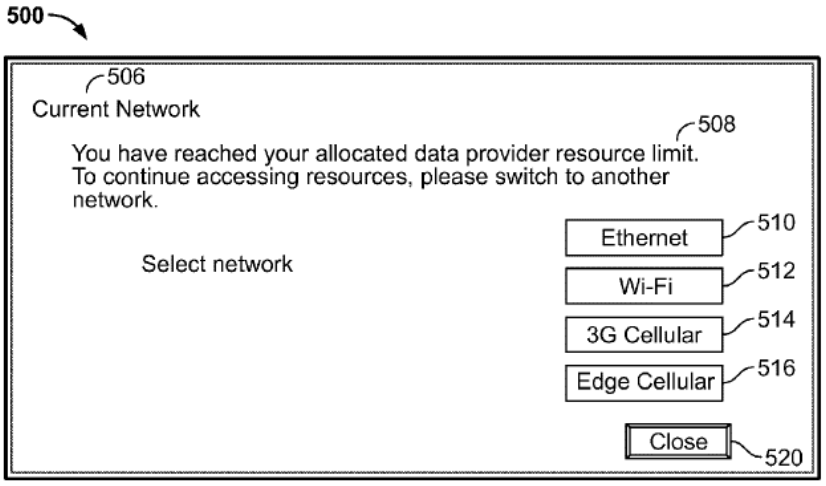


FIG. 5

Id., Fig. 5 (depicting screen 500).

56. Claim 118

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein, when executed by the one or more processors of the wireless end-user device, the machine-executable instructions further cause the one or more processors to: cause a notification to be presented through a user interface of the wireless end-user device."

609. Rao-Fadell teaches this limitation for the reasons discussed in connection with claims 1 and 91. *See supra* Claims 1, 91. For example, Fadell teaches providing a notification through a user interface of a wireless end-user device by disclosing screens 300, 400, and 500. Fadell ¶¶49-70, Figs. 3-5. A POSITA would have displayed Fadell's screens via the user interface of the end-user device in the combined Rao-Fadell system. A POSITA would have been motivated to do so as discussed in claims 1 and 91. *See supra* claims 1, 91.

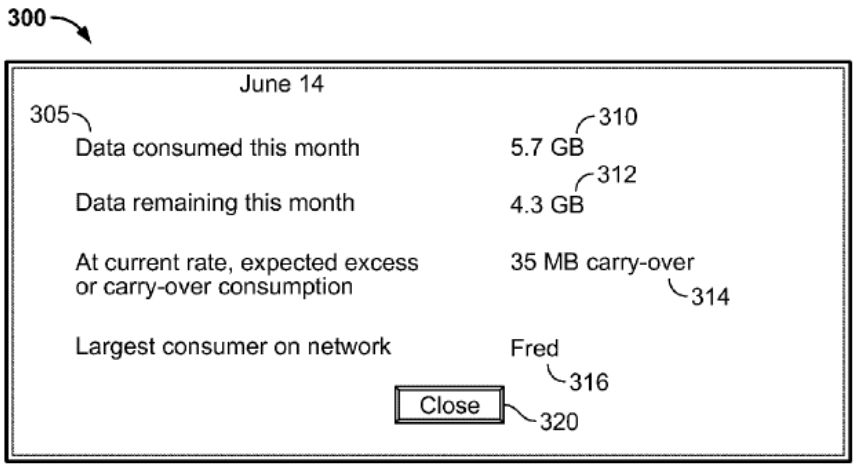


FIG. 3

Id., Fig. 3 (depicting screen 300).

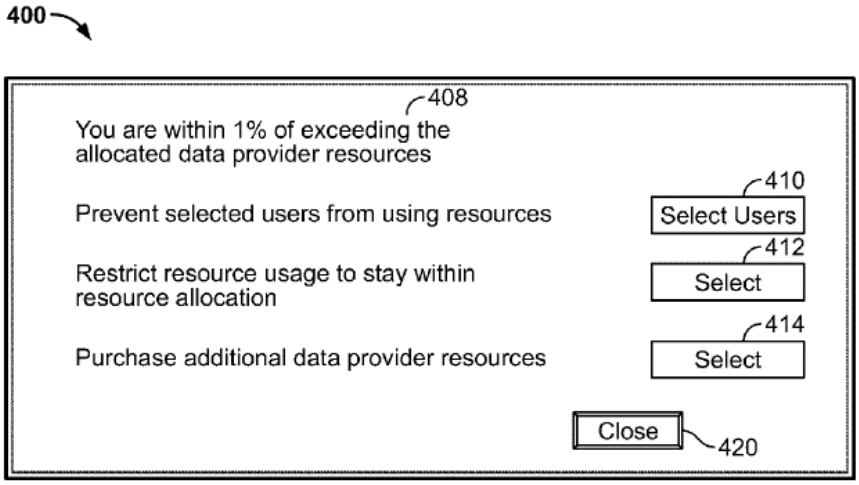


FIG. 4

Id., Fig. 4 (depicting screen 400).

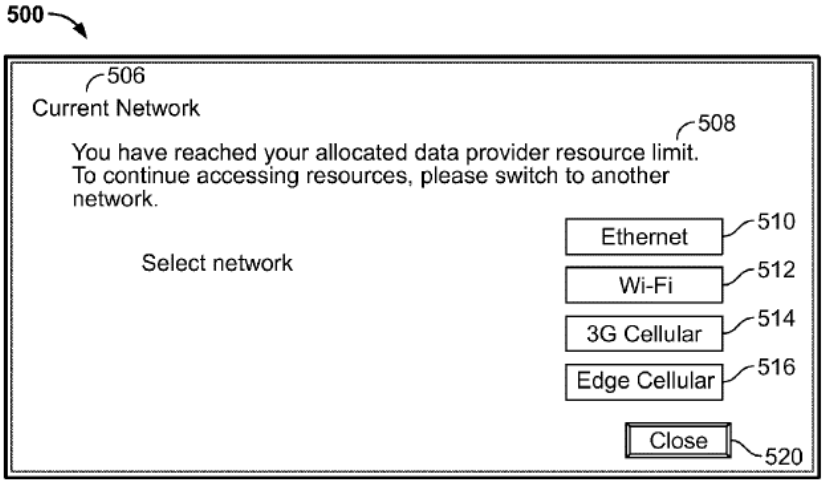


FIG. 5

Id., Fig. 5 (depicting screen 500).

57. Claim 119

a. "The non-transitory computer-readable storage medium recited in claim 118, wherein the notification provides information about the policy."

610. Rao-Fadell teaches this limitation. For example, Fadell's notifications provide information about the policy.

611. For example, Fadell teaches that a user may receive notice of "the amount (e.g., in absolute terms, relative to allocated amount, or combinations of these) of resources consumed for a tier subscription period," the expected consumption for a particular period, and/or expected penalties for data overages. Fadell ¶49. For example, screen 300 provides this information, as shown below in Figure 3. *Id.* ¶¶50-53, Fig. 3. Screen 300 also provides the "expected excess consumption or carry-over for the period (e.g., month)." *Id.* ¶50.

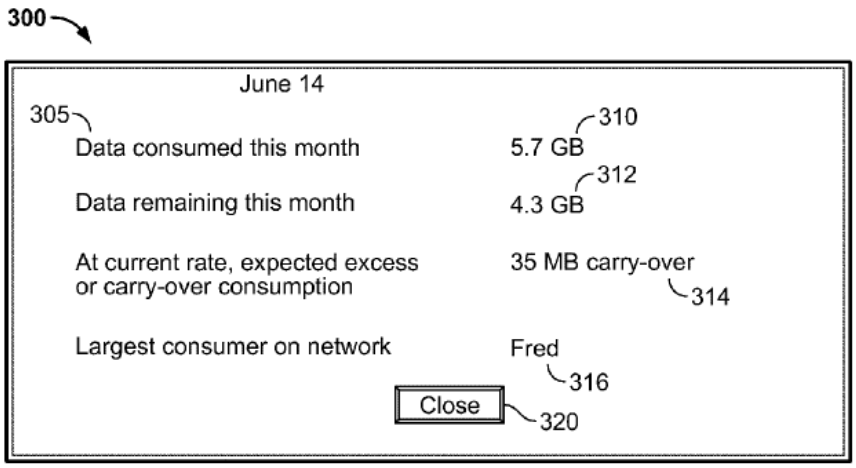


FIG. 3

Id., Fig. 3 (depicting screen 300).

612. Fadell also teaches screen 400 "indicating that the consumer has reached a limit in data provider resources." *Id.* ¶¶54-62, Fig. 4. Screen 400 notifies the consumer that the consumer is "within a predetermined range of the allocated data provider resource limit," where "[t]he predetermined range may be set by the consumer." *Id.* ¶54, Fig. 4.

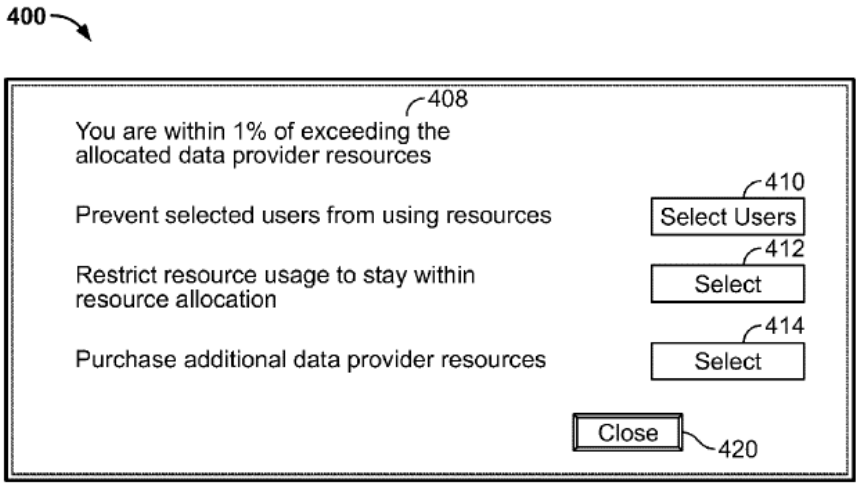


FIG. 4

Id., Fig. 4 (depicting screen 400).

613. A POSITA would have understood that Fadell's disclosure of notifications related to data consumed during a period, including screen 300 and screen 400, teaches a notification that provides information about the policy in the Rao-Fadell system. *See supra* Claim 1. For example, the policy in the combined system intercepts background network packets and defines a prioritization for the packets, and notifies the user when a resource usage threshold is reached. Fadell's

notifications provide information about, for example, the resource usage threshold set by the user within the policy.

614. A POSITA would have been motivated to cause Fadell's notification to provide information about the policy in the combined system in view of Fadell's examples and its suggestion to do so. *See, e.g.*, Fadell ¶49, Figs. 3-5. Doing so would have allowed the user to understand the policy that is being implemented, select how to proceed, and to better understand and control resource usage to prevent data overages and associated charges. *See id.* ¶¶49, 51, 52. This would have required no more than the exercise of routine skill for a POSITA to implement given both Rao's and Fadell's suggestion of a user interface, *see supra* Limitation [1e], and Fadell's disclosure of such notifications.

58. Claim 120

a. "The non-transitory computer-readable storage medium recited in claim 118, wherein the notification provides information about an option to set, control, override, or modify the at least an aspect of the policy or a second aspect of the policy."

615. Rao-Fadell teaches a notification that provides information about an option to set, control, override, or modify the at least an aspect of the policy or a second aspect of the policy for the reasons explained in connection with claims 92 and 93. *See supra* Claims 92, 93; *see also* Claims 115, 110.

59. Claim 121

a. "The non-transitory computer-readable storage medium recited in claim 118, wherein the notification indicates that the service usage activity is the background activity."

616. Rao-Fadell teaches this limitation.

617. Rao-Fadell teaches the notification indicating that the service usage activity is the background activity, for example, when the notification indicates an application that is associated with background activity. As Rao and Fadell disclose, the application may include background email updates, auto-update processes, virus program updates, and the like. Rao ¶¶179, 192; Fadell ¶¶60-61. By providing a notification associated with these applications in the Rao-Fadell, the user is made aware of the application and thus understands the application is background activity, either by virtue of knowledge of the application or the policy in the combined system.

618. It also would have been obvious to indicate in the notification of the combined system, such as Fadell's screen 300, 400, and/or 500, that network packets associated with the application are being intercepted, queued, and priorities because they are associated with background activity. A POSITA would have been motivated to indicate this in the notification because it would have informed the user of the actions being taken by the system and identified which applications are being prioritized by the policy. This would have given the user more information about the

system, the policy, and given the user greater control over how the policy is being implemented. For example, by notifying the user of background activity, the user is made aware of both the application activity and the policy and can, if they wish, take action to override the policy to, for example, allow certain background activity the user desires.

60. Claim 122

a. "The non-transitory computer-readable storage medium recited in claim 118, wherein the notification provides information about a second network."

619. Rao-Fadell teaches a notification that provides information about a second network for the reasons explained in connection with claim 103. *See supra* Claims 91, 103.

61. Claim 123

a. "The non-transitory computer-readable storage medium recited in claim 118, wherein, when executed by the one or more processors of the wireless end-user device, the machine-executable instructions further cause the one or more processors to obtain an indication of a user preference in response to the notification."

620. Rao-Fadell teaches machine-executable instructions that further cause the one or more processors to obtain an indication of a user preference in response to the notification reasons explained in connection with claim 105. *See supra* Claims 91, 105.

62. Claim 124

a. "The non-transitory computer-readable storage medium recited in claim 123, wherein the indication of the user preference comprises a user directive to associate the policy with the first software component."

621. Rao-Fadell teaches this limitation.

622. For example, Fadell teaches that screen 400 includes option 412 to restrict resource usage such that "data transfers may be restricted based on the protocol or ***application*** requesting the data transfer." Fadell ¶56, Fig. 4. Fadell teaches that "the consumer may limit requests for data based on the type of request" using screen 400 and option 412, including "limit[ing] data requests based on the data type of the request (e.g., as identified by a packet header or other metadata associated with the request), ***based on the application*** requesting the data (e.g., ***a media application such as iTunes or QuickTime)***, the protocol used for the transfer (e.g., BitTorrent), or any other suitable criteria." *Id.* ¶59.

623. A POSITA would have understood that, by receiving an indication to restrict resource usage based on a particular application via screen 400, Fadell teaches receiving an indication of a user preference that includes a user directive to associate the policy with the software component (e.g., the first software component). In the combined Rao-Fadell system, a POSITA would have applied Fadell's indication through screen 400 to restrict certain applications by applying the Rao-Fadell policy of intercepting, queuing, and defining a prioritization to

network packets associated with the selected application, in the same or similar manner as applied to background activity.

624. A POSITA would have been motivated to cause the notification of Fadell to obtain an indication of a user preference that directs the Rao-Fadell policy to a particular application in view of Fadell's examples and its suggestion to do so. *See, e.g.*, Fadell ¶¶49, 57-62, Fig. 4. Obtaining a preference from the user with a directive to apply a policy to a particular application by intercepting, queuing, and prioritizing its network packets would enable a user to control implementation of the policy in the combined system and target particular applications and enable the user to prevent data overages and associated charges. *See id.* ¶¶49, 51, 52. For example, a user may understand that particular applications may consume considerable resources and wish to restrict usage of that application when at a resource usage limit or threshold. *See id.* ¶53. This would have required no more than the exercise of routine skill for a POSITA to implement given both Rao's and Fadell's suggestion of a user interface, *see supra* Limitation [1e], Fadell's disclosure of such notification-based, user-selectable options, and the well-known nature of these concepts at the time of the alleged invention.

63. Claim 125

a. "The non-transitory computer-readable storage medium recited in claim 123, wherein the indication of the user preference comprises a user directive to restrict, allow, or block the service usage activity."

625. Rao-Fadell teaches obtaining an indication of a user preference in response to the notification that comprises a user directive to restrict, allow, or block the service usage activity for the reasons explained in connection with claim 107. *See supra* Claims 107, 105, 91.

64. Claim 126

a. "The non-transitory computer-readable storage medium recited in claim 123, wherein the indication of the user preference identifies a traffic control setting associated with the policy."

626. Rao-Fadell teaches obtaining an indication of a user preference in response to the notification that identifies a traffic control setting associated with the policy for the reasons explained in connection with claim 108. *See supra* Claims 108, 105, 91.

65. Claim 127

a. "The non-transitory computer-readable storage medium recited in claim 123, wherein the indication of the user preference comprises a user directive to override or modify the policy."

627. Rao-Fadell teaches obtaining an indication of a user preference in response to the notification that comprises a user directive to override or modify the

policy for the reasons explained in connection with claim 110. *See supra* Claims 110, 105, 91.

66. Claim 128

a. "The non-transitory computer-readable storage medium recited in claim 123, wherein the indication of the user preference comprises a user acknowledgment of the notification."

628. Rao-Fadell teaches obtaining an indication of a user preference in response to the notification that comprises a user acknowledgment of the notification for the reasons explained in connection with claim 94. *See supra* Claims 94, 91. There is no meaningful difference between an indication of a user preference that is a user acknowledgment of a notification (i.e., claim 128) and obtaining an indication of a user response to a notification (i.e., claim 94).

629. Alternatively, Rao-Fadell discloses this limitation for the reasons explained in connection with claims 123 and 105. *See supra* Claims 123, 105, 91. A POSITA would have understood that, by receiving a "user preference in response to [a] notification," the one or more processors receive a "user acknowledgement of the notification."

67. Claim 129

a. "The non-transitory computer-readable storage medium recited in claim 123, wherein the indication of the user preference indicates one or more network types."

630. Rao-Fadell teaches this limitation.

631. For example, as discussed in connection with claims 1 and 91, Fadell teaches screen 500 that "prompt[s] a user to switch networks." Fadell ¶¶63-70, Fig. 5; *see supra* Claims 1, 91. Fadell teaches that screen 500 may include options 510, 512, 514, and 516 to switch to Ethernet, Wi-Fi, a 3G cellular network 514, or an EDGE cellular network, respectively. Fadell ¶63, Fig. 5. The options given by Fadell, "may identify networks by unique identifiers, such as by name (e.g., so that several networks of the same type, such as Wi-Fi, may be available for selection)." *Id.* ¶63. Because the options identify networks by type, a POSITA would have understood that the selection of a particular option (an indication of the user preference) indicates a network type.

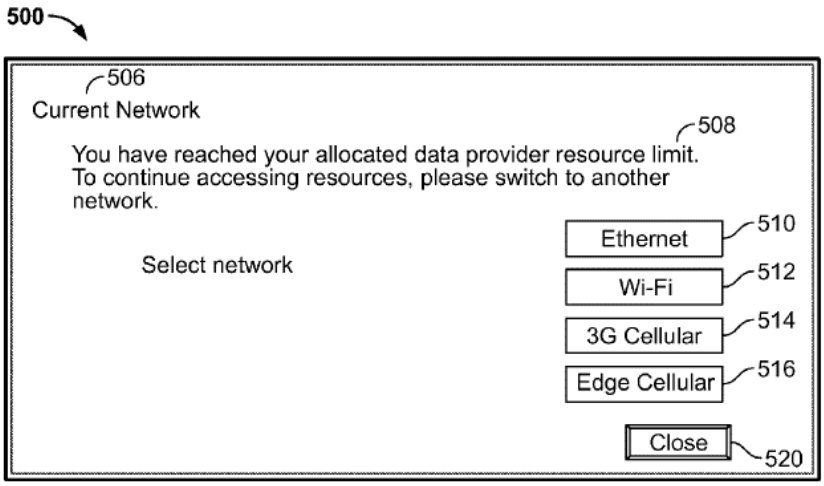


FIG. 5

Id., Fig. 5 (depicting screen 500).

632. For the reasons explained in connection with claims 103 and 122, a POSITA would have been motivated to incorporate this aspect of Fadell in the

combined system and would have had a reasonable expectation of success in doing so. *See supra* Claims 103, 122, 91, 118; *see also* Fadell, Fig. 5.

68. Claim 130

a. "The non-transitory computer-readable storage medium recited in claim 129, wherein the one or more network types comprise WiFi, 4G, 3G, wireless, wired, or a combination of these."

633. Rao-Fadell teaches obtaining an indication of a user preference in response to the notification that indicates one or more network types, wherein the one or more network types comprise WiFi, 3G, wireless, wired, and a combination of these for the reasons explained in connection with claims 103, 122, and 129. *See supra* Claims 103, 122, 129, 91, 118; *see also* Fadell, Fig. 5.

69. Claim 131

a. "The non-transitory computer-readable storage medium recited in claim 118, wherein cause a notification to be presented through a user interface of the wireless end-user device comprises cause the notification to be presented based on occurrence of a trigger."

634. Rao-Fadell teaches causing a notification to be presented through a user interface of the wireless end-user device based on occurrence of a trigger for the reasons explained in connection with claim 111. *See supra* Claims 111, 91.

70. Claim 132

a. "The non-transitory computer-readable storage medium recited in claim 131, wherein the trigger is: a measure of the service usage activity satisfies a first condition relative to a threshold, an aspect of the service usage activity satisfies a second condition, a change to the policy, or a message from the network element."

635. Rao-Fadell teaches causing a notification to be presented through a user interface of the wireless end-user device based on occurrence of a trigger that is a measure of the service usage activity satisfies a first condition relative to a threshold for the reasons explained in connection with claim 112. *See supra* Claims 112, 91.

71. Claim 133

a. "The non-transitory computer-readable storage medium recited in claim 118, wherein the notification enables a user associated with the wireless end-user device to obtain information about at least an aspect of the service usage activity or a service plan associated with the wireless end-user device."

636. Rao-Fadell teaches causing a notification to be presented that enables a user associated with the wireless end-user device to obtain information about at least an aspect of a service plan associated with the wireless end-user device for the reasons explained in connection with claim 113. *See supra* Claims 113, 91.

72. Claim 134

a. "The non-transitory computer-readable storage medium recited in claim 118, wherein the notification presents a list of service usage activities or software components, the list of service usage activities or software components including the service usage activity or the first software component."

637. Rao-Fadell teaches causing a notification to be presented that presents a list of software components, the list including the first software component for the reasons explained in connection with claim 114. *See supra* Claims 114, 91.

73. Claim 135

a. "The non-transitory computer-readable storage medium recited in claim 118, wherein the notification presents information about a setting associated with the policy."

638. Rao-Fadell teaches causing a notification to be presented that presents information about a setting associated with the policy for the reasons explained in connection with claim 108. *See supra* Claims 108, 105, 91; *see also supra* Claim 126. By providing options to the user to restrict data usage and/or purchase additional resources, Fadell's notification presents information about a setting associated with the policy. Fadell ¶¶56, 59-61, Fig. 4; *see* claim 8.

74. Claim 136

a. "The non-transitory computer-readable storage medium recited in claim 118, wherein the notification presents information about the wireless network."

639. Rao-Fadell teaches causing a notification to be presented that present information about the wireless network for the reasons explained in connection with claims 103 and 116. *See supra* Claims 103, 116, 91. For example, as shown in connection with claim 103, Fadell's screen 500 in Figure 5 presents information about the current wireless network, such as "notification 508 indicating to the user that the allocated data provider resource limit for the current network (identified by indication 506)." Fadell, Fig. 5, ¶63. Fadell likewise teaches that this screen may provide information about the resources of the network or option for purchasing additional data. *Id.* ¶¶ 63-65. Likewise, Fadell's screens 300 and 400 provide information about the wireless network, including data consumed, remaining, and indication of the user being "within 1% of exceeding" a data resource limit. *Id.* ¶¶50-62, Figs. 3, 4.

75. Claim 137

a. "The non-transitory computer-readable storage medium recited in claim 118, wherein the notification presents an indication of a measure of usage of the wireless network associated with the service usage activity."

640. Rao-Fadell teaches causing a notification to be presented that presents an indication of a measure of usage of the wireless network associated with the

service usage activity for the reasons explained in connection with claim 116. *See supra* Claims 116, 91.

76. Claim 138

a. "The non-transitory computer-readable storage medium recited in claim 118, wherein the notification presents information about a network busy state or a network availability state."

641. Rao-Fadell teaches causing a notification to be presented that presents information about a network availability state for the reasons explained in connection with claim 103. *See supra* Claims 103, 91. By presenting a notification that provides information about a second network (i.e., claim 103), the notification presents information about a network availability state (i.e., claim 138). Indeed, Fadell teaches screen 500 and "[i]n response to determining that the limit for the current network has been reached, the resource utilization component may identify ***other networks available*** to the consumer for which allocated data provider resources remain." Fadell ¶¶63-65, Fig. 5. For example, resource utilization component may "may identify a Wi-Fi or Ethernet network for which resources are ***available***," and "[s]creen 500 may include selectable options for each ***identified available network***." *Id.* ¶63, Fig. 5. Screen 500 may also "include ***any suitable information associated with*** each identified network, including for example the amount of ***resources available*** for each network." *Id.* ¶63; *see also id.* ¶¶63-65. This teaches information about a "network availability state," as discussed in claim 103.

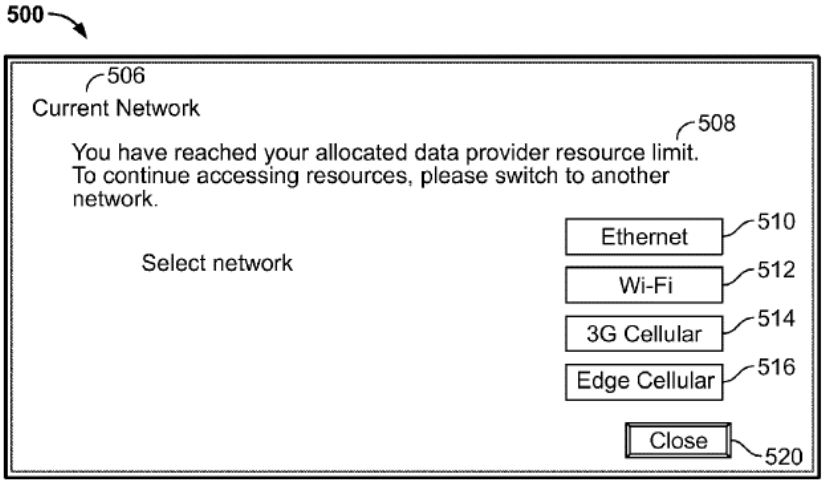


FIG. 5

Id., Fig. 5 (depicting screen 500).

642. Fadell's disclosure corresponds with the '541 patent, which teaches implementing its techniques and/or policies based on, for example, "availability state for alternative networks." EX-1001, 91:32-34; *see also id.*, 71:19-23 (describing a notification policy that includes a notification "that one or more networks are available (e.g., one or more alternative networks and/or network busy state information and/or charging information and/or incentives associated with such networks.").

77. Claim 140

a. "The non-transitory computer-readable storage medium recited in claim 118, wherein the notification presents information about a statistic associated with the service usage activity."

643. Rao-Fadell teaches this limitation. For example, each of Fadell's screens 300 and 400 presents "information about a statistic associated with the

service usage activity" by presenting information related to the service usage activity's contribution to a user's data limit for a given period.

644. For example, Fadell's screen 300 provides "a notice of data provider resources used" for a given period, including "notification 310 of the data consumed for the current period (e.g., current month) and notification 312 of the data remaining for the current period." Fadell ¶50, Fig. 3. Screen 300 may also include "an estimation of expected data usage for the remaining period and a comparison of the estimated usage with the allocated data provider resources," including "notification 314 of the expected excess consumption or carry-over for the period." *Id.* Each of these teaches a "notification present[ing] information about a statistic associated with the service usage activity," at least because the service usage activity contributes to the user's rate of consumption and to the determination of the largest consumer on the network, both of which, a POSITA would have understood, are statistics.

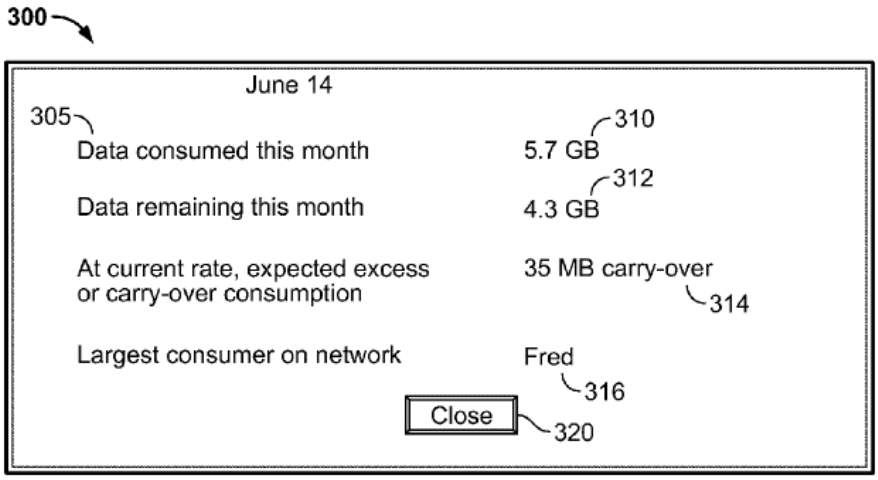


FIG. 3

Id., Fig. 3 (depicting screen 300).

645. Fadell's screen 400 indicates "the consumer has reached a limit in data provider resources." *Id.* ¶¶54-62, Fig. 4. Screen 400 includes an indication that the user is within a given percentage of exceeding the allocated data provider resources. *See id.* Fig. 4 (depicting notification 408 that states "You are within 1% of exceeding the allocated data provider resources").

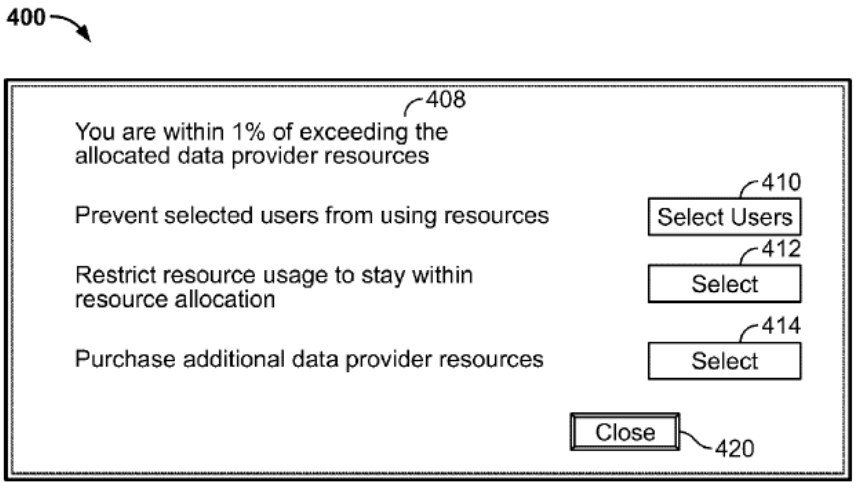


FIG. 4

300

Id. The user's remaining resources, a POSITA would have understood, are also a statistic associated with the service usage activity.

646. In the combined Rao-Fadell system, a POSITA would have been motivated to include Fadell's notifications, including screen 300 and 400, for the reasons discussed in claim 1, and these include information about a statistic associated with the service usage activity. *See supra* Claim 1.

647. In addition, Rao teaches that "the remote access client 120 may determine any other ***characteristics or statistics*** of the application 338*a*-338*n* such as size, memory usage, total execution time, and/or frequency of use." Rao ¶188. Rao also teaches that its policies may be "specified in accordance to . . . the ***size of the payload*** of the network packet." *Id.* ¶182. In the combined system, it would have been obvious to provide in Fadell's notification, for example screen 300 and/or 400, the determined characteristics or statistics of the application associated with a network packet and/or about the network packet itself. This may include the size, memory usage, total execution time, and/or frequency of use of the associated application, or size and data usage required by the network packet intercepted by the system. These "characteristics or statistics" each provide information about a statistic associated with the service usage activity. A POSITA would have been motivated to provide the additional information described in Rao via Fadell's notifications, including screen 300 and 400 based on Rao's teaching and suggestion

of measuring these statistics. *See id.* ¶¶182, 188. Doing so would have kept a user informed about applications associated with network packets, including their frequency of use, and about the size and data requirements of network packets before it is sent over the network. *See id.* This would have furthered Fadell's objectives of monitoring resource usage and preventing data overages. *See* Fadell ¶49.

648. In addition, it also would have been obvious to provide statistics about background activity that is initiated by incoming requests to the user device in Fadell's notifications. For example, Fadell teaches that "resource utilization component may be operative to log and quantify the number of unsolicited pings" to the user's device. *Id.* ¶66. Fadell explains that a measure of these requests is important "to ensure that data transfers not initiated or requested by the consumer are not included in the measured data provider metering," and thus not charged to the user. *Id.* A POSITA would have understood that common background pings include, among others, tests for network connectivity sent to the user's device and background pings for location data. Indicating to the user that a network packet, either sent in response to a ping or incoming from the ping, would have benefited the user for the reasons Fadell explains: preventing unwanted charges based on data requests the user did not initiate. *Id.* ¶66. It would also alert the user what background requests are ongoing that cause frequent pings for the user to monitor and if desired, terminate. Providing such information, including a count of pings or frequency of

the pings, would disclose providing information about a statistic associated with the service usage activity.

78. Claim 141

a. "The non-transitory computer-readable storage medium recited in claim 118, wherein the notification comprises a gauge providing service usage information associated with the service usage activity."

649. Rao-Fadell teaches this limitation.

650. As explained in connection with Claim 140, Rao-Fadell teaches that the notification presents information about a statistic associated with the service usage activity. *See supra* Claim 140. For example, as discussed above, Rao-Fadell teaches providing a notification of the user's rate of consumption, the determination of the largest consumer on the network, or "other characteristics or statistics" associated with the service usage activity to the user. *See id.*

651. In view of these disclosures, it would have been obvious to present this information as a "gauge." For example, Fadell describes presenting information as a percentage, stating "[y]ou are within 1% of exceeding the allocated data provider resources." Fadell, Fig. 4. As explained in connection with Claim 140, a POSITA would have been motivated to better inform the user regarding their network use, as suggested by Rao and Fadell. *See supra* claim 140.

652. To the extent it is argued that a "gauge" must be a graphical representation, Fadell's disclosures render this presentation obvious. As discussed

above, Fadell describes interfaces that provide current and/or historical service usage for the device. A POSITA would have recognized that whether to present the information suggested by Rao and Fadell as text or as a graphic is merely a design choice, and a POSITA would have been motivated to include a graphical representation for the same reasons a POSITA would have been motivated to provide a graphical representation of the information on e.g., screens 300, 400, and 500, or other statistics as discussed above. Providing the information Fadell recommends graphically (e.g., percentages of data remaining or "expected excess consumption or carry-over for the period (e.g., month)," *see, e.g.*, Fadell ¶50, Figs. 3-4) would be straightforward and yielded expected results.

79. Claim 142

a. "The non-transitory computer-readable storage medium recited in claim 118, wherein the notification comprises a gauge providing service usage information associated with one or more networks, the one or more networks including the wireless network."

653. Rao-Fadell teaches this limitation.

654. As discussed above, Rao-Fadell teaches the non-transitory computer-readable storage medium recited in claim 118. *See supra* Claim 118; *see also* supra Claims 140, 141. Rao-Fadell further teaches wherein the notification comprises a gauge providing service usage information associated with one or more networks, the one or more networks including the wireless network.

655. The '541 patent teaches that, "[i]n some embodiments, a UI fuel gauge is displayed (e.g., to depict current and/or historical network service usage, for example, ***relative to a service plan*** for the device, by network, relative to network busy state, time based criteria, and/or other criteria/measures)." EX-1001, 73:65-74:2. Consistent with this description, Rao-Fadell teaches this limitation for the reasons discussed in connection with claims 1 and 91. *See supra* Claims 1, 91.

656. For example, Fadell teaches screens 300, 400, and 500. Fadell ¶¶49-70, Figs. 3-5. For the reasons discuss in connection with claim 141, each of these screens provides a "gauge" providing service usage information associated with one or more networks, the one or more networks including the wireless network. *See supra* Claim 141.

657. A POSITA would have combined Fadell with Rao and would have been motivated to make the combination for the reasons discussed in connection with claims 1 and 91. *See supra* Claims 1, 91. A POSITA also would have been motivated to provide screens 300, 400, and 500, including their indications of service usage for a network, for the reasons explained by Fadell: "[t]o assist the consumer in avoiding excess fees or penalties." Fadell ¶51. Doing so would have enabled a user to monitor service usage in real-time, enable a user to understand his or her data usage, prevent inadvertent overages and unwanted fees, and provide the opportunity to change behaviors or processes when a limit or threshold is met.

658. Moreover, as discussed in claim 141, to the extent it is argued that a "gauge" must be a graphical representation, Fadell's disclosures render this presentation obvious. As discussed above, Fadell describes interfaces that provide current and/or historical network service usage relative to a service plan for the device for the network. For example, Fadell's Fig. 3 notifies the user regarding the balance between the "[d]ata consumed this month" and the "[d]ata remaining this month" under the user's particular service plan. *See Id.*, Fig. 3; *see also id.* Fig. 4 (notifying user "[y]ou are within 1% of exceeding" allocated resources under service plan). A POSITA would have recognized that the choice to present this information as text or as a graphic is merely a design choice, and a POSITA would have been motivated to include a graphical representation for the same reasons a POSITA would have been motivated to provide screens 300, 400, and 500, as discussed above.

80. Claim 143

a. "The non-transitory computer-readable storage medium recited in claim 118, wherein the notification comprises a gauge providing information associated with a service plan."

659. Rao-Fadell teaches causing a notification to be presented that presents a gauge providing information associated with a service plan for the reasons explained in connection with claim 142. *See supra* Claims 142, 118, 1. Fadell's screens 300, 400, and 500 are gauges that are associated with a network and a service

plan, and a POSITA would have been motivated to combine Rao and Fadell as claimed for the reasons discussed in connection with claim 142. *See supra* Claim 142.

81. Claim 144

a. "The non-transitory computer-readable storage medium recited in claim 118, wherein the notification is provided through an e-mail, a text message, a window, a setting, or a voice message."

660. Rao-Fadell teaches causing a notification to be presented through a window, and a POSITA would have been motivated to make the combination, for the reasons explained in connection with claim 117. *See supra* Claims 117, 91, 1.

82. Claim 145

a. "The non-transitory computer-readable storage medium recited in claim 118, wherein the notification comprises a warning or an alert."

661. Rao-Fadell teaches causing a notification to be presented that "comprises" a warning or an alert for the reasons the notification "provides" a warning or an alert, and a POSITA would have been motivated to make the combination, as explained in connection with claim 95. *See supra* Claims 95, 91, 1.

83. Claim 146

a. "The non-transitory computer-readable storage medium recited in claim 118, wherein the information from the network element is first information, and wherein the notification is based on second information from the network element."

662. Rao-Fadell teaches this limitation.

663. As discussed in connection with claim 1, a POSITA would have understood that in the combined system, Rao's gateway 340 teaches the "network element," and Rao-Fadell teaches determining at least an aspect of a policy based on information from the network element. *See supra* Limitation [1e]; *see also* Rao ¶183; *see also id.* ¶¶90-96, Fig. 1A. A POSITA would have understood the information from the network element used to determine at least an aspect of a policy, as discussed in claim 1, may be "first information."

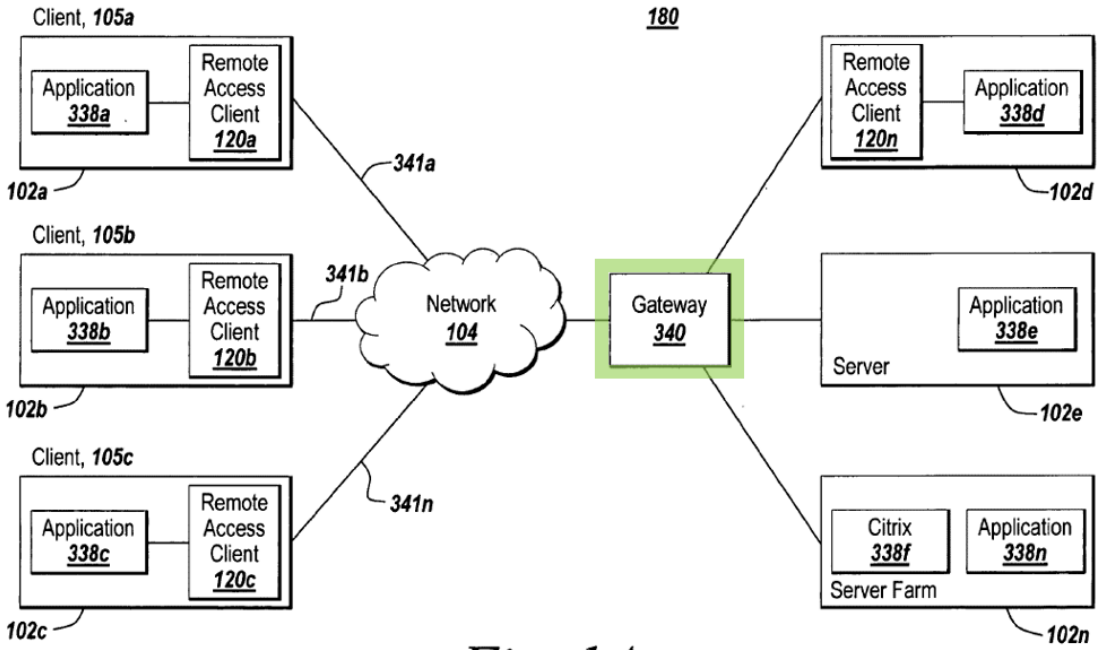


Fig. 1A

Id. at Fig. 1A (annotating gateway 340).

664. Further, as discussed in connection with, for example, Claims 1, 91, and 118, Rao-Fadell teaches the claimed notification. *See supra* Limitation [1g]; Claims 91, 118.

665. Fadell further teaches that the notification may be based on second information from the network element. For example, Fadell teaches that its notifications, include screen 300, which provides "data resource usage information":

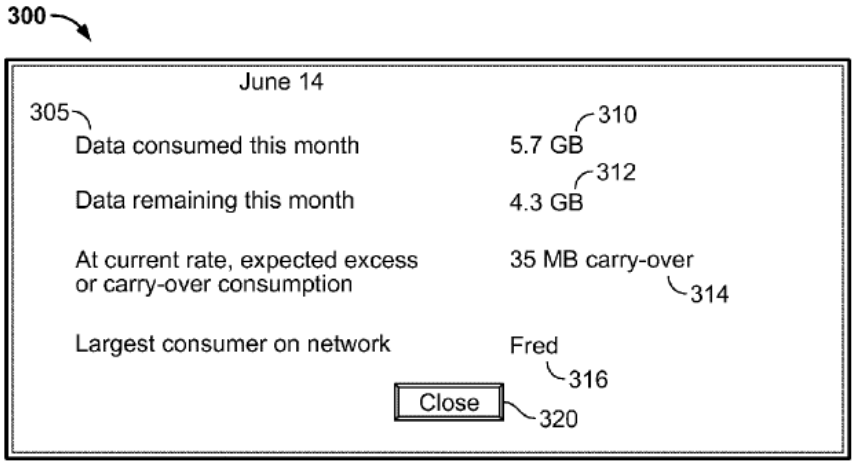


FIG. 3

Fadell ¶50, Fig. 3 (depicting screen 300). Fadell explains that screen 300 may include "any other information related to the consumption of data provider resources" and "may be generated and transmitted to the consumer by ***any suitable component***, ***including for example a router or network component downstream from the resource utilization component.***" *Id.* ¶50. A POSITA would have

recognized that this "information related to the consumption of data provider resources" discloses "second information."

666. A POSITA would further have recognized that this second information is from the network element. *See supra* Limitation [1e]. Rao teaches that its gateway 340 "may comprise any type and/or form of gateway, such as a remote access server." Rao ¶92. A POSITA would have understood that Rao's gateway 340 is a "network component downstream from the resource utilization component," and in view of Fadell's disclosures, in the combined Rao-Fadell system, a POSITA would have been motivated to implement Rao's gateway to provide the consumption information suggested by Fadell. A POSITA would have been motivated to implement Rao's gateway as the network element that provides both first information about the policy and a notification regarding data resource usage based on second information, as Fadell teaches and suggests. Fadell ¶50, Fig. 3. Doing so would have beneficially allowed the system to notify users of the network about resource usage to ensure they do not consume or request more data than allotted. Implementing Rao's gateway as suggested by Fadell would have been within a POSITA's skill and a mere design choice. Applying Fadell's teachings to Rao's gateway would have been nothing more than the combination of known elements according understood principles to yield predictable results.

84. Claim 147

a. "The non-transitory computer-readable storage medium recited in claim 118, wherein the notification comprises information about a cost or a charge associated with the service usage activity."

667. Rao-Fadell teaches this limitation.

668. Rao-Fadell teaches the non-transitory computer-readable medium that causes a notification to be presented, as described above in claim 118. *See supra* Claim 118.

669. Rao-Fadell further teaches that the notification provides information about a cost or a charge associated with the service usage activity.

670. For example, Fadell teaches that the notification "may include option 414 for purchasing additional data provider resources." Fadell ¶¶57, 63. Fadell teaches that "in response to receiving a selection of option 414, the data provider may receive authorization to charge for additional resources. The authorization information may be provided using any suitable approach, for example by receiving credit card or bank account information, a personal pin or passcode associated with the consumer's account (e.g., to authorize an additional purchase on the consumer's account with the data provider), or any other suitable type of authorization information." *Id.*

671. A POSITA would have understood that this option for purchasing additional resources is information about a cost or a charge associated with the

service usage activity, especially since the data provider receives authorization to charge for additional resources for the service usage activity to continue. A POSITA would have understood that an authorization charge would include information related to costs. To the extent that this limitation, and claim 118, requires a quantitative notification of the cost or charge of the service usage, it would have been obvious in light of the Rao-Fadell teachings to inform a customer of the cost of additional data as part of the process of selling the customer additional data capacity. A POSITA would have been motivated to include such information in the notification in order to allow the user to purchase additional resources with a full understanding of the costs. *See, e.g.*, *id.* ¶¶57-61.

672. In the combined Rao-Fadell system, a POSITA would have been motivated and found it obvious to apply Fadell's teachings to continue to enable users to control their resource usage and understand the potential cost of continuing usage after a threshold is reached. This would have required no more than the exercise of routine skill for a POSITA, who would have understood how to present notifications and offer the user options as expressly suggested by Fadell.

85. Claim 148

a. "The non-transitory computer-readable storage medium recited in claim 118, wherein the notification comprises information about a service sponsor."

673. Rao-Fadell teaches this limitation.

674. Fadell teaches a notification that gives the user an option to change to a different type of network, in which "the displayed options may identify networks by unique identifiers, such as by name (e.g., so that several networks of the same type, such as Wi-Fi, may be available for selection)." Fadell ¶63.

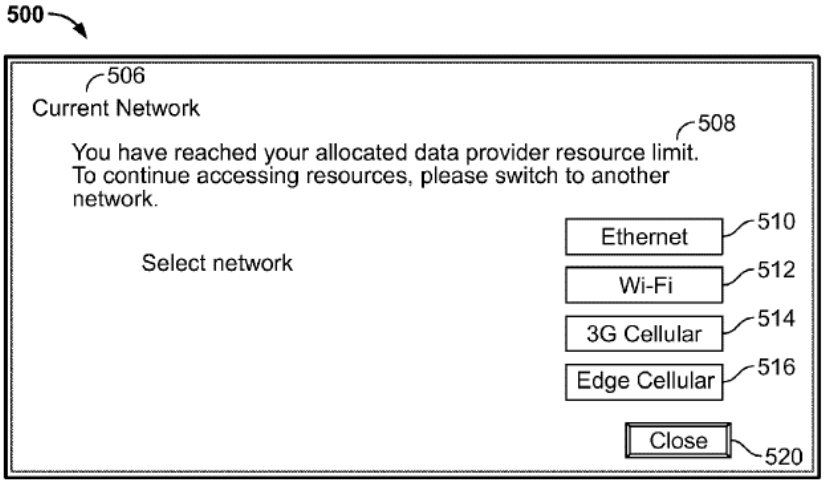


FIG. 5

Id., Fig. 5 (depicting screen 500).

675. A POSITA would have understood that at the time of the alleged invention that free, paid, and sponsored network access was common. Network access might be sponsored, for example in exchange for viewing an ad, the user might receive free or reduced-cost network access. *See, e.g.*, EX-1013. Network access might also be contingent on, for example, the user paying the service sponsor for access to a network, such as a secure Wi-Fi network at a place of business, airport, or the like. EX-1012.

676. Fadell teaches including multiple networks of the same type (e.g., Wi-Fi networks or cellular networks) in the notification to the user, *see, e.g.*, Fadell ¶63, and a POSITA would have understood the benefit of including information about the nature various networks (whether free, paid, or sponsored by a service sponsor) in the notification (e.g., using Fadell's unique network identifiers) to allow the user to make an informed choice, particularly when multiple Wi-Fi networks are available. Fadell also teaches that a user may have to pay for resources on a network. *See id.* ¶¶53 (user providing "credit card information"), 57 (same). Accordingly, where a network offers sponsored access, a POSITA would have included information about the service sponsor (e.g., the sponsor's name or the cost charged by the sponsor) as part of the "unique identifier" suggested by Fadell.

677. Alternatively, Fadell's "network administrator" teaches this limitation. *Id.* ¶¶67-70. Fadell teaches that the network administrator may "allocate a particular amount of data provider resources to each user of the network," and "may monitor the consumption and provide reports, notices, reminders and alerts to each of the devices or users within the network." *Id.* ¶¶67-69. A POSITA would have understood that Fadell's network administrator is an exemplary "service sponsor." For example, in the case of the network administrator who is the administrator of an employee network, such as a local area network or Wi-Fi network, the network administrator would pay a data provider for data and control use of the data on the

network. A network administrator would therefore pay the bill for data instead of the end-user, as contemplated by the description of a "sponsored service provider" in the '541 patent. EX-1001, 78:63-79:8, 80:48-62.

678. Fadell teaches that the network administrator may include information in a notification to the user or consumer in several ways. For example, Fadell teaches that "[s]creen 300 may instead or in addition include ***any other information related to the consumption of data provider resources***, such as, for example, percentages of resources consumed or remaining, instructions to cut back on resource use (e.g., ***a personal message from a network administrator to the consumer***)." Fadell ¶50; *see also id.* ¶69 ("provid[ing] a message indicating that the user has reached his allocated resource limit.") A POSITA would have understood that, by screen 300 providing a personal message from the network administrator to cut back on resource use, Fadell teaches a notification that includes information "about a service sponsor." That information includes the network administrator's desire for consumer to reduce data usage.

679. Fadell also teaches that "network administrator may allow the user or device to exceed the allocated resources in exchange for an additional charge (e.g., a payment or penalty)," for example "in exchange for an agreement to pay a predetermined penalty or the penalty given by the data provider (e.g., ***in response to the user selecting an option agreeing to the penalty***)." *Id.* ¶70. A POSITA would

have understood this also to be a notification from a service sponsor, for example, through screen 400. *Id.* ¶57, Fig. 4. The notification includes information about the network administrator's policy for charging the consumer for additional data and about who the customer would be paying, which are both "information about a service sponsor."

680. A POSITA would have combined Fadell's network administrator and its notifications into the combined Rao-Fadell system to alert users of a network administrator's directives to control data usage and permit reminders and overage/penalty payments. This also would have provided reminders about data use limits to users to prevent overages and related charges. A POSITA would have been motivated to implement Fadell's network administrator and its notifications for the reason Fadell explains: to allocate resources to different devices within the network and therefore maximize use of available data while reducing overages. Fadell ¶¶67-70.

86. Claim 149

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein, when executed by the one or more processors of the wireless end-user device, the machine-executable instructions further cause the one or more processors to: detect an attempted use of the first software component; and based on the detected attempted use of the first software component, cause a notification to be presented through a user interface of the wireless end-user device."

681. Claim 149 introduces machine-executable instructions that "further cause" certain actions to be performed after the steps of claim 1. Rao-Fadell teaches these additional steps.

682. As discussed, in the combined Rao-Fadell system, when a resource usage limit or threshold is met, background network packets are intercepted, queued, and assigned a priority, as taught by Rao, and the user is provided a notification, as taught by Fadell. *See, e.g.*, *supra* Limitation [1g]. The notification, as taught by Fadell, may provide the user with multiple "selectable options." *See, e.g.*, *supra* Limitation [1g]; *see also, e.g.*, Fadell, Figs. 3-5.

683. It would have been obvious to a POSITA to ***continue*** to present those options to a user even after the first application of the policy. For example, if a data limit is reached and background email update (e.g., a service usage activity) performed by an email client (e.g., a first software component) was deprioritized, and the email client later attempted to update or retrieve email, it would have been

obvious to a POSITA to implement the combined system to monitor that attempted use of the email client and again cause a notification to be presented through the user interface to allow the user to determine how to proceed. This teaches detecting an attempted use of the first software component and causing a notification to be presented through a user interface of the wireless end-user device, as claimed.

684. Combining Rao and Fadell in this manner would have been obvious in view of Fadell's teachings. Indeed, detecting attempted uses and causing another notification would have been obvious based on Fadell's notifications and options for determining how to proceed near a limit or threshold. For example, Fadell teaches several notifications that are presented through a user interface to allow a user to determine how to proceed when a resource usage limit or threshold approaches or is reached. For example, Fadell teaches that one such notification (screen 400) provides "selectable options for several actions that the consumer may take in response to being informed that the consumer is within the predetermined range of the allocated resource limit." *Id.* ¶49.

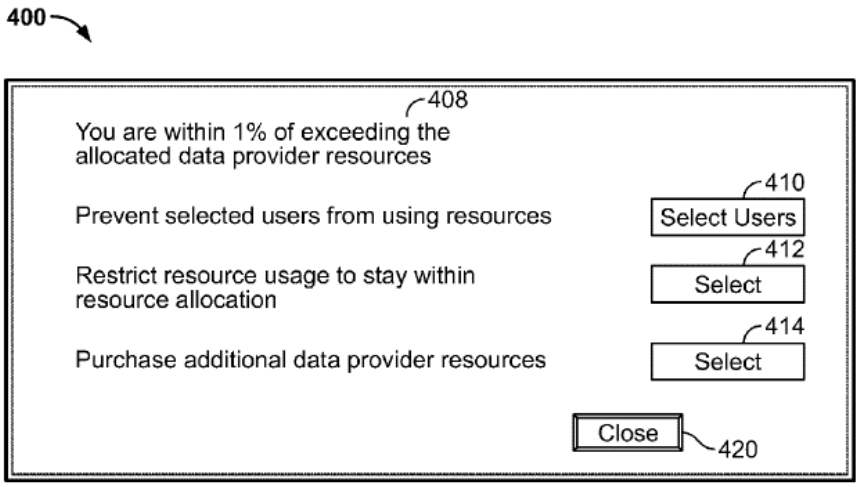


FIG. 4

Id., Fig. 4 (depicting screen 400).

685. Screen 400, as Fadell teaches, allows the user to restrict resource usage:

> [i]n response to receiving a selection of option 412, the electronic devices within the consumer's network, the network element downstream of the resource utilization component, or the resource utilization component may restrict the amount of resources used. For example, the types of data transmitted over the network may be limited to eliminate or reduce data transfers of large file types (e.g., media files). As another example, data transfers may be restricted based on the protocol or application requesting the data transfer.

Id. ¶56. Fadell explains that, when the user opts to restrict his or her resource usage, "the resource utilization component may automatically prevent all data transfers that would exceed the resources allocated to the consumer in response to determining that the data resource allocation limit has been met." *Id.* ¶52.

686. A POSITA would have recognized that, in order to restrict data transfers based on the "protocol[s] or application[s] requesting the data transfer[s]"

(e.g., based on the software component), Fadell's system must detect attempted uses of those software components. A POSITA would further have recognized the benefits of causing a notification to be presented when an attempted use is detected even after implementation of the policy to the service usage activity in the combined system. Fadell emphasizes the benefits of providing users with notices regarding the data consumption limits applicable to their devices. For example, Fadell teaches that a user may receive a notice of "the amount (e.g., in absolute terms, relative to allocated amount, or combinations of these) of resources consumed for a tier subscription period," the expected consumption for a particular period, and/or the expected penalties for data overages. Fadell ¶49; *see also id.* ¶50, 54-55, 63, Figs. 3-5. It would have been obvious to cause another notification on detection of an attempted use to inform the user of such. A POSITA would have recognized the benefits of reminding (notifying) the user of the data restriction and allowing the user to choose how to proceed, as Fadell suggests, especially because Fadell specifically teaches, for example, allowing the user to reschedule tasks or purchase "additional data provider resources," e.g., using "option 414," which may be done repeatedly at different times. *See, e.g.*, *id.* ¶¶57-61.

687. In the combined Rao-Fadell system, a POSITA would have been motivated and found it obvious to apply these teachings of Fadell to continue to enable users to better control their resource usage and stay within/below resource

usage limits or thresholds after the initial policy-based restrictions are imposed. For example, having opted to restrict use of a particular application in response to an initial alert, a user seeking to use that application later would be aware of the restriction and would, on receiving the notification at their attempted use, have the opportunity to choose, as Fadell teaches, to instead have the combined system reschedule, cancel, delay, slow down, enable, disable, and/or switch to other networks to run processes of "lesser importance," overriding the prior impact of Rao's prioritization policy. This would have required no more than the exercise of routine skill for a POSITA, who would have understood how to present notifications and offer the user options as expressly suggested by Fadell.

87. Claim 150

a. "The non-transitory computer-readable storage medium recited in claim 149, wherein the notification provides information to enable a user associated with the wireless end-user device to override the policy."

688. As described above for claim 149, Rao-Fadell teaches a notification that provides information to enable a user associated with the wireless end-user device to override the policy. *See supra* Claim 149.

689. Rao-Fadell teaches causing a notification to be presented through a user interface of the wireless end-user device when the user attempts to user the first software component to allow the user to override their earlier application of the policy, for example, by opting to "exceed the allocated resources" or by purchasing

additional resources to allow a restricted application to operate. *See supra* Claim 149; *see also, e.g.*, Fadell ¶¶53 ("the alert may instead or in addition include an option for allowing the consumer to exceed the allocated resources"), 57 ("option 414 for purchasing additional data provider resources."). One of ordinary skill would recognize that the ability to purchase additional resources allows a user to override a previous resource limit, as the '541 patent confirms." EX-1001, 109:10-14 (describing "policy overrides" for payment).

690. A POSITA would have been motivated to include this option in the combined Rao-Fadell system at least for the reasons discussed in connection with claim 149. *See supra* Claim 149.

88. Claim 151

a. "The non-transitory computer-readable medium recited in claim 149, wherein the notification provides information about a cost or a charge associated with the service usage activity."

691. Rao-Fadell teaches this limitation.

692. Rao-Fadell teaches the non-transitory computer-readable medium of claim 149. *See supra* Claim 149.

693. Rao-Fadell further teaches that the notification provides information about a cost or a charge associated with the service usage activity.

694. As described above in claim 149, Rao-Fadell teaches notifications related to an attempt to use an application, *see supra* Claim 149, and may include information related to a cost or charge associated with using an application.

695. For example, Fadell teaches that the screen, which displays a notification that an allocated resource limit has been reached, "may include option 414 for purchasing additional data provider resources." Fadell ¶¶57, 63. Fadell teaches that "in response to receiving a selection of option 414, the data provider may receive authorization to charge for additional resources. The authorization information may be provided using any suitable approach, for example by receiving credit card or bank account information, a personal pin or passcode associated with the consumer's account (e.g., to authorize an additional purchase on the consumer's account with the data provider), or any other suitable type of authorization information." *Id.*

696. A POSITA would have understood that this option for purchasing additional resources would include information related to cost and charge, especially since the data provider receives authorization to charge for additional resources. A POSITA would have understood that an authorization charge would include information related to costs. As described in connection with claims 147 and 149, a POSITA would have been motivated to include such information in the notification

in order to allowing the user to purchase additional resources, *see supra* Claims 147, 149, with a full understanding of the costs. *See, e.g.*, Fadell ¶¶57-61.

89. Claim 152

a. "The non-transitory computer-readable storage medium recited in claim 149, wherein the notification provides information to enable a user associated with the wireless end-user device to change or upgrade a service plan associated with the wireless end-user device."

697. Rao-Fadell teaches this limitation.

698. As explained, Rao-Fadell teaches the non-transitory computer-readable storage medium recited in claim 149. *See supra* Claim 149. As discussed in connection with claim 149, in view of the teachings of Rao and Fadell, a POSITA would have recognized the benefits of causing a notification to be presented through a user interface of the wireless end-user device when an attempted use of the software component is detected, and further would have been motivated to provide the user an opportunity to choose to override the prioritization policy using the notification. *See supra* Claims 149, 150.

699. Fadell expressly teaches notifications that provide information to enable a user associated with the wireless end-user device to change or update a service plan associated with the wireless end-user device. For example, Fadell teaches that the notification can provide an "option 414 for purchasing additional data provider resources." Fadell ¶57.

700. For the reasons explained in connection with claims 149 and 150, a POSITA would have been motivated to include option 414 in the notification, and doing so would have been merely a routine exercise of ordinary skill. *See supra* Claims 104, 149, 150.

90. Claim 153

a. [153a] "The non-transitory computer-readable storage medium recited in claim 1, wherein the at least an aspect of a policy is based on the user input obtained through the user interface of the wireless end-user device, and"

701. As discussed above, Rao-Fadell teaches that the at least an aspect of a policy is based on the user input obtained through the user interface of the wireless end-user device for the reasons explained above in claim 1. *See supra* Limitation [1e].

b. [153b] "wherein the user input specifies a user preference associated with one or more network types."

702. Rao-Fadell teaches this limitation.

703. As discussed above, Rao-Fadell teaches that the at least an aspect of the policy is based on the user input obtained through the user interface of the wireless end-user device. *See supra* Limitation [1e].

704. Additionally, based on Rao-Fadell's disclosures, a POSITA would have been motivated and found it obvious to modify Rao-Fadell's prioritization and notification policy in the combined Rao-Fadell system to ensure that they applied in

a network-dependent manner according to the user's preference. *See supra* Claim 31.

705. Fadell teaches that a user's screen "may include Ethernet option 510, Wi- Fi option 512, 3G cellular network option 514 and EDGE cellular network option 516" and that "the displayed options may identify networks by unique identifiers, such as by name (e.g., so that several networks of the same type, such as Wi-Fi, may be available for selection)." Fadell ¶63; *see also id.* Fig. 5. The user's screen may also include "any suitable information associated with each identified network, including for example the amount of resources available for each network, the penalty for exceeding the resources on each network, or any other suitable information related to particular network." *Id.* ¶63. A POSITA would have understood that a user's selection of a network type is based on that user's preference for the selected network type.

706. A POSITA would have been further motivated and found it obvious to ensure that a user input specifying a user preference associated with one or more network types (e.g., ethernet network, 3G or other cellular network, EDGE network, Wi-Fi network), *see id.* ¶¶19, 44, 62, 63, 64, Fig. 5, could inform the network-dependent prioritization and notification policy of the Rao-Fadell system. Ensuring that the combined system could account for user inputs specifying a user preference associated with one or more network types would permit a user to better optimize

his or her use of network resources within available limits. That a POSITA could reasonably achieve this goal is supported by Fadell's presentation of a resource utilization component capable of receiving user selections of network types and automatically acting in response to those selections. *See id.* ¶¶63-64, Fig. 5.

91. Claim 154

a. "The non-transitory computer-readable storage medium recited in claim 153, wherein the one or more network types comprise wireless fidelity (WiFi), home, roaming, 4G, 3G, wireless, wired, or a combination of these."

707. Rao-Fadell teaches this limitation.

708. As described above in claim 153, limitation [153a], the network options displayed to the user "may include Ethernet option 510, Wi- Fi option 512, 3G cellular network option 514 and EDGE cellular network option 516" and "may identify networks by unique identifiers, such as by name (e.g., so that several networks of the same type, such as Wi-Fi, may be available for selection)." Fadell ¶63; *see supra* Claim 153. Fadell further teaches that, in certain embodiments, a data provider may impose "different [resource] limits based on the particular network used." Fadell ¶62. And, "the consumer may have a large resource limit associated with [a] Wi-Fi connection, and no resource limit associated with [a] cellular connection." *Id.*

709. As discussed above, in the combined Rao-Fadell system, a POSITA would have been motivated and found it obvious to modify Rao-Fadell's prioritization and notification policy to ensure that the network-dependent policy of the combined system accounted for at least the resource usage limits of ethernet networks, 3G and other cellular networks, EDGE networks, and Wi-Fi networks, as Fadell teaches, *see id.* ¶¶19, 44, 62, 64, Fig. 5, to ensure that users could optimize their use of network resources within available limits. For instance, a POSITA would have sought and found it obvious to ensure that the combined system (1) prioritized network packets associated with background activities in a more restrictive manner and notified a user earlier to avoid exceeding a low(er) resource usage limit associated with a first network, and (2) prioritized network packets associated with background activities in a less restrictive manner and notified a user later to avoid exceeding a high(er) resource usage limit associated with a second network. Indeed, Fadell itself teaches this differential application of policies by noting that certain background tasks (e.g., "receiving email") may be reserved for certain types of networks. *See, e.g.*, *id.* ¶¶19, 64.

92. Claim 155

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein the user input obtained through the user interface of the wireless end-user device is a first user input, and wherein the policy is a first policy, and wherein the first user input or a second user input comprises a directive to apply a second policy to a second software component of the plurality of software components on the wireless end-user device."

710. Rao-Fadell teaches this limitation.

711. Rao-Fadell teaches the non-transitory computer-readable storage medium recited in claim 1. *See supra* Claim 1.

712. Further, as described above in claim 1, Rao-Fadell teaches user input obtained through the user interface of the wireless end-user device and teaches a policy. *See supra* Limitations [1e]-[1g]. A POSITA would have recognized that the user input and policy may be a first user input and a first policy, respectively.

713. For example, as discussed above, Fadell teaches that "the consumer may define the range (e.g., by providing a suitable input)" of the allocated data processor resources (e.g., a first user input) via a user interface. Fadell ¶51. As discussed above, in the combined Rao-Fadell system, a POSITA would have been motivated and found it obvious to include this limitation. *See supra* Limitation [1e].

714. As described above, the combined Rao-Fadell system would apply a first policy (e.g., monitor resource usage limits), and when a resource usage

threshold is met, the system would intercept and define a prioritization to network packets associated with background activity, alert the user of a resource usage threshold via one of Fadell's screens 300-500, and assign a lower priority to queued background-activity packets. *See supra* Limitation [1g].

715. Rao-Fadell further describes wherein the first user input or a second user input comprises a directive to apply a second policy to a second software component of the plurality of software components on the wireless end-user device.

716. For example, Fadell teaches that the user "may change the properties of the data being downloaded, such as by changing the display size of a media file to be displayed or by switching from a more resource intensive Codec to a less resource intensive Codec for playing back the media." Fadell ¶53. A POSITA would have understood that because the user is "changing" aspects of the system, the user is providing input, and would have further understood that the input comprises a directive because the user is causing the application (e.g., a second software component) to operate differently. This different operation, a POSITA would have understood, constitutes a second policy, e.g., using a changed display resolution to

download a media file when the device nears a resource threshold. *Id.*; *see also id.* ¶59.[6]

717. In the combined Rao-Fadell system, a POSITA would have been motivated and found it obvious to implement the option for the first user input or a second user input to comprise a directive to apply a second policy to a second software component of the plurality of software components on the wireless end-user device, as described by Fadell. A POSITA would have recognized that allowing the user to set additional policies to control resource use would have beneficially given the user greater control over the user's resources. For example, as the user neared the resource threshold, the user would have the option to not only deprioritize lower priority network packets (e.g., from background activity) but also change the display size of a media file downloaded in the foreground, allowing the user to conserve additional resources. *See supra* Limitation [1g]; Fadell ¶¶53, 59. Fadell specifically teaches these additional options, confirming that a POSITA would have been able to implement these concepts with likely success.

[6] As discussed in connection with, e.g., Claim 90, the decision whether to implement logical criteria as a part of a first policy or as a second policy would have been a simple design choice and one of two possible approaches for which a POSITA would have had a reasonable expectation of success. *See supra* Claim 90.

93. Claim 156

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein the user input obtained through the user interface of the wireless end-user device is a first user input, and wherein the first user input or a second user input comprises a directive to refrain from applying the policy to a second software component of the plurality of software components on the wireless end-user device."

718. Rao-Fadell teaches this limitation.

719. Rao-Fadell teaches the non-transitory computer-readable storage medium recited in claim 1. *See supra* Claim 1.

720. Further, as described above in claim 1, Rao-Fadell teaches user input obtained through the user interface of the wireless end-user device and teaches a policy. *See supra* Limitations [1e]-[1g]. A POSITA would have recognized that the user input and policy may be a first user input and a first policy, respectively.

721. Rao-Fadell further teaches wherein the first user input or a second user input comprises a directive to refrain from applying the policy to a second software component of the plurality of software components on the wireless end-user device.

722. For example, Fadell teaches that its alert may "include an option for the consumer to exceed the allocated resources," including "an option permitting the resource utilization component to transmit or receive data in excess of the resources allocated to the consumer." Fadell ¶53. In one embodiment, Fadell teaches screen 400, which "include[s] selectable options for several actions that the consumer may

take in response to being informed that the consumer is within the predetermined range of the allocated resource limit." *Id.* ¶¶54-62, Fig. 4. Fadell teaches that screen 400 may provide "a listing of users or devices" and "an option for ***allowing*** particular users or devices to access data provider resources." *Id.* ¶55. Fadell also teaches that screen 400 may include "option 414 for ***purchasing*** additional data provider resources." *Id.* ¶57. Fadell further teaches that screen 400 may allow a user to "prevent the download of media data, but ***allow or permit*** the download of web pages or other non-media intensive transfers." *Id.* ¶59. Fadell specifically teaches that options to control resource usage may be exercised on an application-by-application basis, *see, e.g.*, *id.*, and a POSITA would have recognized the benefit of allowing the user to elect to exceed the threshold for particular identified applications. Doing so would have provided the user increased flexibility and is specifically suggested by Fadell. *Id.*

723. A POSITA would have understood that Fadell's options to allow particular users or devices to continue using data, options to purchase additional data, and options to allow or permit certain applications, teaches a second user input that comprises a directive to refrain from applying the policy to a second software component of the plurality of software components on the wireless end-user device. For example, by opting to allow an application to continue using data, the user is providing a second user input (by choosing that option), and as a POSITA would

have understood, that input directs the system to override the policy as it relates to that application (e.g., the second software component).

724. A POSITA would have implemented Fadell in the combined system such that on receiving the notification that the threshold approached, the user could opt to override the policy for particular applications in view of Fadell's examples and its suggestion to do so. *See, e.g.*, Fadell ¶ 59, Fig. 4. A POSITA would have been motivated to implement these options in the Rao-Fadell system because it would have provided users greater control of resource usage and given users options for implementing the policy in the combined system. Implementing these features would have required no more than the exercise of routine skill for a POSITA to implement given Fadell's disclosure of such notifications and policy control, and the well-known nature of these concepts at the time of the alleged invention.

94. Claim 158

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein the user input obtained through the user interface of the wireless end-user device specifies a user preference associated with the service usage activity or the first software component."

725. As discussed above, Rao-Fadell teaches that the at least an aspect of a policy is based on the user input obtained through the user interface of the wireless end-user device for the reasons explained above in claim 1. *See supra* Limitation [1e] (explaining that Rao discloses user's configuring policies 520 using a user

interface of the end-user device). For example, Rao teaches that policies 520 "may be configurable ***by a user*** by any suitable means and/or mechanism." Rao ¶183. In one embodiment, "agent 326 may provide a configuration mechanism such as ***a user interface, graphical or otherwise, design[ed] and constructed for configuring or specifying the policies 520***." *Id.* Rao teaches that agent 326 is part of the wireless end-user device. *See supra* Limitation [1a]. The user input on the user interface specifies a user preference that is associated with the service usage activity because the input defines how the user prefers to prioritize network packets (the service usage activity). The user preference may specify active applications are processed ahead of background applications. Rao ¶3; Fadell ¶60, Fig. 4.

726. Alternatively, Rao-Fadell also teaches that the user input specifies a user preference associated with the service usage activity or the first software component for the reasons explained above in, e.g. claims 107 and 109. *See supra* Claims 107, 109.

727. A POSITA would have understood that an indication of user preference, as recited by Claims 107 and 109, is user input obtained through the user interface of the wireless end-user device. *Id.*

728. A POSITA would have further understood that an indication of user preference that comprises a user directive to allow or block the service usage activity (Claim 107) or an indication of user preference that comprises a user directive to

allow the service usage activity under a specific condition (Claim 109) is each a user preference associated with the service usage activity that is specified by the user input. *Id.*

95. Claim 159

a. "The non-transitory computer-readable storage medium recited in claim 158, wherein the user preference comprises a preference to restrict, allow, block, delay, or throttle the service usage activity."

729. For the reasons explained in connection with claims 107, 108, 109, 110, and 158, Rao-Fadell teaches that the user preference comprises a preference to restrict, allow, block, delay, or throttle the service usage activity. *See supra* Claims 107, 108, 109, 110, 158.

730. Rao-Fadell teaches the non-transitory computer-readable storage medium recited in claim 158. *See supra* Claim 158.

731. Rao-Fadell's intercepting, queueing, and assigning a priority to network packets associated with background activity restricts network packets (e.g., first service usage activity) until higher priority packets have been processed.

732. Alternatively, as explained in connection with claim 107, Rao-Fadell teaches indicating a user preference that comprises a user directive to allow or block the service usage activity. *See supra* Claim 107. A POSITA would understand that Rao-Fadell's disclosure of indicating a particular user preference teaches that user preference for the same reasons.

96. Claim 160

a. [160a] "The non-transitory computer-readable storage medium recited in claim 1, wherein the service usage activity is a first service usage activity, and wherein the wireless network is a first wireless network, and wherein, when executed by the one or more processors of the wireless end-user device, the machine-executable instructions further cause the one or more processors to:"

733. Rao-Fadell teaches this limitation for the reasons explained above in claim 1. As discussed above, Rao-Fadell teaches a service usage activity and a wireless network, and a POSITA would have understood that these may be the "first" service usage activity and "first" wireless network. *See supra* Claim 1.

b. [160b] "identify a second service usage activity of the wireless end-user device, the second service usage activity being associated with the first software component or with a second software component of the plurality of software components on the wireless end-user device, the second service usage activity comprising one or more prospective or successful communications over a second wireless network; and"

734. Rao-Fadell teaches or at least renders this limitation obvious.

735. As discussed in connection with claim 1, limitation [1b], Rao-Fadell teaches identifying a service usage activity of the wireless end-user device, the service usage activity being associated with a software component on the wireless end-user device. *See supra* Limitation [1b].

736. Further, as discussed in connection with claim 41, Rao-Fadell discloses and/or renders obvious refraining from applying the policy to a second service usage

activity of the first software component (e.g., refrain from controlling a second service usage activity) when connected to a second wireless network. *See supra* Claim 41.

737. Rao-Fadell further teaches that the identified service usage activity may be a "second" service usage activity associated with either a first or a second software component.

738. For example, both Rao, *see, e.g.*, Rao ¶¶4, 41-46, 184-85, Fig. 5B (Step 555), and Fadell, *see, e.g.*, Fadell ¶¶4, 22, 26-29, 32, 46-47, 59, 62, 64, contemplate having ***multiple*** software components (e.g., applications) that may each be associated with ***multiple*** service usage activities, each comprised of one or more prospective or successful communications over the wireless network. *See supra* Limitation [1c].

739. A POSITA would have understood that a particular service activity may be "second" service usage activity associated with a second software component of the plurality of software components on the wireless end-user device and that the second service usage activity may be comprised of second one or more prospective or successful communications. A POSITA would have further understood that in the combined system, the system would continue to identify (e.g., intercept, store, and queue packets) all service usage activities of the application. *See also supra* Limitation [1b].

740. Rao-Fadell further teaches that the identified second service usage activity comprises one or more prospective or successful communications over a *second* wireless network.

741. For example, Fadell teaches that, in order to manage data usage, the user may be prompted to "switch networks," e.g., from a cellular network to a Wi-Fi network. *See, e.g.*, Fadell ¶63, Fig. 5. A POSITA would recognize that, in the combined system, a service usage activity would occur over both the "first" and the "second" wireless network as the user opted to switch between networks to conserve resources, and a POSITA would have been motivated to include this network-switching functionality in the combined system in view of Fadell's suggestion to do so. *See id.* A POSITA would therefore understand that "first service usage activity" may occur as "prospective and/or successful communications" over the "first wireless network" and "second service usage activity" may occur as "prospective and/or successful communications" over the "second wireless network."

742. A POSITA would further recognize that regardless of which network the system was communicating on, it would have been obvious to continue intercepting, storing, and queuing packets and thus identifying the service usage activity from applications 338*a*-338*n*, as taught by Rao. *See supra* Limitation [1b]. Rao teaches as much, disclosing that its packet capture mechanism is disposed between applications 338*a*-338*n* and network 104 on client 105 for "intercepting

network traffic of any of the applications 338*a*-338*n* of the client 105" without limiting client 105 to a particular network setting. Rao ¶¶180, 184. It would have been obvious to continue intercepting, storing, and/or queueing network packets over a Wi-Fi network before determining whether to apply a policy to the queued network packets, as Rao disclosing doing so. *See* Rao ¶184 ("At step 565, a priority ***for the intercepted and queued network packet*** is determined based on the type and/or priority of the application 338*a*-338*n*."). The priority applied to network packets in the queues (and whether to assign a priority at all) is managed by policies ***after*** network packets are intercepted, stored, and/or queued (e.g., "identif[ied]"). The combined system would therefore identify service usage activity over, for example, both a cellular and a Wi-Fi network.

c. [160c] "refrain from applying the policy to the second service usage activity."

743. Rao-Fadell renders this limitation obvious. As described in connection with claim 41, Rao-Fadell teaches refraining from applying the policy to the second service usage activity (e.g., controlling a second service usage activity) when the wireless end-user device is connected to a second wireless network, for example, a Wi-Fi network. *See supra* Limitation [41c]. For the same reasons, Rao-Fadell teaches this limitation.

97. Claim 161

a. [161a] "The non-transitory computer-readable storage medium recited in claim 1, wherein the service usage activity is a first service usage activity, and wherein the background activity is a first background activity, and wherein the wireless network is a first wireless network, and wherein the policy is a first policy, and wherein, when executed by the one or more processors of the wireless end-user device, the machine-executable instructions further cause the one or more processors to:"

744. Rao-Fadell teaches this limitation for the reasons explained above in claim 1, sections [1a]-[1g]. *See supra* Claim 1. As discussed above, Rao-Fadell teaches a service usage activity, a background activity, a wireless network, and a policy, and a POSITA would have understood that these may be the "first" service usage activity, "first" background activity, "first" wireless network, and "first" policy.

b. [161b] "identify a second service usage activity of the wireless end-user device, the second service usage activity being associated with the first software component or with a second software component of the plurality of software components on the wireless end-user device, the second service usage activity comprising one or more prospective or successful communications over a second wireless network; and"

745. For the reasons explained in connection with claim 160, limitation [160b], which is the same as this limitation, Rao-Fadell teaches or at least renders this limitation obvious. *See supra* Limitation [160b].

c. [161c] "determine whether the second service usage activity is a second background activity;"

746. Rao-Fadell teaches this limitation.

747. As described above in claim 1, limitation [1d], Rao-Fadell teaches determining whether a service usage activity comprises a background activity. *See supra* Limitation [1d].

748. As explained in connection with claim 169, a POSITA would have understood that Rao teaches applying this same determination step to a second service usage activity to determine whether it is a second background activity. *See supra* Claim 169. For example, Rao teaches applying its prioritization policy to multiple packets from multiple applications—it notes that its system "indicate[s] a priority for the network packets of the application 338*a*-338*n*." Rao ¶189. A POSITA would have applied this teaching in the combined Rao-Fadell system. *See supra* Limitation [1g].

d. [161d] "if it is determined that the second service usage activity is the second background activity, apply a second policy to the second service usage activity."

749. Rao-Fadell teaches this limitation.

750. As described above in claim 1, Rao-Fadell teaches applying a policy to background activity, e.g., when a resource usage threshold is met, intercepting and defining a prioritization to network packets associated with background activity, alerting the user of a resource usage threshold via one of Fadell's screens 300-500,

and assigning a lower priority to queued background-activity packets. *See supra* Limitation [1g]. A POSITA would have recognized that by assigning a lower-priority to background activity packets, this first policy restricts the first background activity (because a higher priority packet would consume the network resource and disallow the lower priority packet from accessing the network).

751. Fadell further teaches allowing users to "limit data requests based on the data type of the request (e.g., as identified by a packet header or other metadata associated with the request), based on the application requesting the data (e.g., a media application such as iTunes or QuickTime), the protocol used for the transfer (e.g., BitTorrent), or any other suitable criteria. As another example, the consumer may successively limit video downloads, MMS and SMS data based on the amount by which the consumer is below the allocated resource limit." Fadell ¶59. Fadell notes as an example that "the consumer may prevent the download of media data, but allow or permit the download of web pages or other non-media intensive transfers." *Id.* A POSITA would have recognized that permitting the download of web pages or other non-media intensive transfers or using a changed display

resolution to download media files in specific conditions (e.g., when the device nears a resource threshold) is a second policy.[7]

752. A POSITA would have included this second policy disclosed by Fadell (permitting the download of web pages or other non-media intensive transfers) so that background activity (e.g., first background activity) would be restricted by application of the first policy, while non-media intensive transfers (e.g., a second background activity) would be allowed to proceed. A POSITA would have been motivated to include this second policy in the combined Rao-Fadell system to give the user greater control and allow the user to exempt packets associated with, for example, non-media intensive background activity, from being intercepted, queued, and prioritized, despite being background activity. Providing these options in the combined system would have allowed the user to determine how the policy is implemented, select how to proceed, and better understand and control resource usage to prevent data overages and associated charges. *See* Fadell ¶¶49, 51, 52.

[7] As discussed in connection with, e.g., Claim 90, the decision whether to implement logical criteria as a part of a first policy or as a second policy would have been a simple design choice and one of two possible approaches for which a POSITA would have had a reasonable expectation of success. *See supra* Claim 90.

753. Rao-Fadell contemplates applying multiple policies. For example, Rao teaches that the client may "have one or more policies 520 for specifying client-side prioritization of network communications" and that prioritization may be conditional on the application of multiple policies. Rao ¶182. And in view of Fadell's suggestion, a POSITA would have had a reasonable expectation of success.

98. Claim 162

a. "The non-transitory computer-readable storage medium recited in claim 161, wherein the first policy restricts or prevents the first background activity, and wherein the second policy allows the second background activity."

754. Rao-Fadell teaches this limitation.

755. As described above in claim 161, the Rao-Fadell system teaches a first policy associated with a first background activity and second policy associated with a second background activity, and further teaches that the first policy restricts or prevents the first background activity and allows the second background activity. *See supra* Claim 161. For example, Fadell contemplates a second policy by which the user may allow particular background activity (e.g., for certain applications). *Id.*; *see supra* Claim 41.

99. Claim 163

a. [163a] "The non-transitory computer-readable storage medium recited in claim 1, wherein the service usage activity is a first service usage activity, and wherein the wireless network is a first wireless network, and wherein the policy is a first policy, and wherein, when executed by the one or more processors of the wireless end-user device, the machine-executable instructions further cause the one or more processors to:"

756. Rao-Fadell teaches this limitation for the reasons explained above in claim 1. *See supra* Claim 1. As discussed above, Rao-Fadell teaches a service usage activity, a wireless network, and a policy, and a POSITA would have understood that these may be the "first" service usage activity, "first" wireless network, and "first" policy.

b. [163b] "identify a second service usage activity of the wireless end-user device, the second service usage activity being associated with the first software component or with a second software component of the plurality of software components on the wireless end-user device, the second service usage activity comprising one or more prospective or successful communications over a second wireless network; and"

757. For the reasons explained in connection with claim 160, limitation [160b], which is the same as this limitation, Rao-Fadell teaches or at least renders this limitation obvious. *See supra* Limitation [160b].

c. [163c] "apply a second policy to the second service usage activity."

758. Rao-Fadell further teaches this limitation.

759. As explained in claim 161, Rao-Fadell teaches applying a second policy (permitting the download of web pages or other non-media intensive transfers) so that background activity (e.g., first background activity) would be restricted by application of the first policy, while non-media intensive transfers (e.g., a second background activity) would be allowed to proceed. *See supra* Limitation [1d]; Claim 161. A POSITA would have understood this to be a second policy applicable to a second service usage activity as claimed.

100. Claim 164

a. "The non-transitory computer-readable storage medium recited in claim 163, wherein the second policy comprises a control policy, a notification policy, or an accounting policy associated with the first software component or the second software component."

760. Rao-Fadell teaches this limitation.

761. As explained in claim 161, Rao-Fadell teaches applying a second policy (permitting the download of web pages or other non-media intensive transfers) so that background activity (e.g., first background activity) would be restricted by application of the first policy, while non-media intensive transfers (e.g., a second background activity) would be allowed to proceed. *See supra* Limitation [1d]; Claim 161; *see also* Claim 164.

762. A POSITA would have understood this to be a second policy and would further have understood it to be a control policy because it controls the service usage activity. [8]

763. A POSITA would have further understood the policy to be associated with, for example, the first software component. First, a POSITA would have understood that the second policy is associated with the first software component because it controls service usage activity of the first software component. Second, Fadell teaches that users may base data limitations on not just the type of the request (e.g., whether it is media intensive) but also based on the application requesting the data (e.g., a media application such as iTunes or QuickTime). Fadell ¶59. If view of Fadell's suggestion, it would have been obvious to permit the download of non-media intensive transfer for specific applications. Doing so would have given the user further control over how the policy is implemented and allowed the user to better understand and control resource usage to prevent data overages and associated

[8] As discussed in connection with, e.g., Claim 90, the decision whether to implement logical criteria as a part of a first policy or as a second policy would have been a simple design choice and one of two possible approaches for which a POSITA would have had a reasonable expectation of success. *See supra* Claim 90.

charges (e.g., by only specific software components' non-media intensive transfers). *See* Fadell ¶¶49, 51, 52.

101. Claim 166

a. [166a] "The non-transitory computer-readable storage medium recited in claim 1, wherein the service usage activity is a first service usage activity, and wherein the one or more prospective or successful communications over the wireless network are first one or more prospective or successful communications over the wireless network, and wherein, when executed by the one or more processors of the wireless end-user device, the machine-executable instructions further cause the one or more processors to:"

764. Rao-Fadell teaches this limitation for the reasons explained above in claim 1. *See supra* Claim 1. As discussed above, Rao-Fadell teaches a service usage activity and one or more prospective or successful communications over the wireless network, and a POSITA would have understood that these may be the "first" service usage activity and "first" one or more prospective or successful communications over the wireless network.

b. [166b] "identify a second service usage activity of the wireless end-user device, the second service usage activity being associated with a second software component of the plurality of software components on the wireless end-user device, the second service usage activity comprising second one or more prospective or successful communications over the wireless network;"

765. Rao-Fadell teaches or at least renders this limitation obvious.

766. As discussed in connection with claim 1, limitation [1b], Rao-Fadell teaches identifying a service usage activity of the wireless end-user device, the service usage activity being associated with a software component on the wireless end-user device. *See supra* Limitation [1b].

767. Rao-Fadell further teaches that the identified service usage activity may be a "second" service usage activity associated with a second software component. For example, both Rao, *see, e.g.*, Rao ¶¶4, 41-46, 184-85, Fig. 5B (Step 555), and Fadell, Fadell ¶¶4, 22, 26-29, 32, 46-47, 59, 62, 64, contemplate having multiple software components (e.g., applications) that may each be associated with multiple service usage activities, where each is comprised of one or more prospective or successful communications over the wireless network. *See supra* Claims 155, 156; Limitation [1c]. A POSITA would have understood that a particular service activity may be "second" service usage activity associated with a second software component of the plurality of software components on the wireless end-user device and that the second service usage activity may be comprised of second one or more prospective or successful communications over the wireless network. *See supra* Limitations [160b], [1b].

768. The combined Rao-Fadell system's identification of service usage activity as described in claim 1, limitation [1b] would occur in the same way regardless of whether the identification was of a first service usage activity or a

second service usage activity, and regardless of whether the service usage activity was associated with a first software component or a second software component. *See supra* Limitations [1b].

c. [166c] "determine whether the second service usage activity is the background activity; and"

769. Rao-Fadell teaches this limitation.

770. Rao-Fadell teaches determining whether a service usage activity comprises a background activity. *See supra* Limitation [1d].

771. A POSITA would have understood that Rao teaches applying this same determination step to a second service usage activity to determine whether it is also background activity. *See supra* Claim 161. For example, Rao teaches applying its prioritization policy to multiple packets from multiple applications—it notes that its system "indicate[s] a priority for the network packets of the application 338*a*-338*n*." Rao ¶189. A POSITA would have applied this teaching in the combined Rao-Fadell system. *See supra* Limitation [1g].

d. [166d] "if it is determined that the second service usage activity is the background activity, refrain from applying at least a portion of the policy."

772. Rao-Fadell teaches this limitation.

773. As described above in claim 1, limitation [1g], Rao-Fadell teaches applying a policy to background activity, e.g., when a resource usage threshold is met, intercept and define a prioritization to network packets associated with

background activity, alert the user of a resource usage threshold via one of Fadell's screens 300-500, and assign a lower priority to queued background-activity packets. *See supra* Limitation [1g]. A POSITA would have recognized that by assigning a lower priority to background activity packets, this first policy restricts the first background activity (because a higher priority packet would consume the network resource and disallow the lower priority packet from accessing the network).

774. Fadell further teaches allowing users to "limit data requests based on the data type of the request (e.g., as identified by a packet header or other metadata associated with the request), based on the application requesting the data (e.g., a media application such as iTunes or QuickTime), the protocol used for the transfer (e.g., BitTorrent), or any other suitable criteria. As another example, the consumer may successively limit video downloads, MMS and SMS data based on the amount by which the consumer is below the allocated resource limit." Fadell ¶59. Fadell notes as an example that "the consumer may prevent the download of media data, but allow or permit the download of web pages or other non-media intensive transfers." *Id.* A POSITA would have recognized that permitting the download of

web pages or other non-media intensive transfers may be part of the system prioritization policy.[9]

775. A POSITA would have included this aspect of the policy, as suggested by Fadell (permitting the download of web pages or other non-media intensive transfers) so that certain background activity, including those related to particular applications (e.g., software components) would be restricted while other background activity would be allowed to proceed. A POSITA would have been motivated to include this limitation in the combined Rao-Fadell system to give the user greater control, including on an application-by-application basis, and allow the user to exempt packets associated with, for example, non-media intensive background activity, from being intercepted, queued, and prioritized, despite being background activity. Providing these options in the combined system would have allowed the user to determine how the policy is implemented, select how to proceed, and to better understand and control resource usage to prevent data overages and associated

[9] As discussed in connection with, e.g., claim 90, the decision whether to implement logical criteria as a part of a first policy or as a second policy would have been a simple design choice and one of two possible approaches for which a POSITA would have had a reasonable expectation of success. *See supra* Claim 90.

charges. *See* Fadell ¶¶49, 51, 52. And in view of Fadell's suggestion, a POSITA would have had a reasonable expectation of success.

102. Claim 167

a. [167a] "The non-transitory computer-readable storage medium recited in claim 1, wherein the background activity is a first background activity, and wherein the service usage activity is a first service usage activity, and wherein the one or more prospective or successful communications over the wireless network are first one or more prospective or successful communications over the wireless network, and wherein the policy is a first policy, and wherein, when executed by the one or more processors of the wireless end-user device, the machine-executable instructions further cause the one or more processors to:"

776. Rao-Fadell teaches this limitation for the reasons explained above in claim 1. *See supra* Claim 1. As discussed above, Rao-Fadell teaches a background activity, service usage activity, and one or more prospective or successful communications over the wireless network, and a POSITA would have understood that these may be the "first" service usage activity, "first" service usage activity, and "first" one or more prospective or successful communications over the wireless network.

b. [167b] "identify a second service usage activity of the wireless end-user device, the second service usage activity being associated with a second software component of the plurality of software components on the wireless end-user device, the second service usage activity comprising second one or more prospective or successful communications over the wireless network;"

777. For the reasons explained in connection with Claim 166, limitation [166b], which is the same as this limitation, Rao-Fadell teaches or at least renders this limitation obvious. *See supra* Limitation [166b].

c. [167c] "determine whether the second service usage activity is a second background activity;"

778. For the reasons explained in connection with Claim 166, limitation [166c], which is the same as this limitation, Rao-Fadell teaches or at least renders this limitation obvious. *See supra* Limitation [166c].

d. [167d] "obtain a second policy, the second policy to be applied when the second service usage activity is the second background activity, the second policy for controlling the second service usage activity; and"

779. Rao-Fadell teaches or at least renders this limitation obvious as discussed in, e.g., Claim 161, limitation [161d]. *See supra* Limitation [161d].

780. As described above in claim 1, limitation [1g], Rao-Fadell teaches applying a policy to background activity, e.g., when a resource usage threshold is met, intercept and define a prioritization to network packets associated with background activity, alert the user of a resource usage threshold via one of Fadell's

screens 300-500, and assign a lower priority to queued background-activity packets. *See supra* Limitation [1g]. A POSITA would understand this to be a first policy.

781. Fadell further teaches allowing users to "limit data requests based on the data type of the request (e.g., as identified by a packet header or other metadata associated with the request), based on the application requesting the data (e.g., a media application such as iTunes or QuickTime), the protocol used for the transfer (e.g., BitTorrent), or any other suitable criteria. As another example, the consumer may successively limit video downloads, MMS and SMS data based on the amount by which the consumer is below the allocated resource limit." Fadell ¶59. Fadell notes as an example that "the consumer may prevent the download of media data, but allow or permit the download of web pages or other non-media intensive transfers." *Id.* A POSITA would have recognized that permitting the download of web pages or other non-media intensive transfers is a second policy for controlling the second service usage activity because it controls that activity.[10]

[10] As discussed in connection with, e.g., Claim 90, the decision whether to implement logical criteria as a part of a first policy or as a second policy would have been a simple design choice and one of two possible approaches for which a POSITA would have had a reasonable expectation of success. *See supra* Claim 90.

782. A POSITA would further have recognized that this second policy is obtained from the user, who "limits" data requests, e.g., via user input through the user interface. *See* Fadell ¶59; *see also id.* ¶60 ("the consumer may include user-selected or user-identified processes among those to continue"); *supra* Limitation [1e].

783. A POSITA would have included this second policy disclosed by Fadell (permitting the download of web pages or other non-media intensive transfers) in the combined Rao-Fadell system so that background activity (e.g., first background activity) would be restricted by application of the first policy, while non-media intensive transfers (e.g., a second background activity) would be allowed to proceed.

784. A POSITA would have been motivated to include this second policy in the combined Rao-Fadell system, allowing the user to implement this policy, in order to give the user greater control and allow the user to exempt packets associated with, for example, non-media intensive background activity, from being intercepted, queued, and prioritized, despite being background activity. Providing these options in the combined system would have allowed the user to determine how the policy is implemented, select how to proceed, and to better understand and control resource usage to prevent data overages and associated charges. *See* Fadell ¶¶49, 51, 52. Rao-Fadell contemplates applying multiple policies. For example, Rao teaches that the client may "have one or more policies 520 for specifying client-side prioritization of

network communications" and that prioritization may be conditional on the application of multiple policies. Rao ¶182. And in view of Fadell's suggestion, a POSITA would have had a reasonable expectation of success.

e. [167e] "if it is determined that the second service usage activity is the second background activity, apply the second policy."

785. Rao-Fadell renders this limitation obvious for the reasons explained in connection with Claim 161, limitation [161d], which recites that if it is determined that the second service usage activity is the second background activity, apply a second policy to the second service usage activity. *See supra* Limitation [161d]; *see also supra* Limitation [167d].

103. Claim 168

a. "The non-transitory computer-readable storage medium recited in claim 167, wherein the first policy, the second policy, or both are based on a network busy state, a network availability state, or a cost associated with the wireless network."

786. Rao-Fadell teaches this limitation.

787. As discussed in connection with claim 1, Rao-Fadell teaches a policy that prioritizes network packets and notifies a user when a resource usage limit or threshold is reached. *See supra* Limitations [1e]-[1g]. Rao-Fadell also teaches that these resource usage limits or thresholds may be imposed on users based on the "resource consumption tiers or plans" (i.e., service plans) to which the users subscribe. Fadell ¶43; *see supra* Claim 27. The first policy in the combined system

queues and prioritizes network packets associated with background activity and notifies the user when a resource usage range or limit is being reached. *See supra* Claim 1. The data range or limit is based on resource limits of a data plan associated with a data provider. Fadell ¶¶16, 18, 43-44. Fadell teaches that the data providers charge fees for the data plans, and Fadell's notifications "assist a subscriber in managing their usage under such pricing mechanisms." *Id.* ¶¶16-17, 23, 42-44, 51, 53, 57, 63, 65, 72.

788. Given Fadell's disclosure of notifying a user based on limits and ranges relative to a data plan, and doing so to "avoid[] excess fees or penalties" associated with the data plan, *id.* ¶51, a POSITA would have understood that at least the first policy is based on a "cost associated with the wireless network." A POSITA would have applied the policy in the combined system to reduce unwanted costs and excessive fees, as disclosed in Fadell. *Id.* A POSITA would have found doing so desirable and the result predictable, as discussed in connection with Claim 33. *See supra* Claim 33.

104. Claim 170

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein, when executed by the one or more processors of the wireless end-user device, the machine-executable instructions further cause the one or more processors to monitor the service usage activity, account for the service usage activity, report information about the service usage activity, or a combination of these."

789. Rao-Fadell teaches this limitation.

790. For example, Fadell teaches that "Fig. 3 is an illustrative screen of a notice of data provider resources used." Fadell ¶50.

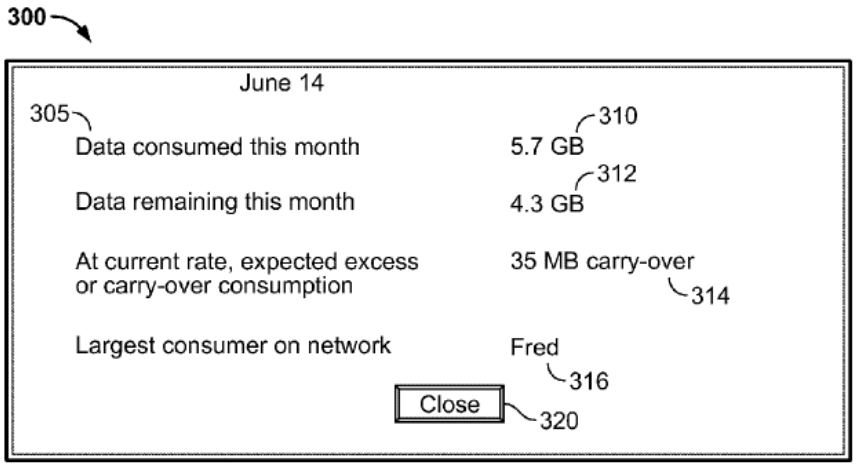


FIG. 3

Id., Fig. 3.

791. Fadell teaches that "[s]creen 300 may include notifications 305 with data resource usage information. For example, screen 300 may include notification 310 of the data consumed for the current period (e.g., current month) and notification 312 of the data remaining for the current period. In some embodiments, the

information provided to the consumer may include an estimation of expected resource usage for the remaining period and a comparison of the estimated usage with the allocated data provider resources." *Id.* ¶50.

792. Additionally, "[s]creen 300 may instead or in addition include any other information related to the consumption of data provider resources, such as for example percentages of resources consumed or remaining, instructions to cut back on resource use (e.g., a personal message from a network administrator to the consumer), or any other suitable information." *Id.* ¶50.

793. A POSITA would have understood that screen 300 teaches a "report" of information related to the consumption of data provider resources that is "information about the service usage activity" and/or an "account for the service usage activity." A POSITA would further have understood that machine-executable instructions executed by the processor cause the processor to generate screen 300. *See, e.g.*, *id.* ¶31.

794. In the combined Rao-Fadell system, a POSITA would have been motivated and found it obvious to apply these teachings of Fadell to continue to enable users to better control their resource usage and stay within/below resource usage limits or thresholds after the initial restrictions are imposed. For example, reporting information about the service usage activity and accounting for it gives

users the ability to determine if they should reduce their resource usage or purchase additional resources.

105. Claim 173

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein, when executed by the one or more processors of the wireless end-user device, the machine-executable instructions further cause the one or more processors to provide information about the service usage activity to the network element."

795. Rao teaches this limitation.

796. For example, Rao teaches that it communicates network packets from the prioritization queues. Rao ¶ 194. Rao explains that when it communicates packets, it does so via gateway 340 (e.g., a network element). *See, e.g.*, *id.* ¶93.

797. Rao further teaches that user device (operating via instructions executed by its processors) transmits packets with information about those packets, including, for example "the IP address of the packet." *Id.* A POSITA would have understood that the IP address is information about the service usage activity (e.g., the network packet) that is provided to the network element (e.g., the gateway).

798. Rao further teaches that packets may include "connection-specific data" and may include "special feature request[s] such as collaboration with other users, fetching of user directory and presence or requesting telephony functionality such as conferencing and web cast." *Id.* ¶94. A POSITA would have understood that

Rao's "connection-specific data" and "special feature request[s]" are also information about the service usage activity (e.g., the network packet) that is provided to the network element (e.g., the gateway).

106. Claim 174

a. "The non-transitory computer-readable storage medium recited in claim 173, wherein the information about the service usage activity comprises a count of data traffic associated with the service usage activity, a transaction count, a message count, a connection time, a connection duration, a classification of traffic, an indication that a measure of the service usage activity satisfies a condition relative to a threshold, a parameter associated with the service usage activity, an indication that the background activity is restricted, or a combination of these."

799. Rao teaches this limitation for the reasons discussed in connection with claim 173. *See supra* Claim 173. A POSITA would have understood that Rao's IP address, "connection-specific data," and "special feature request[s]" are all examples of "information about the service usage activity" that are at least a "classification of traffic" or a "parameter associated with the service usage activity."

C. Rao in View of Freund Renders Obvious Claims 29, 44, 47, 48, 51-57, and 84-86 Under 35 U.S.C. § 103

1. Motivation to Combine Rao and Freund

800. A POSITA would have found it obvious to combine Rao and Freund because they disclose substantially similar and complementary methods for classifying and controlling network communications.

801. As discussed above, Rao teaches optimizing communications over a wired or wireless network, including via "application-aware prioritization of client-side network communications." *See, e.g.*, Rao ¶¶80, 179-95, Figs. 5A, 5B. Rao particularly teaches a "remote access client 120" that captures network packets and prioritizes them in accordance with policies that are applied based on one or more characteristics of the applications that generated the packets (e.g., the applications' names, types, sizes, memory usage, or execution times; how often the applications are used; whether the applications execute in the foreground or background of a client). *See id.* ¶¶86-89, 97-105, 179-95, Figs. 1A-1C, 5A, 5B. Rao teaches that its prioritization techniques "may improve or increase the performance, operational characteristics, and user experience on the client based on the applications running on the client." *Id.* ¶80. Rao also contemplates applying its techniques over various wired and wireless networks. *Id.* ¶95.

802. Freund similarly teaches a "client monitor" or "client-based filter application" that "monitor[s], log[s], and filter[s]" network activities, tracks (via a list) "currently active processes" on a client, and "intercept[s] and interpret[s] all TCP/IP communication and build[s] a comprehensive representation of these TCP/IP activities." Freund, 4:29-39, 13:23-33. By performing these activities, Freund's client monitor can "determine if [a] process . . . should have access to the Internet and what kind of access . . . is permissible for the given specific user." *Id.*,

4:40-50, 13:34-43. It can also "monitor TCP/IP activities on a per process or per application basis" and, when provided certain "access rules," can determine whether the activities should be permitted and "terminate[], redirect[], modif[y], or continue[]" them as necessary. *Id.*, 4:5-28, 4:51-62, 12:66-13:22, 13:44-56.

803. Freund, like Rao, contemplates operation on various kinds of networks. For example, Freund presents one or more embodiments that can be employed to monitor network communications to and from the Internet, a Wide Area Network ("WAN") that "is essentially an open network of computers and [Local Area Networks ('LANs')." *Id.*, 8:45-47, 11:36-37; *see id.*, 14:51-21:46, 21:47-50 (explaining that one or more embodiments "focus[] on monitoring LAN-based access to the Internet and other WANs"). It also presents one or more embodiments that "can alternately be implemented for establishing a monitoring and filtering system for Internet Service Providers (ISPs) or similar organizations" to allow them to "offer their users a tamper-proof, safe, and managed [network] access." *Id.*, 21:50-54.

804. Importantly, Freund also expounds on methods for classifying and differentially treating network activities based on whether the activities, or the applications associated with them, are running in the foreground (i.e., are being "actively" used by a user) or background (i.e., are being "passively" used by a user) of a client—as Rao expressly contemplates. *See, e.g.*, *id.*, 3:12-16, 3:42-48, 6:7-14,

8:63-9:3, 10:17-43, 30:11-49, Figs. 13A-13B. For instance, it provides a method by which an application "can be examined for determining whether it is 'active' by determining whether the application receives 'focus' and/or receives user input (e.g., mouse clicks or key strokes)," *see id.*, 10:37-43, 30:11-49, Figs. 13A-13B, to determine whether the activities should be allowed to continue, *see id.*, 8:63-9:3, 30:11-49, Figs. 13A-13B. Freund points out the "particular[] advantage[s]" of its methods, which include the provision of application-specific Internet access; facilitation of corporate control/management of data, bandwidth, and application usage; establishment of more secure communications; and prevention of "inadvertent disruptions of the network by individual users" through "bandwidth ho[a]rding." *Id.*, 2:3-14 10:55-11:28.

805. Freund likewise details various policies that can be implemented and explains notifications and messages that may be beneficially provided to a user to assist the user in setting and understanding policies. *See, e.g.*, *id.*, 12:66-13:34, 25:53-26:60. Freund teaches that its client monitor can "issue a warning," such as "an error dialog," a "redirecti[on] . . . to an error page," or "an application error," to a user upon the occurrence of a trigger. *Id.*, 4:26-28, 13:20-22, 26:52-58; *see also id.*, 30:26-29, 30:46-49. The client monitor may be triggered to issue such a warning when an application that is "not allowed to access the Internet" under one or more rules tries to do so. *Id.*, 5:61-64. Freund elaborates on how dialogs may be configured

to include messages containing "certain text to be specified at runtime," like application names or Web site names, through the use of, e.g., "tags or macros." *Id.*, 26:64-27:3.

806. A POSITA would have understood that Rao and Freund disclose analogous and complementary art, with respect to both the claims of the '541 patent and each other, and would have looked to Freund to improve Rao given the similarities and disclosed benefits of each reference. For example, a POSITA would have recognized that Freund effectively teaches specific details, long known in the art, by which Rao's differential prioritization of network packets corresponding to foreground and background activities can be achieved and that Freund teaches the use of warnings and errors that allow a user to understand the operation of system policy.

807. A POSITA would have recognized that Freund's method was well-established and capitalized on preexisting messages and processes on a client, allowing it to classify applications and activities and achieve Rao's purposes without further expenditure of significant client resources. Accordingly, a POSITA would have easily combined the teachings of Rao and Freund, and had a reasonable expectation of success in doing so, to create a system that determines when an application and its associated activities are operating in the background of a client

(i.e., being passively used) to apply a policy that assigns a specific priority (e.g., a lower priority) to network packets associated with those activities.

808. In the combined system, network packets from background activities would be queued and deprioritized, as suggested by Rao. *See, e.g.*, Rao ¶¶180-95. In order to identify these background activities, the system would implement Freund's decade-old methods for determining whether an application and its activities are being actively used—i.e., whether they are the object of a user's focus and/or receiving user input(s). Freund, 10:37-43; *see id.*, 30:11-49, Figs. 13A-13B. In one example, where "a mail client" accesses a wireless network to "intermittently poll[] an Internet-based server," the system would begin intercepting and queuing network packets associated with the mail client's polling activities, apply Freund's method to identify the mail client and its polling activities as "an application [and] process[es] executing in the background," *id.*, 10:20-24, and use those "characteristics . . . to indicate priority for [the] network packet[s]," Rao ¶189. Where necessary, Freund's error messages would alert a user that packets related to a particular service usage activity had been deprioritized or disregarded. Freund, 4:26-28, 5:61-64, 13:20-22, 26:52-58; *see also id.*, 30:26-29, 30:46-49.

809. In this way, the combination of Rao and Freund would have been nothing more than the use of a known (and well-established) technique (i.e., Freund's foreground/background identification method, which was disclosed in

1999) to improve similar methods (i.e., Rao's method for identifying and prioritizing network packets associated with foreground/background activities) in the same way. The combination also would have been nothing more than the application of a known technique to a known method ready for improvement to yield the predictable result of a system that, in line with Rao's teachings, could accurately distinguish between foreground and background applications and activities and properly prioritize network packets associated with those applications and activities.

810. Additional considerations supporting a POSITA's motivation to combine Rao and Freund are provided below.

2. Claim 29

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein the policy is based on a user interaction with the first software component, a user interaction with the service usage activity, a user interaction with the wireless end-user device, a user interface priority of the service usage activity, or a combination of these."

811. Rao-Freund teaches this limitation.

812. As discussed above, Rao teaches that policies 520 may "define prioritization" for network packets "based on whether an application [associated with the network packets] is running in the foreground or the background of the client 105." *Id.* ¶182; *see also id.* ¶¶38-43, 180, 188-89, 193, Figs. 5A, 5B; see *supra* Section VIII.A.2.d, Section VIII.A.2.g. Rao further explains that "[e]ach network

packet may be placed and arranged in a priority order respective to all other . . . network packets to provide a packet by packet prioritization across all applications 338*a*-338*n* and . . . network packets." Rao ¶191. As discussed above, a POSITA would have been motivated and found it obvious to determine and apply a policy that assigned a specific priority (e.g., a lower priority) to network packets that were associated with applications 338*a*-338*n* running in the background of client 105. *See supra* Sections VIII.A.2.e-VIII.A.2.f.

813. Rao explains that "application[s] . . . running in the foreground" of a client are "currently in active use by the user," whereas applications running in the background are not being actively used. Rao ¶3; *see also id.* ¶¶182, 188. Rao teaches that a user may actively use an application through "interactive user session[s] that involve[] multimedia elements such as video, voice, chat, gaming, and virtual reality." *Id*. ¶¶133, 140; *see also id.* ¶210. Rao also teaches that a client may include a visual display device 124 and various user input devices, such as "keyboards, mice, trackpads, trackballs, microphones, and drawing tablets," that enable a user to engage in interactive sessions with the applications. *Id*. ¶¶118, 126. To the extent it is argued that Rao does not expressly disclose the assignment of a particular priority (e.g., a lower priority) based on a determination that the user is interacting with an application, it would have been obvious to a POSITA that whether a user is

interacting with the application will ultimately dictate whether the application constitutes a background application and the related priority assignment.

814. Freund also teaches a method for determining when an application is being "actively" used for purposes of distinguishing between foreground and background activities and taking appropriate actions. *See* Freund, 3:12-16, 3:42-48 (disclosing a method designed to "distinguish between 'active' use of the Internet (i.e., when user interaction with the PC causes the Internet access) and 'background' use (i.e., when an application accesses the Internet without user interaction)"); *see also id.*, 8:63-67, 10:17-37 (discussing the differences between actively and passively used applications and noting the desirability of distinguishing between the two). Specifically, it explains that an application "can be examined for determining whether it is 'active' by determining whether the application receives 'focus' and/or receives user input (e.g., mouse clicks or key strokes)," *id.*, 10:37-43, and provides an exemplary method for detecting whether a user is interacting with an application, *see id.*, 30:11-49, Figs. 13A, 13B. Under this method, if user interaction with the application is detected, the application would be classified as a foreground application, and all activities associated with the application would constitute foreground activities. *See id.*; *see also id.*, 6:7-14. All other activities would constitute background activities. *See id.*, 30:11-49, Figs. 13A, 13B.

815. A POSITA would have been motivated and found it obvious to combine the disclosures of Rao and Freund to produce a system capable of determining and applying a policy that assigned a specific priority (e.g., a lower priority) to network packets that were associated with passively used applications 338*a*-338*n* for the same reasons that a POSITA would have been motivated and found it obvious to assign such a priority to network packets associated with background applications. *See supra* Sections VIII.A.2.e-VIII.A.2.f. Importantly, a POSITA would have been aware of the latency- and quality-related issues that could arise when network packets for passively used applications (i.e., background applications) are allowed to be processed ahead of those for applications "currently in active use by the user" (i.e., foreground applications). Rao ¶3. A POSITA also would have been familiar with similar solutions already implemented in the field to address these issues. *See, e.g.*, Oestvall, Abstract, ¶6 (providing a multitasking device capable of preventing certain background applications from running because, "without an explicit close command, [these] applications will continue to run even when not actually in active use" and "therefore continue to use some system resources"). A POSITA also would have recognized that basing Rao's prioritization policy on whether an application is being actively used would be an effective way to mitigate such issues and, with Freund's methodological guidance, would have been able to implement such a policy with a reasonable expectation of success.

816. A POSITA would have understood that basing Rao's prioritization policy on whether an application is being actively used (e.g., whether a user is interacting with the application) would obviously also base it on whether the user is interacting with the application through the end-user device (i.e., a user interaction with the first software component).

817. A POSITA would have further recognized that the Rao-Freund system's implementation of such a policy is consistent with the '541 patent's disclosures that, because an "application can be running in the background and continuing to consume potentially significant network resources" "even when [a] user is not directly interacting with or benefiting from" the application, EX-1001, 14:47-51, it may be desirable to dynamically apply a network service usage control policy based on whether "a network service usage activity is determined to be an active application or process (e.g., based on a user interaction with the device . . .)," *id.*, 96:44-48; *see id.*, 90:65-91:16.

3. Claim 44

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein determine whether the service usage activity comprises a background activity comprises determine whether a user is interacting with or has interacted with the first software component."

818. Rao-Freund teaches this limitation.

819. As discussed above, Rao teaches determining whether the service usage activity comprises a background activity. *See supra* Section VIII.A.2.d. Freund further teaches determining that a service usage activity comprises a background activity by determining whether a user is interacting with or has interacted with a first software component.

820. For example, Freund distinguishes between active (i.e., foreground) and background (i.e., passive) activities. It explains that "certain Internet applications . . . access the Internet in the background while the user attends to other unrelated tasks in the foreground." Freund, 10:24-27; *see also id.*, 3:12-16. Freund explains that, to determine whether an Internet activity (e.g., a service usage activity) is a background activity, an application associated with the activity "can be examined for determining whether it is 'active' by determining whether the application receives 'focus' and/or receives user input (e.g., mouse clicks or key strokes)." *Id.*, 10:40-43. A POSITA would understand Freund's discussion of an application receiving "focus" to include, e.g., an application having recently received user inputs through, for example, the user opening a link or clicking "play" on a video, such that the associated activity is likely not background activity.

821. Freund thus teaches determining whether a service usage activity comprises a background activity by determining whether a user is interacting with a

first software component (e.g., by providing user input) or has interacted with the first software component (e.g., by "focus[ing]" on it).

822. A POSITA would have been motivated and found it obvious to implement these teachings of Freund by configuring the Rao-Freund system to similarly rely on user input(s) or focus to determine whether the service usage activity comprises a background activity. A POSITA would have done so to accurately determine whether network packets correspond to background applications (and not active applications), as Freund discloses. *Id.*, 10:16-43. This would have enabled accurate identification and prioritization of background activity packets, ensuring a user's access is not "mistakenly block[ed] . . . based on excessive use, when in fact a background application is instead responsible for the activity." Freund, 8:63-9:3. Using Freund's "focus" and "user inputs" to determine activity would have improved Rao by improving the accuracy of the determining step (e.g., ensuring activities associated with active applications are not characterized as background activities and deprioritized).

823. Freund recognized in 1999 that identifying the objects of user input or focus was an effective way to determine whether a service usage activity comprises a background activity, and a POSITA at the time of the alleged invention (at least 10 years later), would have been able to implement this decade-old practice with a reasonable expectation of success.

824. Moreover, each of claims 44-59 recites known and well-understood options for determining "whether [a] service usage activity comprises a background activity." In my opinion, a POSITA would have understood that each option was a well-known technique for making such a determination (as evidenced by the prior art of record) and would have appreciated the benefits of employing each option (as discussed herein). Indeed, a POSITA would have understood that the options recited in claims 44-59 were each one solution selected from a finite number of well-known, identified, predictable solutions that a POSITA could implement with a reasonable expectation of success.

4. Claim 47

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein determine whether the service usage activity comprises a background activity comprises determine whether the first software component is or has been classified as being in a background state or the service usage activity is or has been classified as a background service."

825. Rao-Freund teaches this limitation.

826. As discussed above, Rao and Freund both teach or suggest determining whether a service usage activity comprises a background activity in order to better prioritize network communications and manage network resources. *See, e.g.*, Rao ¶182; *see also id.* ¶¶3, 38-43, 180, 182, 188-89, 193, Figs. 5A, 5B; Freund, 3:12-16, 3:42-48 (disclosing a method designed to "distinguish between 'active' use of the

Internet (i.e., when user interaction with the PC causes the Internet access) and 'background' use (i.e., when an application accesses the Internet without user interaction)"); *see* Freund, 8:63-67, 10:17-37 (discussing the differences between actively and passively used applications and noting the desirability of distinguishing between the two); *supra* Section VIII.A.2; Claims 29, 44.

827. Freund also teaches that, to determine whether an activity is "active" (e.g., not a background activity), its client monitor classifies processes as "active" using a list. *See* Freund, 4:29-33, 4:40-41, 13:23-27, 25:20-22 (discussing "an outline list 745 of all applications known to the system"), 30:13-15 ("[T]he Client Monitor maintains a list of active [a]pplications (processes) with various fields to track activities . . . ."); *see also id.*, Abstract, 25:34-45 (noting that "the applications outline 745 provides a version-based list of applications" and discussing the benefits of "tracking applications on a per version basis"), 30:16-49 (explaining that the Client Monitor can update data in the list of active applications), Fig. 13B.

828. Freund further teaches that each process on the list "can be checked for various characteristics" to determine whether "the process in question should have access to the Internet and what kind of access." *Id.*, Abstract, 4:5-63, 8:63-9:3, 10:16-43, 13:23-55, 30:13-49, Fig. 13B. Freund's monitoring application network activity and maintaining a list of active applications discloses determining "whether" a service usage activity is or has been classified as a background service (e.g., whether

applications are or are not background activity). In the case of a service usage activity associated with an actively used application, the service usage activity is not classified as a background service in Freund. This corresponds with claims 56 and 57, which recite "determin[ing] ***whether*** the service usage activity comprises a background activity" comprises "determin[ing] whether the first software component ***is a foreground component***" or "determin[ing] whether the first software component ***is in a foreground*** of user interaction." *See infra* Claims 56-57.

829. In view of these disclosures, a POSITA implementing the combined Rao-Freund system would have been motivated to use Freund's list to classify service usage activities as active or background activities (e.g., as active or background services). A POSITA would have been motivated to do so in order to more readily determine if a particular process (e.g., service usage activity) comprises a background activity, (if so) whether it should have Internet access, and (if so) what kind of access should be permitted under the policy. Freund teaches this approach, and a POSITA would have been motivated and found it obvious to combine the disclosures of Rao and Freund in this way for the same reasons that he or she would have been motivated and found it obvious to determine whether an application's activities constitute background activities. *See supra* Section VIII.A.2.d.

830. Based on the teachings of Rao and Freund, a POSITA would have been readily able to implement such a classification process. For example, Freund

expressly teaches recording and examining data related to whether a process is active or not (e.g., LastInternetAccess, LastInteractiveAccess, LastInteractiveUse, TotalInteractiveUse) in the list of applications and processes maintained by Freund's client monitor. *See, e.g.*, Freund, 30:16-24, 30:30-36, 30:39-43. Under this method, if user interaction with the application is detected based on the content of these fields, the application is classified as an active, foreground application. *See id.*; *see also id.* 6:7-14. If user interaction with the application is not detected based on the content of these fields, the application is not classified as a foreground application by the system, *see id.*, 30:11-49, Figs. 13A-13B, and is simply treated as something "other" than a foreground application (i.e., as a background application).

831. A POSITA would have recognized that where an application has not been classified as an active application or service, it is effectively classified as a background service. To the extent this is not explicitly disclosed in Freund, a POSITA would have understood that the list of active applications and processes maintained by Freund's client monitor could easily be configured to include additional fields (e.g., BackgroundApplication and BackgroundActivity) with data (e.g., "Background") that would identify an application or process that had not been classified as a foreground application or process as a background service using Freund's method. A POSITA also would have recognized that Freund's client monitor could then use these fields to determine what actions to take with respect to

associated applications and processes. This approach would have been particularly obvious given that Freund teaches that the "characteristics" of applications and processes (e.g., whether they constitute foreground or background services) should be included in such a list so that they can be examined to "determine if the process in question should have access to the Internet and what kind of access . . . is permissible." Freund, 4:40-49, 13:34-43; *see also id.*, Abstract. Thus, a POSITA alternatively would have recognized that Freund's list of active applications renders obvious maintaining a list of other applications that are not in active use, and therefore renders obvious a background activity "classif[ication]" (e.g., determining whether the service usage activity is classified as a background service).

832. A POSITA would have been motivated to maintain a background activity classification in Rao-Freund for the reasons Freund discloses, including to accurately distinguish between active and background activity. *See* Freund, 10:16-43. For example, Freund discloses that exemplary background activities include "a mail client…intermittently poll[ing] an Internet-based mail server" (i.e., a communication associated with an email download). *Id.* A POSITA would have understood from this that Freund suggests classifying background activities based on, for example, a type of the application. The result would have enabled "each client process [to] be checked for various characteristics, including checking executable names," as Freund teaches, to determine whether processes constitute background

activities. *Id.*, 13:34-43. Rao also suggests such a classification scheme by disclosing that its remote access client 120 distinguishes between foreground and background applications. Rao ¶¶182-88.

833. A POSITA would have been motivated to maintain a background classification in Rao-Freund for accounting purposes, including enabling review of the active and background list(s) to avoid false positives (e.g., processes or applications inaccurately included on or omitted from the active-use list and vice versa). Maintaining a background activity status in the Rao-Freund system also would have ensured that true background activity packets are subject to Rao's prioritization policies.

834. Moreover, each of claims 44-59 recites known and well-understood options for determining "whether [a] service usage activity comprises a background activity." A POSITA would have understood that each option was a well-known technique for making such a determination (as evidenced by the prior art of record) and would have appreciated the benefits of employing each option (as discussed herein). Indeed, a POSITA would have understood that the options recited in claims 44-59 were each one solution selected from a finite number of well-known, identified, predictable solutions that a POSITA could implement with a reasonable expectation of success.

5. Claim 48

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein determine whether the service usage activity comprises a background activity comprises determine whether the service usage activity is identified by a list specifying one or more background activities."

835. Rao-Freund teaches this limitation.

836. As discussed in connection with claim 47, Rao-Freund teaches determining whether a service usage activity comprises a background activity by determining whether a service usage activity has been classified as a background service using a list presenting all the applications running on the device and indicating which applications were active. *See supra* Claim 47. For the reasons discussed there, a POSITA would have classified activities using a list specifying active and background activities, as suggested by Freund. *See supra* Claim 47. Accordingly, for the same reasons, Rao-Freund teaches that determining whether the service usage activity comprises a background activity comprises determining whether the service usage activity is identified by a list specifying one or more background activities.

837. Moreover, each of claims 44-59 recites known and well-understood options for determining "whether [a] service usage activity comprises a background activity." A POSITA would have understood that each option was a well-known technique for making such a determination (as evidenced by the prior art of record)

and would have appreciated the benefits of employing each option (as discussed herein). Indeed, a POSITA would have understood that the options recited in claims 44-59 were each one solution selected from a finite number of well-known, identified, predictable solutions that a POSITA could implement with a reasonable expectation of success.

6. Claim 51

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein determine whether the service usage activity comprises a background activity comprises: determine a classification of the service usage activity, and based on the classification of the service usage activity, determine whether the service usage activity comprises the background activity."

838. Rao-Freund teaches this limitation for the reasons discussed in connection with email activity in claim 47. *See supra* Claim 47.

7. Claim 52

a. "The non-transitory computer-readable storage medium recited in claim 51, wherein the classification of the service usage activity is based on whether the first software component requires access to the wireless network, whether the one or more prospective or successful communications over the wireless network comprise an update to the first software component, whether the first software component requires information about the wireless network, whether the first software component requires location information, whether the one or more prospective or successful communications over the wireless network comprise an operating system software update, whether the one or more prospective or successful communications over the wireless network comprise a security software update, whether the one or more prospective or successful communications over the wireless network comprise a communication associated with a network-based back-up, whether the one or more prospective or successful communications over the wireless network comprise a communication associated with an e-mail download, whether the one or more prospective or successful communications over the wireless network comprise communications associated with a cloud synchronization service, or a combination of these."

839. Rao-Freund discloses or renders obvious this limitation for the reasons discussed in connection with email activity in claim 47. *See supra* Claim 47.

8. Claim 53

a. [53a] "The non-transitory computer-readable storage medium recited in claim 51, wherein the user input obtained through the user interface of the wireless end-user device is a first user input, and"

840. As discussed above, Rao-Freund teaches that the at least an aspect of the policy is based on a user input. *See supra* Section VIII.A.2.e. A POSITA would recognize that this user input may be a first user input.

b. [53b] "wherein determine a classification of the service usage activity is based on a characteristic of the first software component, a content type associated with the service usage activity, a characteristic of the wireless network, a service plan, a user preference, the first user input, a second user input, the information from the network element, or a combination of these."

841. Rao-Freund teaches this limitation for the reasons discussed in connection with claims 44 and 47. *See supra* Claims 44, 47. A POSITA would have recognized that, by classifying applications and their associated activities based on "focus" and/or user mouse clicks and/or key strokes, Freund's system classifies these applications and activities based on a "second user input."

9. Claim 54

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein determine whether the service usage activity comprises a background activity is based on a user interaction with the wireless end-user device."

842. Rao-Freund teaches this limitation for the reasons presented above in connection with claims 44 and 47 and limitation [53b]. *See supra* Claims 44, 47; Limitation [53b]. A POSITA would have recognized that, by classifying applications and their associated activities based on "focus" and/or user mouse clicks and/or key strokes, Freund's system classifies applications and activities based on a "user interaction with the wireless end-user device."

10. Claim 55

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein determine whether the service usage activity comprises a background activity comprises determine whether a value comprising a measure of the service usage activity satisfies a condition relative to a threshold."

843. Rao-Freund teaches this limitation.

844. Freund teaches a method for determining when an application is being "actively" used for purposes of distinguishing between foreground and background activities and taking appropriate actions. *See* Freund, 3:12-16, 3:42-48 (disclosing a method designed to "distinguish between 'active' use of the Internet (i.e., when user interaction with the PC causes the Internet access) and 'background' use (i.e., when

an application accesses the Internet without user interaction)"); *see also id.*, 8:63-67, 10:17-37 (discussing the differences between actively and passively used applications and noting the desirability of distinguishing between the two).

845. Specifically, Freund explains that an application "can be examined for determining whether it is 'active' by determining whether the application receives 'focus' and/or receives user input (e.g., mouse clicks or key strokes)." *Id.*, 10:37-43. It also provides an exemplary method for detecting whether a user is interacting with an application that is implemented by a client monitor that "maintains a list of active [a]pplications with various fields to track activities and a global activity record." *Id.*, 30:11-49, Figs. 13A-13B.

846. Freund describes its exemplary method as follows: when an application makes a call via a WinSock API, the client monitor intercepts the call and "[m]arks the time of the call in a LastInternetAccess field" of the application's entry in the list maintained by the client monitor. *Id.*, 30:16-19. The client monitor then determines whether the call "uses an Internet protocol usually associated with interactive activity"; if it does, the client monitor "marks the time of the call in a LastInteractiveAccess field of the [a]pplication's list entry." *Id.*, 30:19-24. Similarly, when the client's operating system sends keyboard and/or mouse messages, the client monitor intercepts the messages, "identifies the target . . . [a]pplication of the messages," and "marks the time" of the message in a "LastInteractiveUse field of

the [a]pplication's list entry." *Id.*, 30:30-36. Every five minutes, the client monitor determines whether the LastInteractiveAccess or LastInteractiveUse fields have changed from their previous values and, if so, "add[s] one minute to a TotalInteractiveUse field of the [a]pplication's list entry." *Id.*, 30:39-43.

847. A POSITA would have recognized that determining whether either the LastInteractiveAccess field or the LastInteractiveUse field has changed, and whether time should be added to the TotalInteractiveUse field, within a five-minute window constitutes determining whether a measure of the service usage activity satisfies a condition relative to a threshold.

848. In particular, a POSITA would have recognized that Freund uses these three fields to determine whether the time of active use of an application (and its associated processes, including the service usage activity) exceeds a threshold value of zero minutes within a five-minute span. *See id.*, 30:19-24, 30:30-36, 30:39-43. If the client monitor determines that the time of active use exceeds the threshold value of zero minutes within a five-minute span, it classifies the application as a foreground application, and its activities as foreground activities. If the client monitor determines that the time of active use does not exceed the threshold value of zero minutes within a five-minute span, the application is not classified as a foreground application, and the application's activities are treated as something other than foreground activities (e.g., as background activities).

849. A POSITA would have been motivated and found it obvious to apply these teachings of Freund by configuring the Rao-Freund system to, as Rao teaches, implement Freund's method for determining whether an application 338*a*-338*n* should be classified as a foreground application (and have its associated processes treated as foreground activities) or remain unclassified (and have its associated processes treated as background activities). Doing so would allow the Rao-Freund system to distinguish between network packets corresponding to foreground or background applications and activities, as suggested by both references, using preexisting messages and processes on the client, thereby limiting the resources that would otherwise need to be expended on classifying applications and activities.

850. Freund presented this method for classifying applications back in 1999 as an effective way of determining whether activities associated with applications constituted background service activities, and a POSITA at the time of the alleged invention (at least 10 years later), would have been able to implement this decade-old practice with a reasonable expectation of success.

851. Moreover, each of claims 44-59 recites a known option for how to determine "whether the service usage activity comprises a background activity." In my opinion, a POSITA would have understood that each such option was a well-known technique for making such a determination (as evidenced by the prior art of record), and a POSITA would have appreciated the benefits of employing each

option (as discussed herein). Indeed, a POSITA would have understood that the options recited in claims 44-59 were each one solution selected from a finite number of well-known, identified, predictable solutions that a POSITA could implement with a reasonable expectation of success.

11. Claim 56

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein determine whether the service usage activity comprises a background activity comprises determine whether the first software component is a foreground component or an unclassified component."

852. Rao-Freund teaches this limitation.

853. As discussed above, Rao teaches determining whether a software component is a foreground component. *See supra* Claim 50.

854. Rao explains that foreground applications are those "***currently in active use by the user***" on a client. Rao ¶3; *see also id.* ¶¶182, 188. Rao teaches that a user may actively use an application through "interactive user session[s] that involve[] multimedia elements such as video, voice, chat, gaming, and virtual reality." *Id*. ¶¶133, 140; *see also id.* ¶210. Rao also teaches that a client may include a visual display device 124 and various user input devices, such as "keyboards, mice, trackpads, trackballs, microphones, and drawing tablets," that enable a user to engage in interactive sessions with the applications. *Id*. ¶¶118, 126. In so doing, Rao teaches that background applications can be identified based on the fact that they are

not foreground applications (i.e., applications that are being actively used by a user). *See supra* Claim 50.

855. Freund teaches a method for determining when an application is being "actively" used for purposes of distinguishing between foreground and background activities and taking appropriate actions. *See* Freund, 3:12-16, 3:42-48 (disclosing a method designed to "distinguish between 'active' use of the Internet (i.e., when user interaction with the PC causes the Internet access) and 'background' use (i.e., when an application accesses the Internet without user interaction)"); *see also id.*, 8:63-67, 10:17-37 (discussing the differences between actively and passively used applications and noting the desirability of distinguishing between the two). Specifically, it explains that an application "can be examined for determining whether it is 'active' by determining whether the application receives 'focus' and/or receives user input (e.g., mouse clicks or key strokes)," *id.*, 10:37-43, and provides an exemplary method for detecting whether a user is interacting with an application, *see id.*, 30:11-49, Figs. 13A-13B. Under this method, if user interaction with the application is detected, the application is classified as a foreground application. *See id.*; *see also id.* 6:7-14. If user interaction with the application is not detected, the application is not classified by the system as a foreground application, *see id.*, 30:11-49, Figs. 13A-13B, and is simply treated as something "other" than a foreground

application (i.e., leaving it unclassified as "active" and treating it as a background application).

856. A POSITA would have been motivated and found it obvious to implement these teachings of Freund by configuring the Rao-Freund system to, as Rao teaches, rely on user interactions with the application 338*a*-338*n* (and the wireless end-user device) to either classify application 338*a*-338*n* (a first software component) as a foreground component (and treat its associated processes as foreground activities) or let it remain unclassified (and treat its associated processes as background activities).

857. Doing so would allow the Rao-Freund system to distinguish between network packets corresponding to foreground or background applications and activities and correctly prioritize them while limiting the resources that would otherwise be expended on classifying applications and activities. Freund recognized in 1999 that distinguishing between foreground applications and unclassified applications was an effective way of determining whether activities associated with applications constituted background service activities, and a POSITA at the time of the alleged invention (at least 10 years later), would have been able to implement this decade-old practice with a reasonable expectation of success.

858. Moreover, each of claims 44-59 recites a known option for how to determine "whether the service usage activity comprises a background activity." In

my opinion, a POSITA would have understood that each such option was a well-known technique for making such a determination (as evidenced by the prior art of record), and a POSITA would have appreciated the benefits of employing each option (as discussed herein). Indeed, a POSITA would have understood that the options recited in claims 44-59 were each one solution selected from a finite number of well-known, identified, predictable solutions that a POSITA could implement with a reasonable expectation of success.

12. Claim 57

a. "The non-transitory computer-readable storage medium recited in claim 1, wherein determine whether the service usage activity comprises a background activity comprises determine whether the first software component is in a foreground of user interaction or determine whether the first software component is in a background of user interaction."

859. Rao-Freund teaches this limitation.

860. Rao explains that foreground applications are those "***currently in active use by the user***" on a client. Rao ¶3; *see also id.* ¶¶182, 188. Rao teaches that a user may actively use an application through "interactive user session[s] that involve[] multimedia elements such as video, voice, chat, gaming, and virtual reality." *Id.* ¶¶133, 140; *see also id.* ¶210. Rao also teaches that a client (i.e., the wireless end-user device) may include a visual display device 124 and various user input devices, such as "keyboards, mice, trackpads, trackballs, microphones, and drawing tablets,"

that enable a user to engage in interactive sessions with the applications. *Id*. ¶¶118, 126. In so doing, Rao teaches that a background application can be identified based on the whether a user is actively interacting with the application through a wireless end-user device (e.g., a software component is in a foreground of user interaction when the user is actively interacting with it, and a software component is in the background of user interaction when the user is not actively interacting with it).

861. Freund teaches a method for determining when an application is being "actively" used for purposes of distinguishing between foreground and background activities and taking appropriate actions. *See* Freund, 3:12-16, 3:42-48 (disclosing a method designed to "distinguish between 'active' use of the Internet (i.e., when user interaction with the PC causes the Internet access) and 'background' use (i.e., when an application accesses the Internet without user interaction)"); *see also id.*, 8:63-67, 10:17-37 (discussing the differences between actively and passively used applications and noting the desirability of distinguishing between the two). Specifically, it explains that an application "can be examined for determining whether it is 'active' by determining whether the application receives 'focus' and/or receives user input (e.g., mouse clicks or key strokes)," *id.*, 10:37-43, and provides an exemplary method for detecting whether a user is interacting with an application through a wireless end-user device, *see id.*, 30:11-49, Figs. 13A-13B.

862. In view of the teachings or Rao and Freund, and as explained above, *see supra* Claim 44, a POSITA would have been motivated to determine whether the service usage activity comprises a background activity based on whether the associated application is in the foreground or in the background of user interaction. A POSITA would have been motivated and found it obvious to implement these teachings of Freund by configuring the Rao-Freund system to rely on user interactions with the application 338*a*-338*n* through the wireless end-user device (via, e.g., mouse clicks or keystrokes) to, as suggested by Freund, distinguish between an application receiving focus (and thus, in the foreground of user interaction) and those in the background of user interaction. A POSITA would have recognized that an application in the foreground of user interaction may be identified as an "active" application, such that its associated service usage activities are not background activities, and conversely activities associated with an application not receiving focus (e.g., in the background of user interaction) may be determined to be background activities. In view of the teachings of Freund and Rao, a POSITA would have had a reasonable expectation of success in implementing this method.

863. Moreover, each of claims 44-59 recites a known option for how to determine "whether the service usage activity comprises a background activity." In my opinion, a POSITA would have understood that each such option was a well-known technique for making such a determination (as evidenced by the prior art of

record), and a POSITA would have appreciated the benefits of employing each option (as discussed herein). Indeed, a POSITA would have understood that the options recited in claims 44-59 were each one solution selected from a finite number of well-known, identified, predictable solutions that a POSITA could implement with a reasonable expectation of success.

13. Claim 84

a. [84a] "The non-transitory computer-readable storage medium recited in claim 1, wherein apply the policy comprises: at least assist in preventing initiation of the service usage activity by the first software component; and"

864. Rao-Freund teaches this limitation.

865. Rao teaches that agent 326, filter 322, and/or packet capture mechanism 365 may intercept outbound packet traffic associated with an application 338's establishment of a TCP connection. *See, e.g.*, Rao ¶166 (explaining that the "first packet . . . generated by an application program . . . is intercepted by a filter process 322 before it reaches the network stack"), Fig. 3A-3C; *see also id.* ¶111 ("The remote access client 120 may intercept or capture the IP packets generated by the application 338."). A POSITA would have understood that this "first packet" initiates a service usage activity by the first software component, as disclosed by Rao.

866. Rao teaches that the remote access client 120, upon intercepting these packets, "may identify an application 338 that generated the [network] packet[s]" associated with the attempt to establish the TCP connection and "make a policy-based determination" regarding whether and how the packets should be transmitted "responsive to the identified application 338." *Id.* ¶109. Rao also teaches that the network packets its remote access client 120 intercepts can be prioritized in accordance with policies 520 (which may distinguish between foreground and background applications and processes), queued in accordance with the assigned priorities, and communicated across the network "in a manner according to or consistent with the determined priorities." *Id.* ¶¶191, 194; *see supra* Sections VIII.A.2.e-VIII.A.2.g. Additionally, Rao teaches that the remote access client 120 may prioritize and queue the network packets, then "discard some or all of the network packets after a predetermined period of time" in accordance with policies 520 to "reduce latency and quality issues." Rao ¶207.

867. A POSITA reviewing these disclosures would have been motivated and found it obvious to combine them to generate a system that intercepts initial network packets associated with a background application's establishment of a TCP connection (an initiation of a service usage activity), prioritizes them, queues them, and ultimately discards them, if necessary, to avoid latency- and quality-related issues and reduce network congestion. As explained above, a POSITA would have

been motivated and found it obvious to combine Rao's prioritization- and discarding-related disclosures into a single system with both prioritization and discarding capabilities. *See supra* Claims 34, 80. Moreover, to the extent Rao's disclosures of policies regarding the transmission of network packets associated with initiating TCP connections are connected to embodiments distinct from those disclosing Rao's application-specific prioritization, queuing, and discarding policies, *see* Rao ¶¶108, 182, 207, a POSITA would be motivated to combine them in view of Rao's express invitation to do so, *see id.* ¶218 ("[A]ny of the techniques of the present invention . . . can be practiced in one or more combinations with each other."). Doing so would allow for more granular control over the transmission of network packets (and timing thereof) and achieve Rao's purposes of managing network communications "in accordance with any policies 520 . . . and in further view of any network statistics and other factors occurring on the network" (e.g., congestion). *Id.* ¶195 (noting that the "remote access client 120 may throttle back or not communicate network packets related to other network[] factors, such as congestion," which may be indicated through the remote access client 120's receipt of "a window size of zero for a TCP connection related to an application 338*a*-338*n*"). Doing so would also be merely an exercise of routine skill for a POSITA.

868. A POSITA would have understood that a system capable of discarding network packets associated with an application's establishment of a TCP connection

would prevent the initiation of the service usage activity by the application. Accordingly, a POSITA would have recognized that the Rao-Freund system would prevent the initiation of a service usage activity by the first software component.

b. [84b] "send a message to the first software component."

869. Rao-Freund teaches this limitation.

870. For example, Freund teaches a client monitor capable of "redirecting [a] user to an error page" or "generating an application error" upon the occurrence of an "attempted rule violation." Freund, 26:52-58. An attempted rule violation may arise when an application that is "not allowed to access the Internet" under one or more rules tries to do so; when this occurs, the "client monitor can stop [the] application from accessing the Internet and/or warn the user." *Id.*, 5:61-64. Freund notes that its rules may temporarily "[d]isable Internet [a]ccess for non-critical [a]pplications or protocols" (e.g., Rao's background applications or activities) in order to manage, e.g., network congestion. *Id.*, 30:51-67.

871. A POSITA would have recognized that, in order to cause an application responsible for an attempted rule violation (i.e., an application that is being prevented from accessing the Internet) to redirect a user to an error page or generate an application error, Freund's client monitor must send a message to the application.

872. In the combined Rao-Freund system, a POSITA would have been motivated and found it obvious to apply these teachings of Freund to produce a

system capable of sending a message to background application 338*a*-338*n* and cause it to redirect a user to an error page and/or generate an application error in the event the system was required to discard network packets associated with the application's establishment of a TCP connection (i.e., attempt to initiate a service usage activity). This would have allowed background application 338*a*-338*n* to inform the user that the application would not be permitted to initiate the service usage activity at that time in an effort to avoid latency- and quality-related issues and mitigate network congestion. This would have required no more than the exercise of routine skill for a POSITA, who would have understood how to facilitate communication between the remote access client 120 and application 338*a*-338*n*, *see, e.g.*, Rao ¶¶106, 116 (disclosing that agent 326 and filter 322 may be applications or software components), 190 (disclosing that agent 326 and filter 322 "may communicate . . . via an application programming interface (API), such [as] an IOCTL interface," or other suitable means); *see also* Wyld, 7:30-33 (noting that an API can permit interactions between applications and other software components), particularly given that Freund already teaches that applications may receive information sufficient to permit them to redirect users to error pages and/or generate application errors, *see* Freund, 26:52-58.

14. Claim 85

a. "The non-transitory computer-readable storage medium recited in claim 84, wherein initiation of the service usage activity by the first software component comprises opening of a connection, opening of a socket, initiating transmission, initiating a data flow, or initiating a data stream."

873. Rao-Freund teaches this limitation.

874. As noted above, a POSITA would have been motivated and found it obvious to enable the Rao-Freund system to intercept initial network packets associated with a background application's attempt to initiate a service usage activity (i.e., establish a TCP connection), prioritize them, queue them, and ultimately discard them, if necessary, to avoid latency- and quality-related issues and mitigate network congestion. *See supra* Limitation [84a].

875. Rao further teaches that "a TCP connection is initiated by an application 338 executing on the client 105 for transmission of IP packets to a target computing device," and that "[t]he remote access client 120 may intercept or capture the IP packets generated by the application 338." Rao ¶111. Upon "identify[ing the] application 338 that generated the packet" and "mak[ing] a policy-based determination to transmit the packet . . . responsive to the identified application 338," *id.* ¶109, "[t]he remote access client 120 may send a TCP acknowledgement packet to the application 338," "terminate the TCP connection initiated by the application 338," "create[] a second TCP connection to [a] second computing device

. . . or the gateway 340," and "transmit[] the captured IP packets via the second TCP connection," *id.* ¶111.

876. A POSITA would have recognized that the above process—which outlines how network packets associated with establishing a TCP connection might move if they are not discarded by the Rao-Freund system—would start the transmission of network packets from the application 338 to either the second computing device or the gateway 340. A POSITA also would have understood that the transmission of network packets from the application 338 to either the second computing device or the gateway would have constituted a data flow or data stream, and that the above process therefore would also initiate a data flow or data stream from application 338 to the second computing device or gateway 340.

15. Claim 86

a. "The non-transitory computer-readable storage medium recited in claim 84, wherein the message comprises a reset message, an indication that the service usage activity is not allowed, or an indication that the wireless network is not available."

877. Rao-Freund teaches this limitation.

878. As discussed above, a POSITA would have been motivated and found it obvious to enable the Rao-Freund system to send a message to a background application 338*a*-338*n* to cause it to redirect a user to an error page and/or generate an application error in the event the system was required to discard network packets

associated with the application's establishment of a TCP connection (i.e., attempt to initiate a service usage activity). *See supra* Limitation [84b]. Again, this would have allowed the application to inform the user that the application would not be permitted to initiate the service usage activity at that time in an effort to avoid latency- and quality-related issues and mitigate network congestion. This would have required no more than the exercise of routine skill for a POSITA, who would have understood how to facilitate communication between the remote access client 120 and application 338*a*-338*n*, *see, e.g.*, Rao ¶¶106, 116, 190; *see also* Wyld, 7:30-33, particularly given that Freund already teaches that applications may receive information sufficient to permit them to redirect users to error pages and/or generate application errors, *see* Freund, 26:52-58.

879. A POSITA would have further recognized that a message that causes background application 338*a*-338*n* to redirect a user to an error page and/or generate an application error to inform the user that the application would not be permitted to access the network at that time would have ordinarily and obviously comprised an indication that the service usage activity (e.g., the process(es) of background application 338*a*-338*n*, which were associated with the discarded network packets) would not be allowed.

D. Rao and Fadell in View of Freund Renders Obvious Claims 97, 98, 100, 101, and 139 Under 35 U.S.C. § 103

1. Motivation to Combine Rao, Fadell, and Freund

880. A POSITA would have been motivated and found it obvious to combine Rao, Fadell, and Freund for at least the reasons presented above in Sections VIII.B.1 and VIII.C.1. The disclosures of Rao, Fadell, and Freund build upon and complement one another, where the combined system would determine that the network packets are associated with background applications/activities using, for example, Freund's method of determining whether an application and its activities are the objects of a user's focus and/or receiving user input(s). *See supra* Sections VIII.B.1, VIII.C.1. As discussed above, the system would have been the predictable product of combinations of known limitations. *See supra* Sections VIII.B.1, VIII.C.1.

881. Like Rao, Freund monitors communications to and from networks and distinguishes between foreground and background activity. Freund, 14:51-21:50, 8:63-9:3, 10:16-43. Freund discloses monitoring network activity on a "per process or per application basis." *Id.*, 4:5-5:5, 4:51-63, 10:44-11:28. Freund also discloses triggering warnings, such as "an error dialog," a "redirecti[on] . . . to an error page," or "an application error," when, e.g., an application is "not allowed to access the Internet" under one or more rules. *Id.*, 4:26-28, 5:61-64,13:20-22, 26:52-58

882. As noted above, Fadell teaches that its resource utilization component can alert/notify users and allow them to control their network communications when their resource usage reaches or comes close to certain limits or thresholds. *See* Fadell ¶¶21-22, 27, 47-72, Figs. 1, 3-6; *supra* Section VIII.B.1. These resource usage notifications "assist the consumer in avoiding excess fees or penalties." Fadell ¶51; *see supra* Section VIII.B.1.

883. A POSITA would have recognized that Fadell's "notification" disclosures and Freund's "dialog" disclosures are also analogous and complementary to one another and would have looked to the latter to supplement the former given their similarities and disclosed benefits. For example, a POSITA would have recognized that Freund teaches a well-established means for generating scenario-specific (e.g., application-, resource usage limit-, or threshold-specific) notifications. Accordingly, a POSITA would have combined Fadell and Freund, and had a reasonable expectation of success in doing so, to generate a system capable of preparing and issuing situation-specific notifications for a user upon the user's reaching or coming close to a resource usage limit or threshold.

884. A POSITA would have incorporated Freund's per application monitoring and associated warnings into Rao-Fadell. As Freund discloses, doing so would have benefited system administrators measuring productivity (e.g., on an employer network or employer user device). *Id.*, 8:63-9:3, 10:16-43. By monitoring

application use, unproductive web browsing, for example, can be identified and minimized. *Id.* Specific applications can also be isolated and blocked from Internet access. *Id.*, 4:26-28, 13:20-22, 26:52-58. This would have benefited both Rao and Fadell, for example, by monitoring applications that are background activity and/or those that consume significant bandwidth to assist intercepting those activities and notifying the user of the activity.

885. A POSITA would have been motivated to incorporate Freund's application-specific notifications into Rao-Fadell to provide user notifications when applications have launched or attempted to launch, thereby informing users what processes are in use and consuming data and bandwidth. This would have enabled a user to act, e.g., to modify application usage to avoid data overages/charges. Combining Freund's application-specific monitoring and notifications with Rao-Fadell would have been simply the use of known techniques of application monitoring to improve similar methods (e.g., Rao's packet prioritizing and Fadell's notifications and resource usage monitoring) in the same way. The combination also would have been simply combining known prior art according to understood principles to yield predictable results. In doing so, the system would issue application-specific notifications to inform users of approaching resource usage limits or thresholds and allow them to take appropriate actions in response.

886. Additional considerations supporting a POSITA's motivation to combine Rao, Fadell, and Freund are provided below.

2. Claim 97

a. "The non-transitory computer-readable storage medium recited in claim 91, wherein the first software component is at least a portion of an application, and wherein the one or more prospective or successful communications over the wireless network comprise an attempt to launch, run, or execute the application, and wherein the notification comprises information about the attempt to launch, run, or execute the application."

887. Rao-Fadell-Freund teaches this limitation.

888. Rao teaches that the first software component is at least a portion of an application for the reasons discussed with respect to claim 1. *See supra* Section VIII.B.2.b, [1b]. Rao also teaches that the one or more prospective or successful communications over the wireless network comprise an attempt to launch, run, or execute the application for the reasons discussed in, e.g., claims 1 and 7. *See, e.g.*, *supra* Section VIII.B.2.b; Claim 7.

889. Rao-Fadell-Freund further teaches providing a notification that includes information about the attempt to launch, run, or execute the application. For example, Fadell discloses a web browser application and refraining from "automatically start[ing] playing back [of] video or audio" on a web page until the user instructs. Fadell ¶59. To offer the user the choice of whether to start playing

back video or audio in Fadell's web browser, Fadell discloses attempting to launch, run, or execute a software component that provides the video or audio (e.g., a video or audio plug-in for the web browser). *Id.* Fadell also discloses that "data transfers may be restricted based on the protocol or application requesting the data transfer," Fadell ¶56, e.g., based on the software component, which detects attempted uses of those software components. *Supra* claim 147.

890. A POSITA also would have recognized that an application may prompt other components to engage in background activity (e.g., automatic updates, virus scan updates, RSS feed detectors). Fadell ¶¶56, 60; Rao ¶¶182, 188. A POSITA would have been motivated to apply Fadell's teachings in Rao-Fadell to allow the user to decide whether to start a prompted attempt to launch/run/execute a background activity. This would have conserved resources and avoided unnecessary data expenditure. Fadell ¶59. A POSITA would have been motivated to do so to prevent software components from consuming data and bandwidth, potentially without the user's knowledge (e.g., in the background and automatically), as contemplated by Rao and Fadell. Fadell ¶¶56, 60; Rao ¶¶182, 188. Doing so would have been simply combining known elements according to understood principles to yield predictable results.

891. Freund also discloses that an application may be prevented from accessing the Internet for various reasons, including due to bandwidth concerns.

Freund explains that its system monitors bandwidth and that, if the user "exceed[s a] rule-based quantity [e.g., a bandwidth threshold] either for the specific [a]pplication or the user/workstation, the Client Monitor disables future Internet access and/or warns the user." *Id.*, 30:10-28. Freund discusses possible "warning[s]" that may be conveyed to a user upon the occurrence of an "attempted rule violation" (e.g., when an unauthorized application attempts to access the Internet), explaining that, when the user is prevented from accessing the Internet, the client monitor may "show[] an error dialog," "redirect[a] user to an error page," and/or "generat[e] an application error." *Id.*, 26:52-58, Fig. 7G.

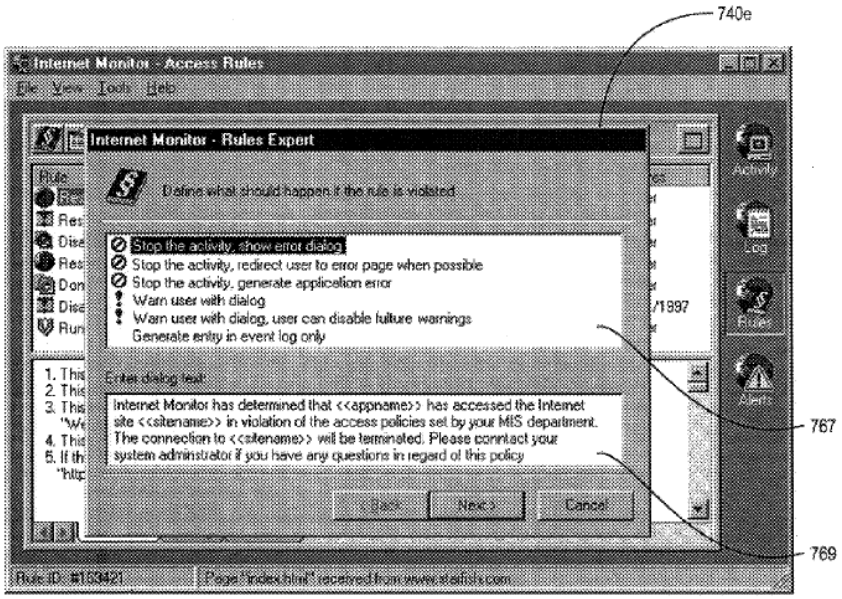


FIG. 7G

Id., Fig. 7G (showing options to "show error dialog," "redirect user to error page," "generate application error," and "warn user with dialog").

892. A POSITA would understand that, when Freund's client monitor "warns" the user that an application has exceeded its allowed quantity of Internet access through an "error dialog," it is providing a notification via the user interface (e.g., the error dialog) that comprises information about the attempt to launch, run, or execute the application (e.g., informing the user that the application has exceeded an allowed bandwidth threshold and is blocked from further Internet access, such that the attempt to launch, run, or execute the application has failed).

893. In the combined Rao-Fadell-Freund system, a POSITA would have been motivated to implement Freund's application-specific warnings to notify a user when system rules are operating on a particular application—that is, to notify the user when service usage activities associated with a background application are being intercepted, queued, and deprioritized because the user had reached a resource usage threshold or limit. A POSITA would have recognized that providing this information would have benefitted a user by allowing the user to understand what network communications were being intercepted, queued, and prioritized, as suggested by Freund. *See, e.g.*, *id.*, 30:10-28. This would have given the user greater control over the policy in the combined system (e.g., by prompting the user to redesignate the priority associated with certain applications or associated service usage activities).

894. Further, a POSITA would have recognized a security benefit of identifying applications attempting to launch, run, or execute in the background to the user. Freund explains that unwanted background applications may be running without the user's knowledge, posing security concerns. *See id.*, 10:44-11:28 (discussing unstable "beta" software with security flaws, viruses, and Trojan horses); *see also* Fadell ¶66 (identifying issue with unsolicited data transfers). A POSITA would have been motivated to provide the warnings described in Freund in the combined system for this additional reason.

3. Claim 98

a. "The non-transitory computer-readable storage medium recited in claim 91, wherein the one or more prospective or successful communications over the wireless network comprise an attempted or successful launch or execution of the first software component, and wherein the notification comprises information about the attempted or successful launch or execution of the first software component."

895. Rao-Fadell-Freund teaches this limitation for the reasons explained in connection with claim 97. *See supra* Claim 97. As discussed above, in the combined system, the notification may comprise information about the attempted launch or execution of the first software component (e.g., that the attempt was blocked).

4. Claim 100

a. [100a] "The non-transitory computer-readable storage medium recited in claim 91, wherein the one or more prospective or successful communications over the wireless network comprise an attempt to download or load an application"

896. Rao-Fadell-Freund teaches this limitation.

897. Rao-Fadell teaches the non-transitory computer-readable storage medium recited in claim 91. *See supra* Claim 91. Rao-Fadell, at least in view of Freund, further teaches that the one or more prospective or successful communications over the wireless network comprise an attempt to download or load an application.

898. Rao emphasizes that the applications running on client 105 (the wireless end-user device)

> can be any type and/or form of application such as any type and/or form of 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.

Rao ¶88. Rao identifies exemplary applications, including various clients and "software related to VoIP communications, such as a soft IP telephone . . . [or] related to real-time data communications, such as applications for streaming video and/or audio." *Id.*

899. Freund discusses similar applications. Freund, 15:12-18 (describing a "multitude" of applications including a "web browser"), 24:1-5 (describing a "real audio player application"), 29:60-66 (referencing Java™ and ActiveX applications). Freund explains that at least 10 years before the alleged invention, "more and more applications [we]re downloaded from the Internet." *Id.*, 10:66-11:1; *see also id.*, 21:33-40, 29:50-51 (discussing downloads of materials to individual user devices).

900. A POSITA would have understood that attempts to download or load applications were common types of network activity, as taught by Freund, and accounted for them in implementing the Rao-Fadell-Freund system. Rao confirms that wireless downloads were within a POSITA's skill by explaining that both relevant policies and its remote access client (which "may comprise an application") may be downloaded onto wireless end-user devices over a wireless network (e.g., via Rao's gateway 340). Rao ¶¶116, 183, 220. Accordingly, a POSITA would have understood that in the Rao-Fadell-Freund system, the one or more prospective or successful communications over the wireless network comprise an attempt to download or load an application.

b. [100b] "and wherein the notification comprises information about the attempted download or load of the application."

901. Rao-Fadell-Freund teaches this limitation.

902. As discussed in connection with claim 97, Freund teaches application-specific notifications that warn the user when system rules are being applied to a particular application. *See supra* Claim 97. And, as further discussed in connection with claim 97, a POSITA would have been motivated to include these application-specific notifications in the combined Rao-Fadell-Freund system. *See supra* Claim 97.

903. For the same reasons, a POSITA would have been motivated to warn the user when the policy was applied to a download or load of an application. *See supra* Claim 97. This is further confirmed by Fadell, which teaches that media-heavy downloads may "require significant resources." *See, e.g.*, Fadell ¶¶18, 59. Alerting the user to an attempted download or load of an application would allow the user to reschedule or restrict the download, as suggested by Fadell, to avoid over-use of resources and minimize costs. *See, e.g.*, *id.* ¶¶18, 60-61.

5. Claim 101

a. "The non-transitory computer-readable storage medium recited in claim 91, wherein the one or more prospective or successful communications over the wireless network comprise an attempt to initiate usage of a cloud-based service or application, and wherein the notification comprises information about the attempted initiation of usage of the cloud-based service or application."

904. For the reasons discussed in connection with claim 97, Rao-Fadell-Freund teaches one or more prospective or successful communications over the

wireless network that comprise an attempt to initiate usage of an application, and further disclose that the notification comprises information about the attempted initiation of usage of the application. *See supra* Claim 97.

905. Rao-Fadell-Freund further teaches that the application which the communication has attempted to initiate usage comprises a "cloud-based service or application."

906. For example, Rao discloses that its client 105 "may connect to a server 102a [or] a ***server farm*** 102*e*, . . . via a gateway." Rao ¶86. Rao further teaches that the server farm is a "logical group of one or more servers that are administered as a single entity," where the server farm "may be ***running one or more applications*** 338N, such as an application 338*f* providing a thin-client computing or remote display presentation application." *Id.* ¶91.

907. A POSITA would have understood that, by disclosing a "server farm" that runs "one or more applications" that are remotely accessible by a client device over a network, Rao teaches attempts to initiate usage of a cloud-based service or application (and, as discussed in connection with Claim 97, notifications related to the same). Indeed, cloud-based services and applications are remotely accessed services and applications that are run on multiple servers and remotely maintained for users to access. This is indistinguishable from Rao's disclosure of a server farm and related applications, and is therefore obvious in view of Rao's disclosures.

Initiating usage of a remotely accessible (e.g., cloud-based) application would occur via network communications, Rao ¶¶86, 91, and a POSITA would have been motivated to include notifications comprising information about that attempted initiation, as discussed with respect to Freund's notifications in claim 97, to offer the user the opportunity to decide whether to start that process. *Supra* claim 97.

6. Claim 139

a. "The non-transitory computer-readable storage medium recited in claim 118, wherein the notification presents an indication of a measure of usage of the wireless network associated with the first software component."

908. Rao-Fadell-Freund teaches this limitation.

909. As discussed in connection with claim 118, Rao-Fadell teaches a notification. *See supra* Claim 118.

910. Rao-Fadell further teaches that the notification may indicate a measure of usage of the wireless network associated with a service usage activity. For example, as discussed in connection with claim 116, in view of Rao and Fadell, a POSITA would have found it obvious to include information related to particular service usage activity in the notifications. *See supra* Claim 116.

911. Rao and Fadell, in further view of Freund, also disclose, or at least render obvious, that the notification presents an indication of a measure of usage of the wireless network associated with the first software component.

912. Like Rao and Fadell, Freund teaches monitoring "Internet access on a per application basis—that is, access broken down by the application or applications used for the access." Freund, 10:44-11:28. This allows "the ability to specify which applications can (and cannot) access the Internet." *Id.*; *see also id.*, 25:20-51 (disclosing a rule that activities of only the "latest release[s]" or certain versions of applications are permitted). Freund further teaches that the client monitor "can stop [an] application from accessing the Internet and/or warn the user" due to bandwidth concerns or user exceeding a resource threshold. *Id.*, 5:61-64, 30:10-28. Freund displays these warnings to the user. *Id.*, 26:52-58, Fig. 7G *Id.*, 5:61-64.

913. Freund discloses that an application may be prevented from accessing the Internet for various reasons, including due to bandwidth concerns. Freund explains that its system monitors bandwidth and that, if the user "exceed[s a] rule-based quantity [e.g., a bandwidth threshold] either for the specific [a]pplication or the user/workstation, the Client Monitor disables future Internet access and/or warns the user." *Id.*, 30:10-28. Freund explains that its warnings may be displayed to the user. *Id.*, 26:52-58, Fig. 7G. Freund's per-application monitoring simplifies the task of tracking bandwidth utilization for a network, including providing detailed review on how the Internet access is being used. *Id.* 10:16-11:28.

914. In the combined Rao-Fadell-Freund system, a POSITA would have been motivated to apply Freund's per-application teachings and display a

notification to the user that provides information not just about the resource usage associated with a particular service usage activity (as discussed in connection with Fadell in claim 116), but also the application associated with that activity, providing the information on a per application basis as Freund suggests. Doing so, as Freund explains, would enable the combined system to "track[] bandwidth utilization" and "provid[e a] detailed review on how the Internet access is being used" based on the application requesting data. *Id.*, 10:44-11:28.

915. A POSITA would have applied Freund's per-application monitoring in the combined system to provide a notification of the measure of usage of each application, and thus indicate of a measure of usage of the wireless network associated with the first software component. Indeed, Freund teaches providing "warning[s]" and "dialogs" to users based on use. *See id.*, 4:26-27, 13:20-21, 26:52-58, Fig. 7G. Applying Freund's per-application monitoring and associated warnings and/or dialogs in the notification to a user in the combined system would have been nothing more than combining known elements in the prior art according to understood principles for predictable results. A POSITA would have been motivated to notify a user in this manner, for example, because it would have informed the user as to how much data particular applications were consuming and would have given the user more information about the system. This would have enabled the user to

take corrective actions, if necessary, including by restricting particular applications or activities to curtail data resource use, as Fadell teaches. Fadell ¶¶51-53, 58-61.

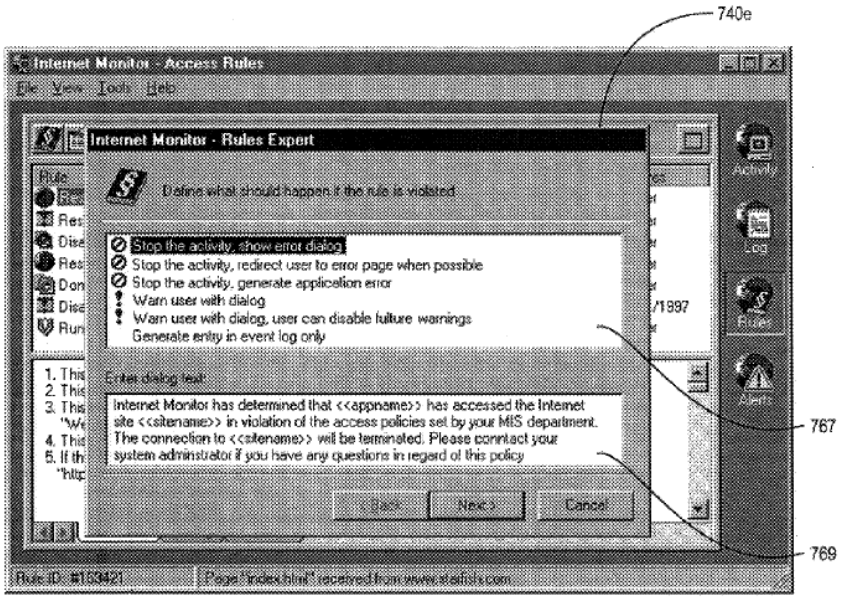


FIG. 7G

Freund, Fig. 7G.

IX. SECONDARY CONSIDERATIONS

916. I have considered the issue of secondary considerations and am currently unaware of any evidence of secondary considerations that would support a finding of non-obviousness or otherwise impact my opinions herein.

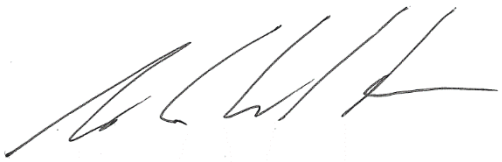
X. CONCLUSION

917. For the reasons set forth above, it is my opinion that claims 1-174 of the ’541 patent are unpatentable in view of the prior art.

918. 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.

919. I declare that all statements made herein of my knowledge are true, that all statements made on information and belief are believed to be true, and that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Dated: 6/5/2024

By: 

Andrew Wolfe

Appendix A

APPENDIX A

I. CLAIMS 2-6

Claim 2	Claim 3	Claim 4	Claim 5	Claim 6
The non-transitory computer-readable storage medium recited in **claim 1**, wherein the first software component comprises at least a portion of an application component or at least a portion of an operating system component, and wherein the one or more prospective or successful communications over the wireless network comprise an update to the first software component.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein the one or more prospective or successful communications over the wireless network comprise a communication associated with a network access, background signaling, a cloud synchronization service, an information feed, a download, an e-mail, a chat client, a security update, a peer-to-peer networking application update, a report of a behavior associated with the wireless end-user device, or a combination of these.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein the one or more prospective or successful communications over the wireless network comprise a communication associated with a content update or a content download.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein the one or more prospective or successful communications over the wireless network comprise a communication associated with an image, music, a video, an electronic book, an e-mail attachment, a content or media subscription, a news feed, a text message, a video chat, or a combination of these.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein the one or more prospective or successful communications over the wireless network comprise a communication associated with a device application or widget, a device operating system function, a file download, streaming media, a software update, a firmware update, a website, a connection to a server, a web browser, or a synchronization service.

II. CLAIMS 7-18

Claim 7	Claim 8	Claim 9	Claim 10	Claim 11
The non-transitory computer-readable storage medium recited in **claim 1**,	The non-transitory computer-readable storage medium recited in **claim 1**,	The non-transitory computer-readable storage medium recited in **claim 1**,	The non-transitory computer-readable storage medium recited in **claim 9**,	The non-transitory computer-readable storage medium recited in **claim 9**,
		wherein the service usage activity results from cooperation between the first software component and at least one other software component, application, process, function, activity, or service, and	wherein the first software component comprises at least a portion of an application, and	
wherein **identify a service usage activity** of the wireless end-user device comprises identify an intention to launch or start the first software component.	wherein **identify a service usage activity** of the wireless end-user device comprises identify: an application identifier associated with the service usage activity or the first software component, an operating system function identifier associated with the service usage activity or the first software component, an aggregate service activity identifier, a component service activity identifier, or a combination of these.	wherein **identify a service usage activity** of the wireless end-user device comprises: identify a data flow to or from the at least one other software component, application, process, function, activity, or service; and associate the data flow with the first software component.	wherein the at least one other software component, application, process, function, activity, or service performs a ***proxy*** function.	wherein the at least one other software component, application, process, function, activity, or service performs a ***proxy*** function.

Claim 12	Claim 13	Claim 14	Claim 15	Claim 16
The non-transitory computer-readable storage medium recited in **claim 9**, wherein the at least one other software component, application, process, function, activity, or service comprises a media service manager, an e-mail service manager, a domain name service (DNS) function, a software download service manager, a media download manager, a data download service manager, a media library function, a simple mail transfer protocol (SMTP) proxy, an Internet message access protocol (IMAP) proxy, a post office protocol (POP) proxy, a hypertext transfer protocol (HTTP) proxy, an instant messaging (IM) proxy, a virtual private network (VPN) service manager, or a secure socket layer (SSL) proxy.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein **identify a service usage activity** of the wireless end-user device comprises: monitor an application ***proxy*** service flow; and classify the application ***proxy*** service flow as being initiated by or belonging to the first software component.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein **identify a service usage activity** of the wireless end-user device comprises: associate an identifier identifying the first software component with a request to a ***proxy*** service; associate the request to the ***proxy*** service with a traffic flow, the traffic flow comprising the service usage activity; and associate the traffic flow with the identifier.	The non-transitory computer-readable storage medium recited in **claim 14**, wherein the identifier comprises a name, a fingerprint, an identification tag, a process number, or a credential.	The non-transitory computer-readable storage medium recited in **claim 9**, wherein the service usage activity results from cooperation between the first software component and a ***proxy*** function, and wherein **identify a service usage activity** of the wireless end-user device comprises: identify a data flow to or from the ***proxy*** function; and associate the data flow with the first software component.

Claim 17	Claim 18
The non-transitory computer-readable storage medium recited in **claim 1**, wherein **identify a service usage activity** of the wireless end-user device comprises identify the service usage activity based on a stream, a flow, a destination, a port, a packet inspection, or a combination of these.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein **identify a service usage activity** of the wireless end-user device comprises determine an identifier associated with the first software component, a number associated with the first software component, a name associated with the first software component, or a signature associated with the first software component.

III. CLAIMS 19-23

Claim 19	Claim 20	Claim 21	Claim 22	Claim 23
The non-transitory computer-readable storage medium recited in **claim 1**, wherein the first software component comprises at least a portion of an application on the wireless end-user device.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein the first software component comprises an operating system component, function, or service.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein the first software component comprises a software function, utility, process, or tool.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein the first software component comprises a plurality of applications, processes, functions, activities, or services.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein the first software component comprises a Java archive (JAR) file, an application that uses an operating system (OS) function, an application that uses a proxy service function, or an OS process function that supports an application or OS function.

IV. CLAIMS 24 AND 172-74

Claim 24	Claim 172	Claim 173	Claim 174
The non-transitory computer-readable storage medium recited in **claim 1**, wherein the network element is communicatively coupled to the wireless end-user device over the wireless network.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein the network element comprises a service controller, a server, a cloud element, or a billing element.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein, when executed by the one or more processors of the wireless end-user device, the machine-executable instructions further cause the one or more processors to provide information about the service usage activity to the network element.	The non-transitory computer-readable storage medium recited in **claim 173**, wherein the information about the service usage activity comprises a count of data traffic associated with the service usage activity, a transaction count, a message count, a connection time, a connection duration, a classification of traffic, an indication that a measure of the service usage activity satisfies a condition relative to a threshold, a parameter associated with the service usage activity, an indication that the background activity is restricted, or a combination of these.

V. CLAIMS 25-43

Claim 25	Claim 26	Claim 27	Claim 28	Claim 29
The non-transitory computer-readable storage medium recited in **claim 1**, wherein the policy is based on an amount of time, a time of day, a day of a week, a schedule, a network busy state, a network performance state, a network quality-of-service state, a priority of the service usage activity, or a combination of these.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein the policy is based on a background service class, a background service state, or a combination of these.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein the policy is based on at least an aspect of a service plan.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein the policy is based on a behavior of the first software component, a behavior of the service usage activity, a messaging layer behavior, a random back off, a power state of the wireless end-user device, a usage state of the wireless end-user device, or a combination of these.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein the policy is based on a user interaction with the first software component, a user interaction with the service usage activity, a user interaction with the wireless end-user device, a user interface priority of the service usage activity, or a combination of these.

Claim 30	Claim 31	Claim 32	Claim 33	Claim 34
The non-transitory computer-readable storage medium recited in **claim 1**, wherein the wireless end-user device is part of a device group, and wherein the policy is associated with the device group.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein the policy is based on a type of the wireless network.	The non-transitory computer-readable storage medium recited in **claim 31**, wherein the type of the wireless network is cellular, 2G, 3G, 4G, home, roaming, wireless fidelity (WiFi), or a combination of these.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein the policy is based on a roaming condition of the wireless end-user device, a cost associated with communicating over the wireless network, or a combination of these.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein controlling the service usage activity comprises preventing the first software component from launching, executing, or running.

Claim 35	Claim 36	Claim 37	Claim 38	Claim 39
The non-transitory computer-readable storage medium recited in **claim 1**, wherein the at least an aspect of the policy is based on the user input obtained through the user interface of the wireless end-user device, and wherein the user input identifies the first software component or the service usage activity.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein the at least an aspect of the policy is based on the user input obtained through the user interface of the wireless end-user device, and wherein the user input identifies a network parameter or a network type.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein the policy is based on a usage limit or a threshold.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein the policy is based on a limit, wherein the limit is based on the user input obtained through the user interface of the wireless end-user device, a user preference, an indication of a threshold, a total traffic, a type of traffic, a destination, a port, a frequency of access, an access behavior, or a combination of these.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein the policy is based on a type of the service usage activity, a priority of the service usage activity, a duration of the service usage activity, a characteristic of the wireless network, a quality-of-service (QoS) rule associated with the service usage activity, or a combination of these.

Claim 40	Claim 41	Claim 42	Claim 43
The non-transitory computer-readable storage medium recited in **claim 1**, wherein the policy comprises one or more filters, wherein the one or more filters provide filtering based on: a characteristic of the wireless network, a service plan applicable to the wireless end-user device, a characteristic of the first software component, a time of day, a network busy state, or a combination of these.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein the wireless network is a ***first*** wireless network, and wherein the service usage activity is a first service usage activity, and wherein the policy assists the one or more processors to control the first service usage activity when the wireless end-user device is connected to the first wireless network and refrain from controlling a second service usage activity when the wireless end-user device is connected to a second wireless network, the second service usage activity being associated with the first software component.	The non-transitory computer-readable storage medium recited in **claim 41**, wherein control the first service usage activity comprises prevent, restrict, or block the first service usage activity.	The non-transitory computer-readable storage medium recited in **claim 41**, wherein the second wireless network is a wireless fidelity (WiFi) network or a home network.

VI. CLAIMS 44-59

Claim 44	Claim 45	Claim 46	Claim 47
The non-transitory computer-readable storage medium recited in **claim 1**, wherein determine whether the service usage activity comprises a background activity comprises determine whether a user is interacting with or has interacted with the first software component.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein determine whether the service usage activity comprises a background activity comprises determine whether the first software component is in a user interface foreground.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein determine whether the service usage activity comprises a background activity comprises determine whether the service usage activity is a software update.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein determine whether the service usage activity comprises a background activity comprises determine whether the first software component is or has been classified as being in a background state or the service usage activity is or has been classified as a background service.

Claim 48	Claim 49	Claim 50	Claim 51
The non-transitory computer-readable storage medium recited in **claim 1**, wherein determine whether the service usage activity comprises a background activity comprises determine whether the service usage activity is identified by a list specifying one or more background activities.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein determine whether the service usage activity comprises a background activity comprises determine whether the service usage activity is a **foreground** activity.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein determine whether the service usage activity comprises a background activity comprises determine whether the first software component is a foreground component.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein determine whether the service usage activity comprises a background activity comprises: determine a classification of the service usage activity, and based on the classification of the service usage activity, determine whether the service usage activity comprises the background activity.

Claim 52	Claim 53	Claim 54	Claim 55
The non-transitory computer-readable storage medium recited in **claim 51**, wherein the classification of the service usage activity is based on: whether the first software component requires access to the wireless network, whether the one or more prospective or successful communications over the wireless network comprise an update to the first software component, whether the first software component requires information about the wireless network, whether the first software component requires location information, whether the one or more prospective or successful communications over the wireless network comprise an operating system software update, whether the one or more prospective or successful communications over the wireless network comprise a security software update, whether the one or more prospective or successful communications over the wireless network comprise	The non-transitory computer-readable storage medium recited in **claim 51**, wherein the user input obtained through the user interface of the wireless end-user device is a ***first*** user input, and wherein determine a classification of the service usage activity is based on a characteristic of the first software component, a content type associated with the service usage activity, a characteristic of the wireless network, a service plan, a user preference, the ***first*** user input, a ***second*** user input, the information from the network element, or a combination of these.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein determine whether the service usage activity comprises a background activity is based on a user interaction with the wireless end-user device.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein determine whether the service usage activity comprises a background activity comprises determine whether a value comprising a measure of the service usage activity satisfies a condition relative to a threshold.

Claim 52	Claim 53	Claim 54	Claim 55
a communication associated with a network-based back-up, whether the one or more prospective or successful communications over the wireless network comprise a communication associated with an e-mail download, whether the one or more prospective or successful communications over the wireless network comprise communications associated with a cloud synchronization service, or a combination of these.			

Claim 56	Claim 57	Claim 58	Claim 59
The non-transitory computer-readable storage medium recited in **claim 1**, wherein determine whether the service usage activity comprises a background activity comprises determine whether the first software component is a foreground component or an unclassified component.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein determine whether the service usage activity comprises a background activity comprises determine whether the first software component is in a foreground of user interaction or determine whether the first software component is in a background of user interaction.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein determine whether the service usage activity comprises a background activity comprises determine whether content associated with the service usage activity is in a foreground of a user interface of the wireless end-user device.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein determine whether the service usage activity comprises a background activity comprises determine whether the first software component is active.

VII. CLAIMS 60-76 AND 79-90

Claim 60	Claim 61	Claim 62	Claim 63	Claim 64
The non-transitory computer-readable storage medium recited in **claim 1**,	The non-transitory computer-readable storage medium recited in **claim 1**,	The non-transitory computer-readable storage medium recited in **claim 1**,	The non-transitory computer-readable storage medium recited in **claim 1**,	The non-transitory computer-readable storage medium recited in **claim 1**, wherein the one or more prospective or successful communications over the wireless network comprise one or more Internet protocol (IP) address requests, and
wherein apply the policy comprises at least assist in allowing, restricting, delaying, throttling, or preventing the service usage activity.	wherein apply the policy comprises at least assist in: blocking access to the wireless network, restricting access to the wireless network, delaying access to the wireless network, or aggregating and holding the service usage activity.	wherein apply the policy comprises at least assist in queuing, time-windowing, suspending, quarantining, killing, or removing the service usage activity.	wherein apply the policy comprises at least assist in preventing an update associated with the first software component.	wherein apply the policy comprises at least assist in withholding, delaying, time-windowing, reducing in frequency, or aggregating at least a portion of the service usage activity.

Claim 80	Claim 81	Claim 87	Claim 88
The non-transitory computer-readable storage medium recited in **claim 1**, wherein apply the policy comprises at least assist in killing or suspending the service usage activity or the first software component.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein apply the policy comprises at least assist in changing or setting a priority of the service usage activity.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein apply the policy comprises: identify a socket to be opened for the service usage activity; and based on a condition, block the service usage activity or terminate the socket.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein controlling the service usage activity comprises: blocking a network access event or attempt associated with the first software component, modulating a number of access events or attempts associated with the first software component, aggregating a plurality of access events or attempts associated with the first software component, or time-windowing the number of access events or attempts associated with the first software component.

Claim 65	Claim 66	Claim 67	Claim 68	Claim 69
The non-transitory computer-readable storage medium recited in **claim 1**, wherein the information from the network element is ***first*** information, and wherein apply the policy comprises provide ***second*** information to the first software component.	The non-transitory computer-readable storage medium recited in **claim 65**, wherein provide ***second*** information to the first software component comprises provide the ***second*** information through an application programming interface.	The non-transitory computer-readable storage medium recited in **claim 65**, wherein, when executed by the one or more processors of the wireless end-user device, the machine-executable instructions further cause the one or more processors to: provide ***third*** information to a ***second*** software component on the wireless end-user device, the ***third*** information being different from the ***second*** information.	The non-transitory computer-readable storage medium recited in **claim 67**, wherein provide ***third*** information to a ***second*** software component on the wireless end-user device comprises provide the ***third*** information through an application programming interface.	The non-transitory computer-readable storage medium recited in **claim 67**, wherein the ***third*** information enables the ***second*** software component to communicate over the wireless network.

Claim 70	Claim 71	Claim 72	Claim 73	Claim 74
The non-transitory computer-readable storage medium recited in **claim 65**, wherein the wireless network is a ***first*** wireless network, and wherein the ***second*** information comprises a network access condition of the ***first*** wireless network, a network busy state associated with the ***first*** wireless network, a network availability state associated with the ***first*** wireless network, a network busy state associated with a ***second*** wireless network, a network availability state associated with the ***second*** wireless network, or information about the policy.	The non-transitory computer-readable storage medium recited in **claim 65**, wherein the ***second*** information comprises a setting for assisting the first software component in restricting, allowing, blocking, throttling, deferring, time scheduling, or queuing the service usage activity.	The non-transitory computer-readable storage medium recited in **claim 71**, wherein the setting is based on a characteristic of the wireless network, a network busy state associated with the wireless network, a time, a service plan associated with the wireless end-user device, a classification of the service usage activity, or a combination of these.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein apply the policy comprises inform the first software component whether the first software component is allowed to access the wireless network.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein apply the policy comprises inform the first software component whether the wireless network is available.

Claim 75	Claim 76	Claim 84	Claim 85	Claim 86
The non-transitory computer-readable storage medium recited in **claim 1**, wherein apply the policy comprises inform the first software component of a traffic control to be implemented or applied by the first software component.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein the information from the network element is ***first*** information, and wherein apply the policy comprises obtain ***second*** information from the first software component.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein apply the policy comprises: at least assist in preventing initiation of the service usage activity by the first software component; and send a message to the first software component.	The non-transitory computer-readable storage medium recited in **claim 84**, wherein initiation of the service usage activity by the first software component comprises opening of a connection, opening of a socket, initiating transmission, initiating a data flow, or initiating a data stream.	The non-transitory computer-readable storage medium recited in **claim 84**, wherein the message comprises a reset message, an indication that the service usage activity is not allowed, or an indication that the wireless network is not available.

Claim 79	Claim 82	Claim 83
The non-transitory computer-readable storage medium recited in **claim 1**, wherein apply the policy comprises at least assist in intercepting a stack application programming interface (API) level or application messaging layer request.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein apply the policy comprises at least assist in emulating a network application programming interface (API) message.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein apply the policy comprises at least assist in intercepting, modifying, blocking, removing, injecting, swapping, or replacing an application interface message.

Claim 89	Claim 90
The non-transitory computer-readable storage medium recited in **claim 1**,	The non-transitory computer-readable storage medium recited in **claim 1**,
	wherein the policy is a ***first*** policy, and
wherein, when executed by the one or more processors of the wireless end-user device, the machine-executable instructions further cause the one or more processors to:	wherein, when executed by the one or more processors of the wireless end-user device, the machine-executable instructions further cause the one or more processors to:
if it is determined that the service usage activity is not the background activity, refrain from applying the policy.	if it is determined that the service usage activity is not the background activity, apply a ***second*** policy.

VIII. CLAIMS 77, 78, AND 91-152

Claim 77	Claim 78
The non-transitory computer-readable storage medium recited in **claim 1**, wherein apply the policy comprises at least assist in intercepting, controlling, blocking, modifying, removing, or replacing a notification associated with the first software component or the service usage activity, the notification for presentation through a user interface of the wireless end-user device.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein apply the policy comprises at least assist in intercepting, controlling, blocking, modifying, removing, or replacing a notification for presentation through a user interface of the wireless end-user device.

Claims 91-117		Claims 118-48		Claims 149-52
Claim 91		**Claim 118**		**Claim 149**
The non-transitory computer-readable storage medium recited in **claim 1**, wherein apply the policy comprises cause a notification to be presented through a user interface of the wireless end-user device.		The non-transitory computer-readable storage medium recited in **claim 1**, wherein, when executed by the one or more processors of the wireless end-user device, the machine-executable instructions further cause the one or more processors to: cause a notification to be presented through a user interface of the wireless end-user device.		The non-transitory computer-readable storage medium recited in **claim 1**, wherein, when executed by the one or more processors of the wireless end-user device, the machine-executable instructions further cause the one or more processors to: detect an attempted use of the first software component; and based on the detected attempted use of the first software component, cause a notification to be presented through a user interface of the wireless end-user device.
Claim 92		**Claim 119**		
The non-transitory computer-readable storage medium recited in **claim 91**, wherein the notification provides information about the policy.		The non-transitory computer-readable storage medium recited in **claim 118**, wherein the notification provides information about the policy.		

Claim 93	Claim 115	Claim 120		Claim 150
The non-transitory computer-readable storage medium recited in **claim 91**, wherein the notification provides information about an option to set, control, override, or modify the at least an aspect of the policy or a second aspect of the policy.	The non-transitory computer-readable storage medium recited in **claim 91**, wherein the notification presents an option to modify the policy.	The non-transitory computer-readable storage medium recited in **claim 118**, wherein the notification provides information about an option to set, control, override, or modify the at least an aspect of the policy or a second aspect of the policy.		The non-transitory computer-readable storage medium recited in **claim 149**, wherein the notification provides information to enable a user associated with the wireless end-user device to override the policy.
		Claim 121		
		The non-transitory computer-readable storage medium recited in **claim 118**, wherein the notification indicates that the service usage activity is the background activity.		
Claim 94	**Claim 105**	**Claim 123**		
The non-transitory computer-readable storage medium recited in **claim 91**, wherein, when executed by the one or more processors of the wireless end-user device, the machine-executable instructions further cause the one or more processors to obtain an indication of a user response to the notification.	The non-transitory computer-readable storage medium recited in **claim 91**, wherein apply the policy further comprises obtain an indication of a user preference in response to the notification.	The non-transitory computer-readable storage medium recited in **claim 118**, wherein, when executed by the one or more processors of the wireless end-user device, the machine-executable instructions further cause the one or more processors to obtain an indication of a user preference in response to the notification.		

Claim 95		Claim 145
The non-transitory computer-readable storage medium recited in **claim 91**, wherein the notification provides a warning or an alert.		The non-transitory computer-readable storage medium recited in **claim 118**, wherein the notification comprises a warning or an alert.

Claim 96
The non-transitory computer-readable storage medium recited in **claim 91**, wherein the notification provides information about a service plan limit.

Claim 97	Claim 98
The non-transitory computer-readable storage medium recited in **claim 91**, wherein the first software component is at least a portion of an application, and wherein the one or more prospective or successful communications over the wireless network comprise an attempt to launch, run, or execute the application, and wherein the notification comprises information about the attempt to launch, run, or execute the application.	The non-transitory computer-readable storage medium recited in **claim 91**, wherein the one or more prospective or successful communications over the wireless network comprise an attempted or successful launch or execution of the first software component, and wherein the notification comprises information about the attempted or successful launch or execution of the first software component.

Claim 99	
The non-transitory computer-readable storage medium recited in **claim 91**, wherein the policy is based on a limit, and wherein, when executed by the one or more processors of the wireless end-user device, the machine-executable instructions further cause the one or more processors to determine that a data usage associated with the service usage activity is not less than the limit, and wherein cause a notification to be presented through a user interface of the wireless end-user device comprises trigger presentation of the notification based on the determination that the data usage associated with the service usage activity is not less than the limit.	

Claim 100	
The non-transitory computer-readable storage medium recited in **claim 91**, wherein the one or more prospective or successful communications over the wireless network comprise an attempt to download or load an application, and wherein the notification comprises information about the attempted download or load of the application.	
Claim 101	
The non-transitory computer-readable storage medium recited in **claim 91**, wherein the one or more prospective or successful communications over the wireless network comprise an attempt to initiate usage of a cloud-based service or application, and wherein the notification comprises information about the attempted initiation of usage of the cloud-based service or application.	

Claim 102
The non-transitory computer-readable storage medium recited in **claim 91**, wherein the notification indicates that one or more service usage activities are subject to the policy.

Claim 103
The non-transitory computer-readable storage medium recited in **claim 91**, wherein the notification provides information about ***a second*** network.

Claim 104
The non-transitory computer-readable storage medium recited in **claim 91**, wherein the notification comprises an offer for a service plan upgrade or downgrade.

Claim 122
The non-transitory computer-readable storage medium recited in **claim 118**, wherein the notification provides information about ***a second*** network.

Claim 136
The non-transitory computer-readable storage medium recited in **claim 118**, wherein the notification presents information about ***the*** wireless network.

Claim 152
The non-transitory computer-readable storage medium recited in **claim 149**, wherein the notification provides information to enable a user associated with the wireless end-user device to change or upgrade a service plan associated with the wireless end-user device.

Claim 106		Claim 124	
The non-transitory computer-readable storage medium recited in **claim 105**, wherein the indication of the user preference comprises a user directive to associate the policy with a ***second*** software component.		The non-transitory computer-readable storage medium recited in **claim 123**, wherein the indication of the user preference comprises a user directive to associate the policy with the ***first*** software component.	
Claim 107		**Claim 125**	
The non-transitory computer-readable storage medium recited in **claim 105**, wherein the indication of the user preference comprises a user directive to allow or block the service usage activity.		The non-transitory computer-readable storage medium recited in **claim 123**, wherein the indication of the user preference comprises a user directive to restrict, allow, or block the service usage activity.	
Claim 108		**Claim 126**	
The non-transitory computer-readable storage medium recited in **claim 105**, wherein the indication of the user preference identifies a traffic control setting associated with the policy.		The non-transitory computer-readable storage medium recited in **claim 123**, wherein the indication of the user preference identifies a traffic control setting associated with the policy.	
Claim 109			
The non-transitory computer-readable storage medium recited in **claim 105**, wherein the indication of the user preference comprises a user directive to allow the service usage activity under a specified condition.			

Claim 110		Claim 127	
The non-transitory computer-readable storage medium recited in **claim 105**, wherein the indication of the user preference comprises a user directive to override or modify the policy.		The non-transitory computer-readable storage medium recited in **claim 123**, wherein the indication of the user preference comprises a user directive to override or modify the policy.	
		Claim 128	
		The non-transitory computer-readable storage medium recited in **claim 123**, wherein the indication of the user preference comprises a user acknowledgment of the notification.	
		Claim 129	
		The non-transitory computer-readable storage medium recited in **claim 123**, wherein the indication of the user preference indicates one or more network types.	
		Claim 130	
		The non-transitory computer-readable storage medium recited in **claim 129**, wherein the one or more network types comprise WiFi, 4G, 3G, wireless, wired, or a combination of these.	

Claim 111		Claim 131	
The non-transitory computer-readable storage medium recited in **claim 91**, wherein cause a notification to be presented through a user interface of the wireless end-user device comprises cause the notification to be presented based on occurrence of a trigger.		The non-transitory computer-readable storage medium recited in **claim 118**, wherein cause a notification to be presented through a user interface of the wireless end-user device comprises cause the notification to be presented based on occurrence of a trigger.	
Claim 112		**Claim 132**	
The non-transitory computer-readable storage medium recited in **claim 111**, wherein the trigger is: a measure of the service usage activity satisfies a first condition relative to a threshold, an aspect of the service usage activity satisfies a second condition, a change to the policy, or a message from the network element.		The non-transitory computer-readable storage medium recited in **claim 131**, wherein the trigger is: a measure of the service usage activity satisfies a first condition relative to a threshold, an aspect of the service usage activity satisfies a second condition, a change to the policy, or a message from the network element.	
Claim 113		**Claim 133**	
The non-transitory computer-readable storage medium recited in **claim 91**, wherein the notification enables a user associated with the wireless end-user device to obtain information about at least an aspect of the service usage activity or a service plan associated with the wireless end-user device.		The non-transitory computer-readable storage medium recited in **claim 118**, wherein the notification enables a user associated with the wireless end-user device to obtain information about at least an aspect of the service usage activity or a service plan associated with the wireless end-user device.	

Claim 114		Claim 134	
The non-transitory computer-readable storage medium recited in **claim 91**, wherein the notification presents a list of service usage activities or software components, the list of service usage activities or software components including the service usage activity or the first software component.		The non-transitory computer-readable storage medium recited in **claim 118**, wherein the notification presents a list of service usage activities or software components, the list of service usage activities or software components including the service usage activity or the first software component.	
		Claim 135	
		The non-transitory computer-readable storage medium recited in **claim 118**, wherein the notification presents information about a setting associated with the policy.	
Claim 116		**Claim 137**	**Claim 139**
The non-transitory computer-readable storage medium recited in **claim 91**, wherein the notification presents an indication of a measure of usage of the wireless network associated with the service usage activity.		The non-transitory computer-readable storage medium recited in **claim 118**, wherein the notification presents an indication of a measure of usage of the wireless network associated with the service usage activity.	The non-transitory computer-readable storage medium recited in **claim 118**, wherein the notification presents an indication of a measure of usage of the wireless network associated with the first software component.

	Claim 138	
	The non-transitory computer-readable storage medium recited in **claim 118**, wherein the notification presents information about a network busy state or a network availability state.	
	Claim 140	
	The non-transitory computer-readable storage medium recited in **claim 118**, wherein the notification presents information about a statistic associated with the service usage activity.	
	Claim 141	
	The non-transitory computer-readable storage medium recited in **claim 118**, wherein the notification comprises a gauge providing service usage information associated with the service usage activity.	

	Claim 142	
	The non-transitory computer-readable storage medium recited in **claim 118**, wherein the notification comprises a gauge providing service usage information associated with one or more networks, the one or more networks including the wireless network.	
	Claim 143	
	The non-transitory computer-readable storage medium recited in **claim 118**, wherein the notification comprises a gauge providing information associated with a service plan.	
	Claim 146	
	The non-transitory computer-readable storage medium recited in **claim 118**, wherein the information from the network element is ***first*** information, and wherein the notification is based on ***second*** information from the network element.	

Claim 117	Claim 147	Claim 151
The non-transitory computer-readable storage medium recited in **claim 91**, wherein the notification is provided through an e-mail, a text message, a window, a setting, or a voice message.	The non-transitory computer-readable storage medium recited in **claim 118**, wherein the notification comprises information about a cost or a charge associated with the service usage activity.	The non-transitory computer-readable storage medium recited in **claim 149**, wherein the notification provides information about a cost or a charge associated with the service usage activity.
	Claim 148	
	The non-transitory computer-readable storage medium recited in **claim 118**, wherein the notification comprises information about a service sponsor.	
	Claim 144	
	The non-transitory computer-readable storage medium recited in **claim 118**, wherein the notification is provided through an e-mail, a text message, a window, a setting, or a voice message.	

IX. CLAIMS 153-59

Claim 153	Claim 154	Claim 155	Claim 156	Claim 157
The non-transitory computer-readable storage medium recited in **claim 1**, wherein the at least an aspect of a policy is based on the user input obtained through the user interface of the wireless end-user device, and wherein the user input specifies a user preference associated with one or more network types.	The non-transitory computer-readable storage medium recited in **claim 153**, wherein the one or more network types comprise wireless fidelity (WiFi), home, roaming, 4G, 3G, wireless, wired, or a combination of these.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein the user input obtained through the user interface of the wireless end-user device is a ***first*** user input, and wherein the policy is a ***first*** policy, and wherein the ***first*** user input or a ***second*** user input comprises a directive to apply a ***second*** policy to a second software component of the plurality of software components on the wireless end-user device.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein the user input obtained through the user interface of the wireless end-user device is a ***first*** user input, and wherein the first user input or a ***second*** user input comprises a directive to refrain from applying the policy to a second software component of the plurality of software components on the wireless end-user device.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein the user input obtained through the user interface of the wireless end-user device comprises a directive to apply the policy to a second software component of the plurality of software components on the wireless end-user device.

Claim 158	Claim 159
The non-transitory computer-readable storage medium recited in **claim 1**, wherein the user input obtained through the user interface of the wireless end-user device specifies a user preference associated with the service usage activity or the first software component.	The non-transitory computer-readable storage medium recited in **claim 158**, wherein the user preference comprises a preference to restrict, allow, block, delay, or throttle the service usage activity.

X. CLAIMS 160-69

Claim 160	Claim 161	Claim 162	Claim 163	Claim 164
The non-transitory computer-readable storage medium recited in **claim 1**, wherein the service usage activity is a ***first*** service usage activity, and wherein the wireless network is a ***first*** wireless network, and wherein, when executed by the one or more processors of the wireless end-user device, the machine-executable instructions further cause the one or more processors to identify a ***second*** service usage activity of the wireless end-user device,	The non-transitory computer-readable storage medium recited in **claim 1**, wherein the service usage activity is a ***first*** service usage activity, and wherein the background activity is a ***first*** background activity, and wherein the wireless network is a ***first*** wireless network, and wherein the policy is a ***first*** policy, and wherein, when executed by the one or more processors of the wireless end-user device, the machine-executable instructions further cause the one or more processors to: identify a ***second*** service usage activity of the wireless end-user device,	The non-transitory computer-readable storage medium recited in **claim 161**, wherein the ***first*** policy restricts or prevents the ***first*** background activity, and wherein the ***second*** policy allows the ***second*** background activity.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein the service usage activity is a ***first*** service usage activity, and wherein the wireless network is a ***first*** wireless network, and wherein the policy is a ***first*** policy, and wherein, when executed by the one or more processors of the wireless end-user device, the machine-executable instructions further cause the one or more processors to: identify a ***second*** service usage activity of the wireless end-user device,	The non-transitory computer-readable storage medium recited in **claim 163**, wherein the ***second*** policy comprises a control policy, a notification policy, or an accounting policy associated with the ***first*** software component or the ***second*** software component.

Claim 160	Claim 161	Claim 162	Claim 163	Claim 164
the ***second*** service usage activity being associated with the ***first*** software component or with a ***second*** software component of the plurality of software components on the wireless end-user device, the ***second*** service usage activity comprising one or more prospective or successful communications over a ***second*** wireless network; and refrain from applying the policy to the ***second*** service usage activity.	the ***second*** service usage activity being associated with the ***first*** software component or with a ***second*** software component of the plurality of software components on the wireless end-user device, the ***second*** service usage activity comprising one or more prospective or successful communications over a ***second*** wireless network; and determine whether the ***second*** service usage activity is a ***second*** background activity; if it is determined that the ***second*** service usage activity is the ***second*** background activity, apply a ***second*** policy to the ***second*** service usage activity.		the ***second*** service usage activity being associated with the first software component or with a ***second*** software component of the plurality of software components on the wireless end-user device, the ***second*** service usage activity comprising one or more prospective or successful communications over a ***second*** wireless network; and apply a ***second*** policy to the ***second*** service usage activity.	

Claim 165	Claim 166	Claim 167	Claim 168	Claim 169
The non-transitory computer-readable storage medium recited in **claim 1**, wherein the service usage activity is a ***first*** service usage activity, and wherein the one or more prospective or successful communications over the wireless network are ***first*** one or more prospective or successful communications over the ***first*** wireless network, and wherein the background activity is a ***first*** background activity, and wherein the user input obtained through the user interface of the wireless end-user device is a ***first*** user input, and wherein, when executed by the one or more processors of the wireless end-user device, the machine-executable	The non-transitory computer-readable storage medium recited in **claim 1**, wherein the service usage activity is a ***first*** service usage activity, and wherein the one or more prospective or successful communications over the wireless network are ***first*** one or more prospective or successful communications over the wireless network, and wherein, when executed by the one or more processors of the wireless end-user device, the machine-executable	The non-transitory computer-readable storage medium recited in **claim 1**, wherein the background activity is a ***first*** background activity, and wherein the one or more prospective or successful communications over the wireless network are ***first*** one or more prospective or successful communications over the wireless network, and wherein the policy is a ***first*** policy, and wherein, when executed by the one or more processors of the wireless end-user device, the machine-executable	The non-transitory computer-readable storage medium recited in **claim 167**, wherein the ***first*** policy, the ***second*** policy, or both are based on a network busy state, a network availability state, or a cost associated with the wireless network.	The non-transitory computer-readable storage medium recited in **claim 1**, wherein the service usage activity is a ***first*** service usage activity, and wherein the one or more prospective or successful communications over the wireless network are ***first*** one or more prospective or successful communications over the wireless network, and wherein, when executed by the one or more processors of the wireless end-user device, the machine-executable

Claim 165	Claim 166	Claim 167	Claim 168	Claim 169
instructions further cause the one or more processors to: identify a ***second*** service usage activity of the wireless end-user device, the ***second*** service usage activity being associated with a ***second*** software component of the plurality of software components on the wireless end-user device, the ***second*** service usage activity comprising ***second*** one or more prospective or successful communications over the wireless network; and determine whether the ***second*** service usage activity is a ***second*** background activity;	instructions further cause the one or more processors to: identify a ***second*** service usage activity of the wireless end-user device, the ***second*** service usage activity being associated with a ***second*** software component of the plurality of software components on the wireless end-user device, the ***second*** service usage activity comprising ***second*** one or more prospective or successful communications over the wireless network; and determine whether the ***second*** service usage activity is a ***second*** background activity;	instructions further cause the one or more processors to: identify a ***second*** service usage activity of the wireless end-user device, the ***second*** service usage activity being associated with a ***second*** software component of the plurality of software components on the wireless end-user device, the ***second*** service usage activity comprising ***second*** one or more prospective or successful communications over the wireless network; and determine whether the ***second*** service usage activity is a ***second*** background activity; obtain a ***second*** policy, the ***second*** policy to be applied when the ***second*** service usage activity is the ***second*** background activity, the ***second*** policy for controlling the ***second*** service usage activity; and		instructions further cause the one or more processors to: identify a ***second*** service usage activity of the wireless end-user device, the ***second*** service usage activity being associated with the first software component, the ***second*** service usage activity comprising ***second*** one or more prospective or successful communications over the wireless network; and determine whether the ***second*** service usage activity is the background activity;

Claim 165	Claim 166	Claim 167	Claim 168	Claim 169
if it is determined that the ***second*** service usage activity is the ***second*** background activity, apply at least a portion of the policy, wherein the at least a portion of the policy is based on a ***second*** user input.	if it is determined that the ***second*** service usage activity is the ***second*** background activity, refrain from applying at least a portion of the policy.	if it is determined that the ***second*** service usage activity is the ***second*** background activity, apply the ***second*** policy.		if it is determined that the ***second*** service usage activity is the background activity, apply at least a portion of the policy.

XI. CLAIMS 170 AND 171

Claim 170	Claim 171
The non-transitory computer-readable storage medium recited in **claim 1**, wherein, when executed by the one or more processors of the wireless end-user device, the machine-executable instructions further cause the one or more processors to monitor the service usage activity, account for the service usage activity, report information about the service usage activity, or a combination of these.	The wireless end-user device embodying the non transitory computer-readable storage medium recited in **claim 1**.