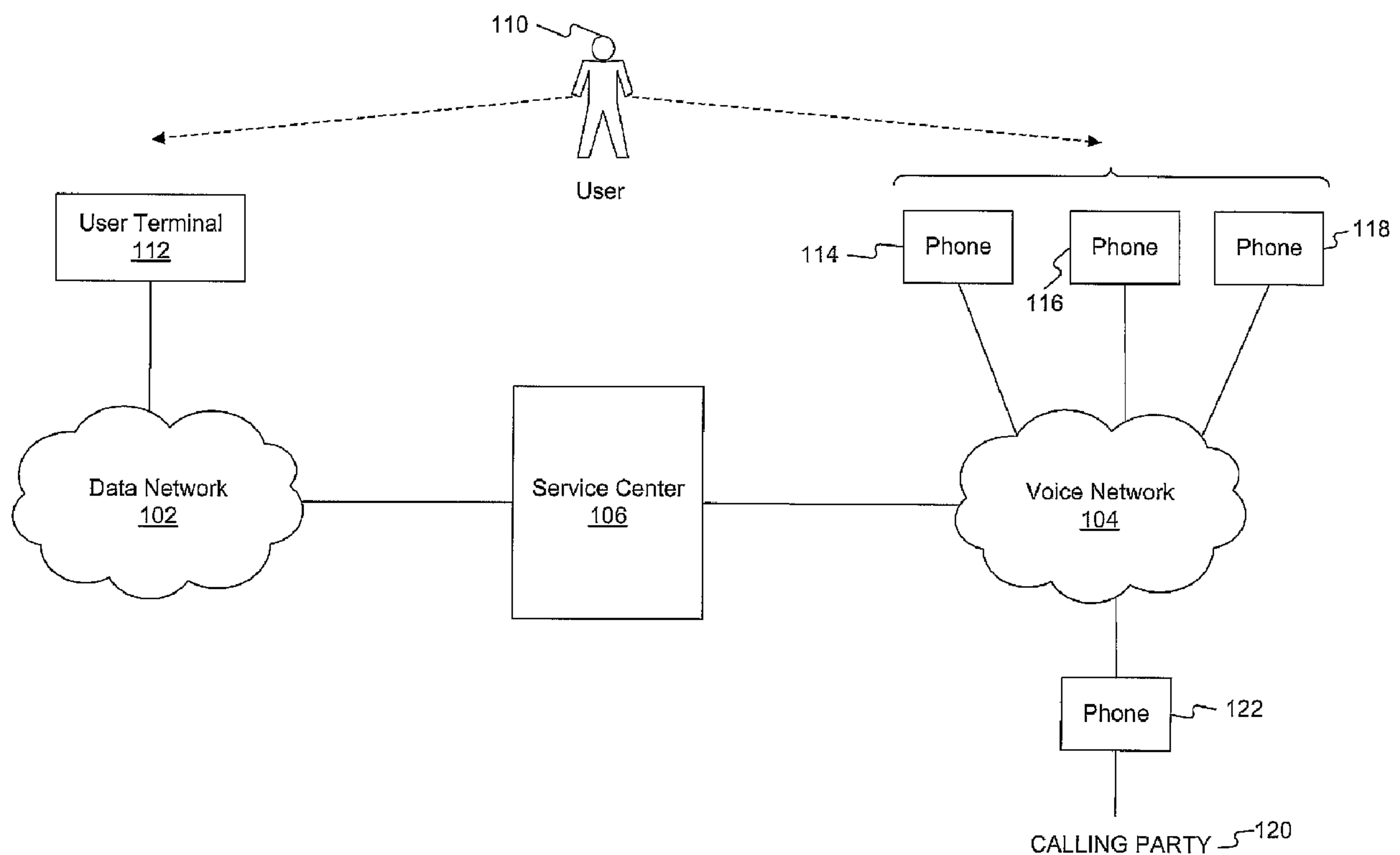




(86) Date de dépôt PCT/PCT Filing Date: 2003/11/25
(87) Date publication PCT/PCT Publication Date: 2004/06/10
(45) Date de délivrance/Issue Date: 2013/01/29
(85) Entrée phase nationale/National Entry: 2005/05/25
(86) N° demande PCT/PCT Application No.: US 2003/037478
(87) N° publication PCT/PCT Publication No.: 2004/049121
(30) Priorités/Priorities: 2002/11/25 (US60/428,704);
2002/12/26 (US60/436,018)

(51) Cl.Int./Int.Cl. *H04M 3/54* (2006.01),
H04B 7/00 (2006.01)
(72) Inventeurs/Inventors:
REDING, CRAIG L., US;
HELBLING, CHRISTOPHER L., US
(73) Propriétaire/Owner:
TELESECTOR RESOURCES GROUP, INC., US
(74) Agent: R. WILLIAM WRAY & ASSOCIATES

(54) Titre : PROCEDES ET SYSTEMES DE GESTION AUTOMATIQUE DE LIGNES DE COMMUNICATION FONDEE
SUR LA LOCALISATION DE DISPOSITIFS
(54) Title: METHODS AND SYSTEMS FOR AUTOMATIC COMMUNICATION LINE MANAGEMENT BASED ON DEVICE
LOCATION



100

(57) Abrégé/Abstract:

Methods and Systems for managing one or more communications devices associated with a user of a communications network (110) are disclosed. The methods and systems are capable of receiving an indication regarding wireless communications between



(57) **Abrégé(suite)/Abstract(continued):**

a first device (112) and a second device (114, 116, 118). This indication may indicate that the first device (112) has entered or left a vicinity (or range) of a second device (114, 116, 118). Additionally, this may be accomplished by using a protocol such as Bluetooth protocol, the IEEE 802.11 (b) protocol, and/or the IEEE 802.11(g) protocol. For example if a first device (112) enters the vicinity of a second device (114, 116, 118), calls for the user may be automatically forwarded to a phone of the user that is located near the second device (114, 116, 118). Likewise, in an embodiment, if the first device (112) leaves the vicinity of the second device (114, 116, 118), calls may be automatically forwarded to the first device (112).

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
10 June 2004 (10.06.2004)

PCT

(10) International Publication Number
WO 2004/049121 A3

(51) International Patent Classification⁷: **H04B 7/00**,
H04M 1/00, 3/42, H04Q 7/20, 7/24

(74) Agents: **SUCHYTA, Leonard, C.** et al.; c/o Christian
R. Andersen, Verizon Corporate Services Group Inc., 600
Hidden Ridge Drive, Mailcode HQE03H14, Irving, TX
75038 (US).

(21) International Application Number:
PCT/US2003/037478

(22) International Filing Date:
25 November 2003 (25.11.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/428,704 25 November 2002 (25.11.2002) US
60/436,018 26 December 2002 (26.12.2002) US

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU,
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,
CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,
MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE,
SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC,
VN, YU, ZA, ZM, ZW.

(84) Designated States (*regional*): ARIPO patent (BW, GH,
GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,
ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE,
SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA,
GN, GQ, GW, ML, MR, NE, SN, TD, TG).

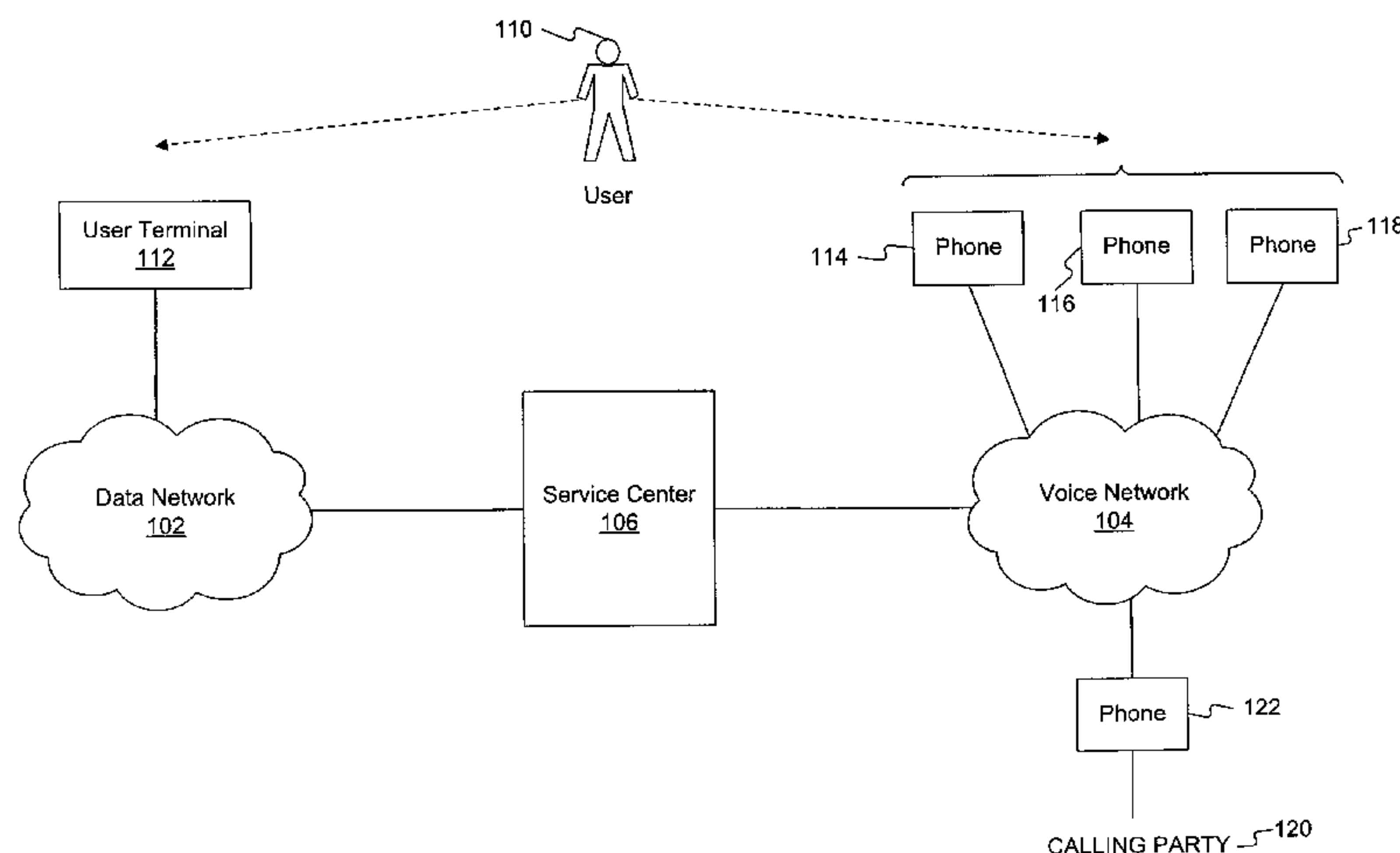
(71) Applicant: **TELESECTOR RESOURCES GROUP,
INC.** [US/US]; A Delaware Corporation, 1095 Avenue of
the Americas, New York, NY 10036 (US).

(72) Inventors: **REDING, Craig, L.**; 289 Erie Avenue, Mid-
land Park, NJ 07432 (US). **HELBLING, Christopher, L.**;
159 Frederick Street #2R, Stamford, CT 06902 (US).

Published:
— with international search report

[Continued on next page]

(54) Title: METHODS AND SYSTEMS FOR AUTOMATIC COMMUNICATION LINE MANAGEMENT BASED ON DEVICE LOCATION



100

(57) Abstract: Methods and Systems for managing one or more communications devices associated with a user of a communications network (110) are disclosed. The methods and systems are capable of receiving an indication regarding wireless communications between a first device (112) and a second device (114, 116, 118). This indication may indicate that the first device (112) has entered or left a vicinity (or range) of a second device (114, 116, 118). Additionally, this may be accomplished by using a protocol such as Bluetooth protocol, the IEEE 802.11 (b) protocol, and/or the IEEE 802.11(g) protocol. For example if a first device (112) enters the vicinity of a second device (114, 116, 118), calls for the user may be automatically forwarded to a phone of the user that is located near the second device (114, 116, 118). Likewise, in an embodiment, if the first device (112) leaves the vicinity of the second device (114, 116, 118), calls may be automatically forwarded to the first device (112).

WO 2004/049121 A3

WO 2004/049121 A3



— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(88) Date of publication of the international search report:

22 July 2004

METHODS AND SYSTEMS FOR AUTOMATIC COMMUNICATION LINE MANAGEMENT BASED ON DEVICE LOCATION

FIELD OF THE INVENTION

[0003] The present invention relates generally to communications systems and, more particularly, to methods and systems for automatic communication line management based on the location of a device.

BACKGROUND OF THE INVENTION

[0004] A wide variety of means exist for communication between users. For example, a user may conduct phone calls via a home phone, work phone, and mobile phone. In addition, users may also communicate using devices such as PC's, PDA's, pagers, etc. using manners of communicating as e-mail and instant messaging.

[0005] Unfortunately, managing such a wide variety of communication means can be difficult. In particular, as a user changes location, communication with the user may vary. For example, while on travel, it may only be possible to reach a user by mobile phone. However, the user may best be reached by e-mail while at work. Also, the user may wish to implement various rules for receiving and controlling communications. For example, to be reached at home, the user may want the home phone to ring three times before forwarding the call to a mobile phone. As another example, the user may wish to be paged each time an e-mail is received from a particular person while away from the office.

[0006] Typically, to implement communication management, a person must individually manage each communication device separately. Thus, when the user wishes to change how communication is managed, the user may have to deal with numerous devices and, perhaps, service centers.

SUMMARY OF THE INVENTION

[0007] In accordance with the purposes of the invention, as embodied and broadly described herein, methods and systems are provided including a method for managing calls directed to one or more communications devices associated with a user of a communications network. This method includes receiving user-defined preferences regarding handling of calls directed to at least one of the devices, receiving an indication regarding wireless communications between a first device and a second device, and modifying the handling of calls to the one or more communications devices in response to receipt of the indication.

[0008] Additional aspects and advantages of the invention will be set forth in part in the description which follows, and in part will be obvious from the description, or may be learned by practice of the invention. Various advantages of the invention will be realized and attained by means of the elements and combinations particularly pointed out in the appended claims.

[0009] It is to be understood that the scope of the claims should not be limited should not be limited by the preferred embodiments set forth in the examples, but should be given the broadest interpretation consistent with the description as a whole.

[0010] The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate one (several) embodiment(s) of the invention and together with the description, serve to explain the principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate one embodiment of the invention and, together with the description, serve to explain the principles of the invention.

[0012] FIG. 1 is a diagram of an exemplary data processing and telecommunications environment in which features and aspects consistent with the principals of the present invention may be implemented;

[0013] FIG. 2 is a diagram of an exemplary user terminal, consistent with the principals of the present invention;

[0014] FIG. 3 is a diagram of a voice network, consistent with the principles of the present invention;

[0015] FIG. 4 is a block diagram of a service center, consistent with the principals of the present invention;

[0016] FIG. 5 illustrates a logical architecture of an exemplary system, consistent with the principals of the present invention;

[0017] FIG. 6 illustrates an exemplary screen shot of a screen that may be displayed to a user in response to the user electing to activate call forwarding, consistent with the principals of the present invention;

[0018] FIG. 7 illustrates an exemplary screen shot of a screen that may be displayed to a user to select a number to which calls are to be forwarded, consistent with the principals of the present invention;

[0019] FIG. 8 illustrates an exemplary screen shot of a screen that may be displayed to a user that selected call forwarding regarding the detectable device, consistent with the principals of the present invention;

[0020] FIG. 9 is a diagram of an exemplary flowchart of a method for establishing automatic forwarding of calls to a specific device, consistent with the principals of the present invention;

[0021] FIG. 10 illustrates a diagram of an exemplary flow chart of a method for automatically forwarding calls, consistent with the principals of the present invention; and

[0022] FIG. 11 is a diagram of an exemplary flowchart of a method for establishing automatic forwarding of call notifications to a specific device, consistent with the principals of the present invention.

DETAILED DESCRIPTION

[0023] Reference will now be made in detail to exemplary embodiments of the present invention, examples of which are illustrated in the accompanying drawings. Wherever possible, the same reference numbers will be used throughout the drawings to refer to the same or like parts.

[0024] FIG. 1 is a block diagram of a data processing and telecommunications environment 100, in which features and aspects consistent with the present invention may be implemented. The number of components in environment 100 is not limited to what is shown and other variations in the number of arrangements of components are possible, consistent with embodiments of the invention. The components of FIG. 1 may be implemented through hardware, software, and/or firmware. Data processing and telecommunications environment 100 may include a data network 102, a voice network 104, and a service center 106. A user 110 may use a user terminal 112 to interface with data network 102 and may use phones 114, 116, and 118 to interface with voice network 104. A calling party 120 may use a phone 122 to call a user, such as user 110, at any one of phones 114, 116, and 118.

[0025] Data network 102 provides communications between the various entities depicted in environment 100 of FIG. 1, such as user terminal 112 and service center 106. Data network 102 may be a shared, public, or private network and encompass a wide area or local area. Data network 102 may be implemented through any suitable combination of wired and/or wireless communication networks. By way of example, data network 102 may be implemented through a wide area network (WAN), local area network (LAN), an intranet and/or the Internet. Further, service center 106 may be connected to multiple data networks 102, such as, for example, to a wireless carrier network and to the Internet.

[0026] Voice network 104 may provide telephony services to allow a calling party, such as

calling party 120, to place a call to user 110. In one embodiment, voice network 104 may be implemented using a network, such as the Public Switched Telephone Network ("PSTN"). Alternatively, voice network 104 may be implemented on a voice-over-broadband network, such as, for example, a network using voice-over-Internet Protocol ("VoIP") technology. Additionally, in other embodiments, voice network 104 may be a video-over-broadband network, such as, for example, a network for providing 2-way video communications. In another example, voice network 104 may be a wireless broadband network, such as, for example, a network using WiFi (i.e., IEEE 802.11(b) and/or (g)). In yet another example, voice network 104 may be a wireless voice network(s), such as, for example, a cellular or third-generation cellular network). In addition, voice network 104 may be implemented using any single or combination of the above-described technologies consistent with the principles of the present invention. Further, service center 106 may be connected to multiple voice networks 104, such as for example, Verizon's™ Voice Network, voice networks operated by other carriers, and wireless carrier networks.

[0027] Service center 106 provides a platform for managing communications over data network 102 and voice network 104. Service center 106 also provides gateway functions, such as code and protocol conversions, to transfer communications between data network 102 and voice network 104. Service center 106 may be implemented using a combination of hardware, software, and/or firmware. For example, service center 106 may be implemented using a plurality of general purpose computers or servers coupled by a network (not shown). Although service center 106 is shown with direct connections to data network 102 and voice network 104, any number and type of network elements may be interposed between service center 106, data network 102, and voice network 104.

[0028] User terminal 112 provides user 110 an interface to data network 102. For example, user terminal 112 may be implemented using any device capable of accessing the Internet, such as a general purpose computer or personal computer equipped with a modem. User terminal 112 may also be implemented in other devices, such as the Blackberry™, and Ergo Audrey™. Furthermore, user terminal 112 may be implemented in wireless devices, such as pagers, mobile phones (with data access functions), and Personal Digital Assistants ("PDA") with network connections.

[0029] User terminal 112 also allows user 110 to communicate with service center 106. For example, user 110 may use instant messaging ("IM") to communicate with service center 106. In addition, user terminal 112 may use other aspects of TCP/IP including the hypertext transfer protocol ("HTTP"); the user datagram protocol ("UDP"); the file transfer protocol ("FTP"); the hypertext markup language ("HTML"); and the extensible markup language ("XML").

[0030] Furthermore, user terminal 112 may communicate directly with service center 106. For example, a client application may be installed on user terminal 112, which directly communicates with service center 106. Also, user terminal 112 may communicate with service center 106 via a proxy.

[0031] Phones 114, 116, 118, and 122 interface with voice network 104. Phones 114, 116, 118, and 122 may be implemented using known devices, including wireline phones and mobile phones. Although phones 114, 116, 118, and 122 are shown directly connected to voice network 104, any number of intervening elements, such as a private branch exchange ("PBX"), may be interposed between phones 114, 116, 118, and 122 and voice network 104.

[0032] FIG. 2 is a block diagram of a user terminal 112 consistent with the present invention. User terminal 112 includes a central processing unit (CPU) 200, a memory 202, a storage module 204, a network interface 206, an input interface 208, an output interface 210, an input device 212, and an output device 214.

[0033] CPU 200 provides control and processing functions for user terminal 112. Although FIG. 2 illustrates a single CPU, user terminal 112 may include multiple CPUs. CPU 200 may also include, for example, one or more of the following: a co-processor, memory, registers, and other processing devices and systems as appropriate. CPU 200 may be implemented, for example, using a Pentium™ processor provided from Intel Corporation.

[0034] Memory 202 provides a primary memory for CPU 200, such as for storing program code. Memory 202 may be embodied with a variety of components of subsystems, including a random

access memory ("RAM") and a read-only memory ("ROM"). When user terminal 112 executes an application installed in storage module 204, CPU 200 may download at least a portion of the program code from storage module 204 into memory 202. As CPU 200 executes the program code, CPU 200 may also retrieve additional portions of program code from storage module 204.

[0035] Storage module 204 may provide mass storage for user terminal 112. Storage module 204 may be implemented with a variety of components or subsystems including, for example, a hard drive, an optical drive, CD ROM drive, DVD drive, a general-purpose storage device, a removable storage device, and/or other devices capable of storing information. Further, although storage module 204 is shown within user terminal 112, storage module 204 may be implemented external to user terminal 112.

[0036] Storage module 204 includes program code and information for user terminal 112 to communicate with service center 106. Storage module 204 may include, for example, program code for a calendar application, such as GroupWise™ provided by Novell™ Corporation or Outlook™ provided by Microsoft™ Corporation; a client application, such as a Microsoft Network Messenger Service (MSNMS) client or America Online™ Instant Messenger (AIM) client; and an Operating System (OS), such as the Windows™ Operation System provided by Microsoft Corporation. In addition, storage module 204 may include other program code and information, such as program code for TCP/IP communications; kernel and device drivers; configuration information, such as a Dynamic Host Configuration Protocol (DHCP) configuration; a web browser, such as Internet Explorer provided by Microsoft Corporation, or Netscape Communicator provided by Netscape Corporation; and any other software that may be installed on user terminal 112.

[0037] Network interface 206 provides a communications interface between user terminal 112 and data network 102. Network interface 206 may receive and transmit communications for user terminal 112. For example, network interface 206 may be a modem, a local area network ("LAN") port, a wireless modem, or a wireless data port.

[0038] Input interface 208 receives input from user 110 via input device 212 and provides the

input to CPU 200. Input device 212 may include, for example, a keyboard, a microphone, and a mouse. Other types of input devices may also be implemented consistent with the principles of the present invention.

[0039] Output interface 210 provides information to user 110 via output device 214. Output device 214 may include, for example, a display, a printer, and a speaker. Other types of output devices may also be implemented consistent with the principles of the present invention.

[0040] FIG. 3 is a diagram of a voice network 104, consistent with the principles of the present invention. As shown, voice network 104 includes an intelligent service control point (ISCP) 302, service transfer points (STP) 304 and 306, service switching points (SSP) 308 and 310, a line information database (LIDB) 312, an ISCP Service Provisioning And Creation Environment (SPACE) 314, a Recent Change Environment 316, and an Intelligent Peripheral (IP) 320. Although voice network 104 in this embodiment is described as a PSTN, as discussed above in other embodiments, voice network 104 may be, for example, a voice- or video-over-broadband network, a wireless broadband network, a wireless voice network, etc.

[0041] Voice network 104 may be implemented using the PSTN and SS7 as a signaling protocol. As is known to those skilled in the art, the SS7 protocol allows voice network 104 to provide features such as call forwarding, caller-ID, three-way calling; wireless services such as roaming and mobile subscriber authentication; local number portability; and toll-free/toll services. The SS7 protocol provides various types of messages to support the features of voice network 104. For example, these SS7 messages may include Transaction Capabilities Applications Part ("TCAP") messages to support event "triggers," and queries and responses between ISCP 302 and SSPs 308 and 310.

[0042] ISCP 302 may also be, for example, a standard service control point (SCP), an Advanced Intelligent Network (AIN) SCP, a soft switch, or any other network call controller. As used herein, the term service control point (SCP) is a generic term that covers standard SCPs, ISCPs and AIN SCPs. ISCP 302 provides translation and routing services of SS7 messages to support the features of voice network 104, such as call forwarding. In addition, ISCP 302 may exchange

information with the service center 106 using TCP/IP or SS7. ISCP 302 may be implemented using a combination of known hardware and software. Although ISCP 302 is shown with both a direct connection to service center 106 and a connection through ISCP SPACE 314, any number of network elements including routers, switches, hubs, etc., may be used to connect ISCP 302, ISCP SPACE 314, and service center 106. Further, information exchanged between the ISCP 302 and service center 106 may use, for example, the SR-3389 General Data Interface (GOI) for TCP/IP.

[0043] STPs 304 and 306 relay SS7 messages within voice network 104. For example, STP 304 may route SS7 messages between SSPs 308 and 310. STP 302 may be implemented using known hardware and software from manufacturers such as NORTEL™ and LUCENT Technologies™.

[0044] SSPs 308 and 310 provide an interface between voice network 104 and phones 114 and 120, respectively, to setup, manage, and release telephone calls within voice network 104. SSPs 308 and 310 may be implemented as a voice switch, an SS7 switch, or a computer connected to a switch. SSPs 308 and 310 exchange SS7 signal units to support a telephone call between calling party 120 and user 110. For example, SSPs 308 and 310 may exchange SS7 messages, such as TCAP messages, within message signal units ("MSU") to control calls, perform database queries to configuration database 312, and provide maintenance information.

[0045] Line Information Database (LIDB) 312 comprises one or more known databases to support the features of voice network 104. For example, LIDB 312 may comprise a subscriber database, including information, such as a service profile, name and address, and credit card validation information. Although LIDB 312, in this figure, is illustrated as directly connected to ISCP 302, LIDB 312 may be connected to ISCP 302 through an STP (e.g., 304 and 306). Additionally, this communication link may use, for example, the GR-2838 General Dynamic Interface (GDI) for SS7.

[0046] ISCP Service Provisioning and Creation Environment (SPACE) 314 may be included as part of the ISCP 302 or be separate from the ISCP 302. For example, the Telcordia™ ISCP may include an environment similar to SPACE 314 as part of the product. Further, ISCP SPACE 314

may include one or more servers. ISCP SPACE 314 is the point in the ISCP platform where customer record updates may be made.

[0047] In one embodiment, customer records may be stored in the ISCP SPACE 314 such that the records may be updated and sent to the ISCP 302. These records may comprise customer records including information regarding how to handle calls directed to the customer. For example, these customer records may include information regarding whether or not calls for the customer are to be forwarded to a different number, and/or whether or not the call should be directed to an IP, such as a voice mail system, after a certain number of rings. Additionally, one ISCP SPACE 314 may provide updates to one or more ISCPs 302 via an ISCP network (not shown).

[0048] Recent change engine 316 may include one or more engines such as, for example, an Enterprise Recent Change engine (eRC); an Assignment, Activation, and Inventory System (AAIS); or a multi-services platform (MSP). As an example, the eRC and AAIS may be used in voice networks 104 located in the western part of the United States, while an MSP may be used in networks in the eastern part. Recent change engine 316 may be used to update switch and ISCP databases. For example, recent change engine 316 may deliver database updates to SSPs and to ISCPs, such that when updating databases, recent change engine 316 emulates human operators. Additionally, if the instructions are to be sent to an ISCP 302, recent change engine 316 may first send the instructions to the ISCP SPACE 314, which then propagates the instructions to the ISCP 302 as discussed above. Further, an MSP may be used, for example, for providing updates to both the SSPs 308 or 310 and the ISCPs 302. Alternatively, for example, an eRC may be used for providing updates to the SSPs 308 or 310, while an AAIS is used for providing updates to the ISCPs 302. Additionally, updates sent to the SSPs 308 or 310 may be sent from recent change engine 316 via a switch access 320 that may, for example, convert the updates into the appropriate protocol for the SSP 308 or 310. For example, recent change engine 316 may send updates to the SSPs 308 or 310 via TCP/IP. The switch access 320 may then convert the updates from TCP/IP to X.25. This switch access 320 may be any type of hardware and/or software. Additionally, these connections may include any number of elements, such as, for example, switches, routers, hubs, etc. and may be, for example, an internal data network for

the voice network 104.

[0049] As shown in FIG. 3, voice network 104 may include one or more intelligent peripherals (IPs) 320 connected to SSP 308. These IPs may be used for providing services, such as voice mail services. Additionally, the communications between the SSP 308 and IP 320 may use the Primary Rate interface (PRI) (e.g., the 1129 protocol) protocol. Additionally, IP 320 may be capable of sending and receiving information to/from the Service Center 106. These communications may use, for example, the SR-3511 protocol. Further, although FIG. 3 illustrates the connection between IP 320 and service center 106 as a direct connection, this connection may include any number of elements including routers, switches, hubs, etc., and may be via, for example, an internal data network for the voice network 104.

[0050] FIG. 4 is a block diagram of a service center 106, consistent with the principles of the present invention. As shown, service center 106 may include firewalls 402 and 404, one or more digital companion servers 406, one or more communication portal servers 408, one or more network access servers 410, and a voice portal 412. Voice portal 412 may include a voice portal application server 414 and a voice recognition server 416. A network 418 may be used to interconnect the firewalls and servers. Additionally, back end server(s) 420 may be provided between the service center 106 and the voice network 104.

[0051] Firewalls 402 and 404 provide security services for communications between service center 106, data network 102, and voice network 104, respectively. For example, firewalls 402 and 404 may restrict communications between user terminal 112 and one or more servers within service center 106. Any appropriate security policy may be implemented in firewalls 402 and 404 consistent with the principles of the present invention. Firewalls 402 and 404 may be implemented using a combination of known hardware and software, such as the Raptor Firewall provided by the Axent Corporation. Further, firewalls 402 and 404 may be implemented as separate machines within service center 106, or implemented on one or more machines external to service center 106.

[0052] Network 418 may be any appropriate type of network, such as an Ethernet or FDDI

network. Additionally, network 418 may also include switches and routers as appropriate without departing from the scope of the invention. Further, additional firewalls may be present in network 418, for example, to place one or more of servers 406, 408, 410, or voice portal 412 behind additional firewalls.

[0053] Each server (406, 408, 410, 414, 416, 420) may be any appropriate type of server or computer, such as a Unix- or DOS-based server or computer. The servers may implement various logical functions, such as those described below. In FIG. 4, a different server is illustrated as being used for each logical function. In other embodiments, the logical functions may be split across multiple servers, multiple servers may be used to implement a single function, all functions may be performed by a single server, etc.

[0054] In general, a digital companion server 406 may provide the software and hardware for providing specific services of the service center. Exemplary services include, for example, permitting a customer to add contacts to their address book from a history of calls made or received by the customer, permitting a customer to make calls directly from their address book, scheduling a call to be placed at a specific time, or permitting the customer to look at the name and/or address associated with a phone number. Additionally, these services may include permitting the customer to listen to their voice mail on-line, forwarding their calls based on a scheduler and/or the calling parties number, setting up conference calls on-line, etc.

[0055] Communication portal server 408 may provide the hardware and software for managing a customer's account and interfacing with customer account information stored by the provider of customer's voice network 104. Network access servers 410 may provide the hardware and software for sending and receiving information to voice network 104 in processing the applications provided by the service center. For example, network access servers 410 may be used for transmitting and/or receiving information from/to an ISCP 302 or an SSP 308 or 310 of voice network 104.

[0056] Voice portal 412 includes software and hardware for receiving and processing instructions from a customer via voice. For example, a customer may dial a specific number for

voice portal 412. Then the customer, using speech, may instruct the service center 105 to modify the services to which the customer subscribes. Voice portal 412 may include, for example, a voice recognition function 416 and an application function 414. Voice recognition function 416 may receive and interpret dictation, or recognize spoken commands. Application function 414 may take, for example, the output from voice recognition function 416, convert it to a format suitable for service center 106 and forward the information to one or more servers (406, 408, 410) in service center 106.

[0057] FIG. 5 illustrates a logical architecture of an exemplary system, consistent with the present invention. As illustrated, the logical architecture may be split into four planes: client side 502, application service 504, network access 506, and voice network 508.

[0058] Client side 502 includes user terminals 112_A and 112_B that a user may use to send and/or receive information to/from service center 106. Additionally, client side 502 includes user's phone(s) 114. As discussed above, user terminals 112 may be any type of device a user may use for communicating with Service Center 106. For example, user terminal 112_A may be a PDA running a program for communicating with Service Center 106, while user terminal 112_B may be a desktop type computer running a web browser for communicating with the Service Center 106 via the Internet. Additionally, the user may have one or more phones 114, such as, for example, one or more standard landline telephones and/or wireless phones.

[0059] Application service plane 504 includes digital companion server(s) 406, communication portal server(s) 408, and voice portal 412. These entities may communicate between one another using, for example, web services or any other suitable protocols. Web services are a standardized way of integrating Web-based applications using the Extensible Markup Language (XML), Simple Object Access Protocol (SOAP), Web Services Description Language (WSDL) and Universal Description, Discovery and Integration (UDDI) open standards over an Internet protocol (IP) backbone.

[0060] As illustrated, digital companion server 406 may provide the following functions: a client proxy 512, a web server 514, an application server function 516, a calendar server function 518,

a notification server function 520, and a database function 522. Each of these functions may be performed in hardware, software, and/or firmware. Further, these functions may each be executed by a separate server, split across multiple servers, included on the same server functions, or any other manner.

[0061] Client proxy function 512 provides a proxy function for the digital companion that may be used for security purposes. This client proxy function 512 may be included in a separate server such that all communications sent from the other digital companion functions/servers to user terminal 112 via data network 102 go through client proxy 512. Also, if the client proxy 512 is included on a separate server, for example, an additional firewall may be provided between client proxy 512 and other digital companion servers to provide additional security.

[0062] Web server 514 provides functionality for receiving traffic over the data network 102 from a customer. For example, web server 514 may be a standard web server that a customer may access using a web browser program, such as Internet Explorer or Netscape Communicator.

[0063] Application server function 516 encompasses the general functions performed by digital companion server(s) 406. For example, these functions may include interfacing with the various other digital companion functions to perform specific applications provided by the service center. These services may include, for example, interfacing with other function(s), software, and/or hardware to provide a customer with the capability of managing their calls online. For example, permitting a customer to add contacts to their address book from a history of calls made or received by the customer, permitting a customer to make calls directly from their address book, scheduling a call to be placed at a specific time, or permitting the customer to look at the name and/or address associated with a phone number. Additionally, these services may include permitting the customer to listen to their voice mail on-line, forwarding their calls based on a scheduler and/or the calling parties number, setting up conference calls on-line, etc.

[0064] Additionally, application server function 516 may interface with one or more external devices, such as an external web server, for retrieving or sending information. For example, application server function 516 may interface with voice network's data center 556 (e.g.,

verizon.com) to determine the services to which the customer subscribes (e.g., call waiting, call forwarding, voice mail, etc.).

[0065] Calendar server function 518 may provide the capability of scheduling events, logging when certain events occurred, triggering the application-functions to perform a function at a particular time, etc.

[0066] Notification server function 520 provides the capability to send information from service center 106 to user terminal 112. For example, notification server function 520 at the direction of application server function 516 may send a notification to user terminal 112 that the user is presently receiving a phone call at user's phone 114.

[0067] Database function 522 provides the storage of information useable by the various applications executed by the digital companion servers. These databases may be included in, for example, one or more external storage devices connected to the digital companion servers. Alternatively, the databases may be included in storage devices within the digital companion servers themselves. The storage devices providing database function 522 may be any type of storage device, such as for example, CD-ROMs, DVD's, disk drives, magnetic tape, etc.

[0068] As discussed above, communication portal server(s) 408 provide the hardware and software for managing a customer's account and interfacing with customer account information stored by the provider of the customer's voice network 104. As illustrated in FIG. 5, communication portal server 408 may provide the following functions: a web server function 526, an application server function 528, a contacts database function 530, and/or a customer profile function 532. Each of these functions may be performed by a separate server, split across multiple servers, included on the same server functions, or any other manner.

[0069] Web server function 526, as with web server function 522 of the digital companion servers, provides functionality for receiving traffic over data network 102 from a customer. For example, the web server may be a standard web server that a customer may access using a web browser, such as Internet Explorer or Netscape Communicator.

[0070] Application server function 528 encompasses the general functions performed by communication portal servers 406. For example, these functions may include interfacing with the voice network to retrieve and/or modify customer profile information, and creating and editing an address book for the user. Additionally, application server function 528 may include the functionality of sending and/or receiving information to/from external servers and/or devices. For example, communication portal servers 408 may be connected to a network, such as the Internet. Application server function 528 may then provide connectivity over the Internet to external servers 552 that provide web services, such as the Superpages webpage. Application function 528 could then contact these external services 552 to retrieve information, such as an address for a person in the user's address book.

[0071] In another example, application server function 528 of communication portal 408 may interface a single sign on (SSO) server 554. SSO 554 may be used to allow users to access all services to which the user subscribes, on the basis of a single authentication that is performed when they initially access the network.

[0072] Contacts database 530 includes storage devices for storing an address book for the user. This address book may be any appropriate type of address book. For example, the user's address book may include the names, phone numbers, and addresses of people and/or organizations. These storage devices may be internal or external to communication portal servers 406 or some combination in between. In addition, these storage devices may be any type of storage device, such as magnetic storage, memory storage, etc.

[0073] Customer profile database 532 includes storage devices for storing customer profile information for the user. These storage devices may be the same or separate storage devices used for the contacts database. The customer profile may include information regarding the user's account for their voice network. For example, this information may include the user's name, billing address, and other account information. Additionally, the customer profile may include information regarding voice services to which the user subscribes, such as, for example, call waiting, voice mail, etc.

[0074] Additionally, application services plane 504 of the architecture may include voice portal 412. As discussed above, voice portal 412 may include, for example, a voice recognition function 416 and an application server function 414, and be used for receiving and processing instructions from a customer via voice. The voice recognition function may be implemented using hardware and/or software capable of providing voice recognition capabilities. This hardware and/or software may be a commercially available product, such as the Voice Application platform available from Tellme™ Networks, Incorporated. Application server function 414 of voice portal 412 may include hardware and/or software for exchanging information between digital companion servers 406 and voice recognition function 416. Additionally, application server function 414 may be included on a separate server, included in the hardware and software providing voice recognition function 416, included in digital companion servers 406, etc.

[0075] Network Access plane 506 of the architecture includes the functions for providing connectivity between application service plane 502 and voice network 104. For example, this plane may include recent change engines 316, network access servers 410, and/or back end servers 420.

[0076] As discussed above, recent change engines 316 may be used to update switches and ISCP databases included in voice network 104. In one embodiment, recent change engines 316 may include an AAIS 544, an eRC 546, and/or an MSP 548. Additionally, a proxy 542 may be used between digital companion servers 406 and recent change engines 542 for security purposes.

[0077] Network access servers 410 may be included in service center 106 and may provide the hardware and software for sending and receiving information to voice network 410 in processing the applications provided by the service center. For example, network access servers 410 may include a Caller ID (CID) functionality for retrieving caller ID information from voice network 104, a click to dial (CTD) functionality for instructing an intelligent peripheral (IP) in the voice network to place a call via an SSP, and/or a real time call management (RTCM) functionality for interfacing with an ISCP of the voice network.

[0078] Network Access plane 506 may also include one or more back end server(s) 420. These back end server(s) 420 may include hardware and/or software for interfacing service center 106 and voice network 104. Back end server(s) 420 may be connected to service center 106 by a network, by a direct connection, or in any other suitable manner. Further, back end server(s) 420 may connect to one or more devices in voice network 104 by a network, a direct connection, or in any other suitable manner.

[0079] Back end server(s) 420 may include, for example, a server providing a voice mail retrieval and notification function. For example, this voice mail retrieval and notification function may include the capability to receive notifications when a user receives a voice mail, physically call a user's voice mail system, enter the appropriate codes to retrieve the voice mail, retrieve the voice mail, convert the voice mail to a digital file, and send it to digital companion servers 406.

[0080] Additionally, these back end server(s) 420 may also include, for example, a directory assistance server. This directory assistance server may, for example, interface service center 106 with a Reverse Directory Assistance Gateway (RDA Gateway) of voice network 104. A RDA Gateway is a device for issuing requests to a Data Operations Center (DOC) of the voice network 104 for name and/or address information associated with a phone number and receiving the name and/or phone number in response to this request.

[0081] In another example, back end server(s) 420 may include a wireless internet gateway that is used for interfacing with a mobile switching center (MSC) of a wireless voice network. As with the above-described back end server(s) 420, this wireless internet gateway may be used for converting requests and information between the formats used by service center 106 and those used by the wireless voice network.

[0082] In yet another example, back end server(s) 420 may include a conference blasting server for instructing a conference bridge in voice network 106 to dial out via an SSP to the participants of a voice conference. Alternatively, back end server(s) 420 may include a server for instructing

an IP of the voice network to place a call between two parties by dialing out to each of the parties. Back end server(s) 420 may also include the capability to instruct the bridge or IP device to call an audio digitizing device that can listen to the conference, convert the audio signals to digital format, and forward the digitized signals to a user device via, for example, an audio streaming server. The audio streaming server may, for example, allow a user to connect to it via, for example, the Internet. Additionally, the audio streaming device may buffer or record the signals to permit the user to pause, rewind, and/or fast-forward thru the conference.

[0083] In yet another example, back end server(s) 420 may include a Single Number Short Message Service (SN SMS) server for interfacing service center 106 with a SMS gateway in voice network 104. This may be used for example to permit the customer to have SMS messages addressed to their home phone number directed to an SMS capable device of the users choosing.

[0084] Voice network plane 508 includes the hardware and software included in voice network 104, as discussed above with reference to FIG. 3. For example, voice network plane 508 may include ISCP SPACE 314, ISCP 302, intelligent peripherals 320, and SSP 308. Additionally, voice network plane 508 may also include the hardware and software included in a wireless carrier's network, such as, for example, the mobile switching center, etc.

[0085] The following provides a more detailed description of methods and systems for automatically forwarding calls from a communications line to a particular device, in accordance with methods and systems consistent with the invention. As used herein the term "communications line" refers to the physical connection and associated data for connecting a particular device with a communications network. For example, in the PSTN, a communications line may be, for example, the line connecting a user's home to a local switching office, wherein the user may connect a phone to the line to communicate over the PSTN. Alternatively, in wireless system, a communications line may be for example, the data and associated hardware for permitting the wireless network to communicate with a user's wireless device.

[0086] As discussed above, user terminal 112_A may execute a client application (hereinafter referred to as the Digital Companion ("DC") client application). This DC client application

preferably can access digital companion server(s) 406 via, for example, the Internet. This DC client application preferably may retrieve information from the digital companion server(s) regarding the user's communication devices (e.g., their home phone, work phone, cell phone, etc.) that the user has elected to register for digital companion services. Further, as discussed above, the user may also access and retrieve such information from the digital companion server(s) via a browser operating on a user terminal 112_B via communication portal 408. Alternatively, as discussed above, the user may access and retrieve such information from digital companion server(s) 406 via voice portal 412 using a phone 114.

[0087] In this example, the user may be able to register, for example, using the DC client application or browser, one or more communications devices (e.g., phones, wireless PDAs, computers, etc.) with digital companion server(s) 406. This list of devices will be referred to as the user's device profile and may include, for example, a name for the device, a phone number for the device if it is a phone, or an IP address for the device if the device is a device with Internet connectivity (e.g., a wireless PDA, computer, etc.). This information may be provided by the user via, for example, the DC client application or browser. Alternatively, if the communications line for the device is associated with voice network 104, information may be retrieved by communication portal 408, as discussed above.

[0088] Additionally, the user may register one or more devices that include a transceiver capable of automatically detecting if the device enters the vicinity (comes within range) of a user terminal 112.sub. A including a corresponding transceiver and establishing communications between the device and user terminal 112_A. These transceivers may use a protocol such as, for example, Bluetooth™ or WiFi ((i.e., IEEE 802.11(b) and/or (g)), or any other suitable wireless protocol.

[0089] For example, Bluetooth-enabled devices typically include operating system software that manages the discovery and registration of new devices coming within the vicinity of each other. The vicinity of the device is hereinafter defined as the range around a transceiver of the device wherein when a device having a like transceiver enters this range it may be discovered by the device. Accordingly, when Bluetooth-enabled devices come within range of one another, an

electronic conversation may automatically take place to determine whether the devices have data to share or whether one device needs to control the other. Once this initial discovery conversation has occurred, the Bluetooth devices form a network referred to as a Personal-Area Network (PAN) or "piconet" that may fill a room or may encompass no more distance than that between a Bluetooth-enabled cellphone and a user's Bluetooth-enabled computer. Once a piconet is established, the members randomly hop frequencies in unison so they stay in touch with one another and avoid other piconets that may be operating in the same room.

[0090] For ease of explanation, in this exemplary embodiment, the device coming within range of the user terminal 112_A will be referred to as a Bluetooth-enabled wireless phone. However, it should be understood that in other examples this device may be a Bluetooth-enabled Personal Data Assistant (PDA), a WiFi-enabled laptop, etc. The user thus when initially registering the device may specify that the device includes a Bluetooth- or WiFi-transceiver and enter the corresponding information. Alternatively, if the device comes within range of user terminal 112_A, user terminal 112_A may automatically prompt the user regarding whether the user wishes to add this device to their device profile.

[0091] Once a user enters the information, the user may elect to save the information. In response, user terminal 112_A may forward the information from user terminal 112_A to digital companion servers 406, which may store the information in database 522. In the future, when the user wishes to access or modify their user device profile, the user can send a query to digital companion servers 406 which can provide user terminal 112_A with their current device profile. For a more detailed description of user devices and methods and systems for automatically forwarding calls, see the above-referenced U.S. patent application publication No. 20050105510, entitled Methods and Systems for Line Management.

[0092] As discussed above, in an exemplary embodiment, the user may elect to have all calls for any of their communication devices (i.e., communications devices) automatically handled in a particular manner. The following provides a more detailed description of methods and systems consistent with the invention for automatically forwarding calls to a specific device (e.g., a Bluetooth-enabled device) when the user carries the specific device (e.g., the Bluetooth-enabled

device) into or out of a vicinity (e.g., the range of a Bluetooth transceiver included in user terminal 112_A).

[0093] FIG. 6 illustrates an exemplary screen shot of a screen 600 that may be displayed to a user on terminal 112A in response to the user electing to activate call forwarding. As illustrated, screen 600 may display the phone numbers or names 602 for the user's different communication devices along with a corresponding activate call forwarding link 604. If a user desires to forward calls for one of their devices, the user can click on the activate call forwarding link 604 to the right of the phone's number (or name). In response, the user may be presented with a new screen for selecting the number to which the calls are to be forwarded.

[0094] FIG. 7 illustrates an exemplary screen shot of a screen 700 that may be displayed to a user on terminal 112A to select a number to which calls are to be forwarded (hereinafter referred to as a forward-to number). As illustrated, screen 700 may display number 602 to which the user has elected to have calls forwarded. Additionally, screen 700 may display a pull-down list 702 that includes a list of numbers to which the calls are to be forwarded and/or user assigned nicknames for these devices. These numbers in pull down list 702 may include, for example, the numbers and/or names for the other communication devices in the user's device profile, along with any other numbers/names saved by the user. The user may then select from this pull down list 702, for example, to forward calls to their cellular phone. Alternatively, the user may select e-mail notification from this pull-down list to cause an e-mail message regarding the call to be sent to them including information regarding the call. Alternatively, the user may select an instant messaging account 712 to have an instant message regarding the call sent to them.

[0095] Once the user has selected the device to which they desire to have calls forwarded, the user may then click on an activate button 706 to have their changes saved so that the desired call forwarding is implemented. Alternatively, the user may click on a cancel button 710 to cancel call forwarding. The above-referenced U.S. patent application publication No. 20050105510 entitled Methods and Systems For Line Management provides for a further description of call forwarding along with scheduling call forwarding.

[0096] As illustrated, pull down list 702 may also include an entry 704 for forwarding calls to a device (e.g., a Bluetooth-enabled wireless phone) that includes a transceiver capable of automatically being detected if the device enters a vicinity (comes within range) of the user terminal 112_A. Although in this example, this device is referred to as a Bluetooth-enabled wireless phone, as discussed above, this device may also be, for example, a Bluetooth-enabled PDA, a WiFi-enabled laptop etc.

[0097] FIG. 8 illustrates an exemplary screen shot of a screen 800 that may be displayed to a user who has selected call forwarding regarding his Bluetooth-enabled cell phone. As illustrated, the user may be presented with various call forwarding options. For example, the user may select a check box 802 to forward all calls (initially directed by a calling party to any of the user's devices) to the users wireline office phone 602 whenever the users Bluetooth-enabled wireless phone comes within the vicinity (i.e., the range) of the user terminal 112_A, also located in the user's office. Alternatively, the user may select a check box 804 so that only calls initially directed to the user's office phone 602 are sent to the office phone 602, whenever the Bluetooth-enabled wireless phone is in the vicinity of the user terminal 112_A. The user may also select a check box 806 to individually select the devices for which calls thereto are forwarded to their office phone. In the event the user selects check box 806, the user may be presented with a screen listing all their registered communications devices and including corresponding check boxes for selecting which of the devices whose calls are to be forwarded to their office phone.

[0098] Additionally, the user may be presented with a check box 808 for selecting to have calls initially directed by a calling party to the users office phone automatically forwarded to the user's Bluetooth-enabled wireless phone 704 in the event the Bluetooth-enabled wireless phone leaves the vicinity (i.e., range) of the user terminal 112_A. Additionally, this screen may also present the user with other options such as, for example, forwarding calls for any of its communications devices or a user specified subset of the user's devices.

[0099] FIG. 9 is a diagram of an exemplary flowchart of a method for establishing automatic forwarding of calls to a specific device, in accordance with methods and systems consistent with the invention. Although the steps of the flowchart are described in a particular order, one skilled

in the art will appreciate that these steps may be performed in a modified or different order. Further, one or more of the steps in FIG. 9 may be performed concurrently or in parallel.

[0100] In this example, the user terminal 112_A includes a transceiver capable of automatically detecting if a device enters its vicinity (comes within range of the user terminal 112_A) and establishing communications with the device. As discussed above, this transceiver and the device may use a protocol such as, for example, Bluetooth or WiFi ((i.e., IEEE 802.11(b) and/or (g))). For ease of explanation, in this example, the device coming within range of the user terminal 112_A will be referred to as a Bluetooth-enabled wireless phone. However, it should be understood that in other examples this device may be for example, Bluetooth-enabled Personal Data Assistant (PDA), a WiFi-enabled laptop, etc.

[0101] When the Bluetooth-enabled wireless phone comes within range of the user terminal 112_A, the Bluetooth software running on the user terminal 112_A automatically detects the phone. This detection generates an event that is detected by the DC client application executing on the user terminal 112_A and the DC client application is provided with identification information regarding the phone. (S902).

[0102] The DC client application then uses the received identification information to determine if the Bluetooth-enabled wireless phone is registered in the user's device profile. (S904). If the Bluetooth-enabled wireless phone is not in the user's preferred device profile, the DC client application may prompt the user to add the Bluetooth-enabled wireless phone. (S906). This may be accomplished by, for example, displaying a checkbox on a screen of the user terminal 112_A inquiring whether or not the user wishes to add this Bluetooth-enabled wireless phone to their preferred device profile. If the user selects YES, additional screens may be displayed to the user to permit the user to enter a name for the device, a phone number or IP address for the device, etc. If, however, the device is a printer, keyboard, etc., or the user elects to not enter the device in their preferred device profile, the DC client application ignores the event and the flow is terminated. (S908)

[0103] If the device is in the user's device profile, the DC client application may query the user's

device profile to determine whether or not call forwarding should be changed. (S910). For example, as discussed above, the user may choose to have calls to be forwarded to their office phone in the event their Bluetooth-enabled wireless phone comes within range of the user terminal 112_A, where their office phone sits next to the user terminal 112_A.

[0104] If the user's device profile includes a selection that the preferred device be changed in the event the Bluetooth-enabled wireless phone comes in range of the user terminal 112_A, the DC client application of the user terminal 112_A may automatically send an instruction to the DC server(s) 406 to accordingly change call forwarding. (S912).

[0105] If, however, no preference has been set, the DC client application may prompt the user to set up such a preference. (S914). For example, the DC client application may display on user terminal 112_A a prompt informing the user that the Bluetooth-enabled wireless phone was detected and inquiring whether the user wishes to change their preferred device.

[0106] If the DC client application is aware that, for example, the office phone is next to the user terminal 112_A, this query may automatically include the option of setting the office phone as the preferred device. In the event the DC client application is not aware that the office phone is in the same area as the user terminal 112_A or the user elects to set another device as their preferred device, the DC client application could then display a listing of all the user's communications devices and allow the user to select from this list a device to which calls should be forwarded (hereinafter referred to as "the forward-to device"), or to enter a new device in this list that the user wishes to set as the forward-to device. This user may also elect to save this option, so that in the event the Bluetooth-enabled wireless phone comes in range of the user terminal 112_A in the future, the DC client application automatically causes calls for all the user's devices to be forwarded to the office phone, without the need to query the user.

[0107] If the user selects to change their forward-to device, the DC client application then sends an instruction to digital companion servers 406 instructing call forwarding to be changed. If, however, the user does not elect to change their forward-to device, the flow is terminated and no changes are made. (S916)

[0108] When the Bluetooth-enabled wireless phone goes out of range (e.g., the user terminal does not receive an Link Management Protocol (LMP) message for more than 30 seconds), the Bluetooth software running on the user terminal detects that the Bluetooth-enabled wireless phone has left the range of the user terminal and generates a corresponding event. (S918). The DC client application then detects this event and based on the event determines that the Bluetooth-enabled wireless phone has left the vicinity (i.e., left the Piconet). (S920).

[0109] If the DC client application determines that the Bluetooth-enabled wireless phone has moved out of range, the DC client application then queries the user's device profile to determine whether to switch the user's device to the Bluetooth-enabled wireless phone. (S922). If the user has set up such an instruction, the DC client application then sends an instruction to digital companion server(s) 406 instructing that the forward-to device be changed to the Bluetooth-enabled wireless phone. (S924). Thereafter, digital companion server(s) 406 directs that calls for the user be automatically forwarded to the Bluetooth-enabled wireless phone. As discussed above, the user may select that calls for all of the user's devices, only calls to the office phone, or calls to a subset of the user's devices be forwarded to the Bluetooth-enabled wireless phone. For a more detailed description of methods and systems for forwarding calls to a user's preferred device, see the above-referenced U.S. patent application publication No. 20050105510 entitled *Methods and Systems For Line Management*.

[0110] If, however, the Bluetooth software running on the user terminal 112_A detects that the Bluetooth-enabled wireless phone was powered off or that the user does not wish to forward calls to the Bluetooth-enabled wireless phone, the user terminal's queries the user's device profile to determine which device to set as the user's forward-to device, and then sends an instruction to digital companion server(s) 406 to change the user's forward-to device accordingly. (S926). Digital companion server 406 will then switch the user's preferred device to the one indicated by the user's preferences.

[0111] FIG. 10 is a diagram of an exemplary flowchart of a method for automatically forwarding calls to a specific device, in accordance with methods and systems consistent with the invention.

In this example, it is assumed that the user has a Bluetooth-enabled wireless phone and has selected to have calls for their Office Phone forwarded to the Bluetooth-enabled wireless phone in the event the Bluetooth-enabled wireless phone is not within the vicinity of the user's office computer. Referring back to FIG. 5, in this example, user terminal 112_A is assumed to be the user's office computer, and phone 114 is assumed to be the user's office phone. Additionally, in this example, the Bluetooth-enabled wireless phone has left the vicinity of the user's office computer.

[0112] First, a call is placed by a calling party directed to the user's office phone number (i.e., to phone 114). (S1002). The call is then routed by network 104 to SSP 310, which is associated with user phone 114. (S1004). SSP 310 then generates a trigger that is picked up by ISCP 302 (S1006). This trigger may be, for example, a Termination Attempt Trigger (TAT) or a specific Digit String (SDS). ISCP 302 then determines if special handling of the call should be applied (i.e., whether the call should be forwarded to a different communications device, whether the call should be sent directly to voice mail, whether the user should be notified of the call and allowed to direct handling of the call, etc). (S1008). If so, ISCP 302 queries Digital Companion server(s) 406 through network access server 410 (S1010). This query may include the caller-ID of the calling party's phone number (i.e., "caller-ID").

[0113] This query is then forwarded to application server 516 of digital companion 406. (S1012). Application server 516 then determines if the call should be forwarded to a different communications device (S1014). If so, application server 516 retrieves the information regarding handling of the call (e.g., the number the call should be forwarded to, hereinafter referred to as the "forward-to" number) (S1016). Application server 516 then instructs ISCP 302 to handle the call according to the retrieved handling instructions (S1018).

[0114] For example, application server 516 may determine that the call is to be forwarded to a particular number ("forward-to number"), such as, for example, to the number of a user's Bluetooth-enabled wireless phone. In such an example, application server 516 may send an instruction to forward the call to ISCP 302 via network access server 410 (S1018). ISCP 302 may then instruct SSP 310 to forward the call to the forward-to number, i.e. to the Bluetooth-

enabled wireless phone (S1020). In response, SSP 310 forwards the call to the forward-to number (S1022).

[0115] In addition to having calls forwarded based on the location of a particular device, the user may also elect to have notification of incoming calls to one of their communications devices sent to different devices based on the location of the particular device. For example, in are embodiment, a user may manage call(s) in real-time. In such an example, service center 106 may receive information from the voice network 104 pertaining to a call directed to one of the user's communications devices. Service center 106 may then send a notification of the call to a device associated with the user. Service center 106 may then receive a response from the user regarding how to handle the call. Service center 106 may then instruct voice network 104 to handle the call in accordance with the instructions received from the user. A further description of real time call management is presented in the above-referenced U.S. patent application publication No. 20050105510, entitled Methods and Systems for Call Management With User Intervention.

[0116] In such an example, notification of the call may be sent to user terminal 112_A if the user is logged on to service center 106 via user terminal 112_A. As discussed above, however, one of the user's devices such as, for example, a Bluetooth-enabled wireless phone, a Bluetooth-enabled PDA, a WiFi enabled laptop, etc., may include a transceiver which is detected by user terminal 112_A whenever the device comes within range of the user terminal 112_A. For ease in explanation, such device will be referred to a Bluetooth-enabled PDA in the below description. Additionally, in this example, the Bluetooth enable PDA includes wireless capability such that the Bluetooth-enabled PDA may send and receive data over, for example, a wireless network.

[0117] As discussed above, the user may receive notification of an incoming call directed to one of the user's communication devices, and the user, in response, may specify how voice network 104 should handle the call. In the present example, the user may specify that the call notification be sent to user terminal 112_A whenever the Bluetooth-enabled PDA is in range of user terminal 112_A. If, however, the Bluetooth-enabled PDA is not in range of user terminal 112_A, notification of the call is to be sent via the wireless network to the Bluetooth-enabled PDA. This election to send notification to devices based on the location of a particular device (e.g.,

Bluetooth-enabled PDA) may be specified by the user and stored in the user's device profile.

[0118] FIG. 11 is a diagram of an exemplary flowchart of a method for automatically forwarding notification of calls to a specific device, in accordance with methods and systems consistent with the invention. Although the steps of the flowchart are described in a particular order, one skilled in the art will appreciate that these steps may be performed in a modified or different order. Further, one or more of the steps in FIG. 10 may be performed concurrently or in parallel.

[0119] When the Bluetooth-enabled PDA comes within range of user terminal 112_A, the Bluetooth software running on user terminal 112_A automatically detects the presence of the PDA. This detection generates an event that is detected by the DC client application executing on user terminal 112_A and the DC client application is provided with identification information regarding the PDA. (S1102).

[0120] The DC client application then uses the received identification information to determine if the Bluetooth-enabled PDA is registered in the user's device profile. (S1104). If the Bluetooth-enabled PDA is not in the user's device profile, the DC client application prompts the user to add the device. (S1106). This may be accomplished by, for example, displaying a checkbox on a screen of user terminal 112_A inquiring whether or not the user wishes to add this Bluetooth-enabled PDA to their preferred device profile. If the user selects YES, additional screens may be displayed to the user to permit the user to enter a name, a phone number, or IP address, etc., for the Bluetooth-enabled PDA. If, however, the user elects to not enter the Bluetooth-enabled PDA in their preferred device profile, the DC client application ignores the event and the flow is terminated. (S1108)

[0121] If the Bluetooth-enabled PDA is in the user's device profile, the DC client application queries the user's device profile to determine whether or not the device to which notification of incoming calls is sent should be changed. (S1110). The device to which the user specifies for service center 106 is to send notification is hereinafter referred to as the user's "preferred device."

[0122] If the user's device profile includes a selection that the preferred device be changed in the

event the Bluetooth-enabled PDA comes in range of user terminal 112_A, the DC client application of user terminal 112_A may automatically send an instruction to DC server(s) 406 to change the user's preferred device to the selected device. (S1112)

[0123] If, however, no preference has been set, the DC client application may prompt the user to set up such a preference. (S1114). For example, the DC client application may display on user terminal 112_A prompt informing the user that the Bluetooth-enabled PDA was detected and inquiring whether the user wishes to change their preferred device.

[0124] If the user selects to change their preferred device, the DC client application then sends an instruction to digital companion servers 406 instructing the preferred device to be changed. If, however, the user does not elect to change their preferred device, the flow is terminated and no changes are made to the preferred device. (S1116)

[0125] When the Bluetooth-enabled PDA is turned off or goes out of range (e.g., the user terminal does not receive Link Manager Protocol (LMP) message for more than 30 seconds), the Bluetooth software running on user terminal 112_A detects this event and generates a corresponding event notification. (S1118). The DC client application then detects this notification and determines, based on the notification whether the Bluetooth-enabled PDA moved out of range or was turned off. (S1120).

[0126] If the Bluetooth-enabled PDA moved out of range, the DC client application then queries the user's device profile to determine whether to switch the user's preferred device to the Bluetooth-enabled wireless PDA. (S1122). If the user has set up such an instruction, the DC client application then sends an instruction to digital companion server(s) 406 instructing that the preferred device be changed to the Bluetooth-enabled PDA. (S1124). Thereafter, service center 106 sends notifications regarding incoming calls automatically to the Bluetooth-enabled PDA. The user, in response to receipt of notification, may specify how the call should be handled. For a more detailed description of real time call management, see the above-referenced U.S. patent application publication No. 20050105510 entitled, Methods and Systems Call Management with User Intervention.

[0127] If, however, the Bluetooth software running on user terminal 112_A detects that the Bluetooth-enabled PDA was powered off or that the user has not specified that the preferred device should be changed, the DC client application queries the user's device profile to determine which device to set as the user's device, and then sends an instruction to digital companion server(s) 406 to change the user's preferred device accordingly. (S1126).

[0128] While the present invention has been described in connection with various embodiments, many modifications will be readily apparent to those skilled in the art. One skilled in the art will also appreciate that all or part of the systems and methods consistent with the present invention may be stored on or read from computer-readable media, such as secondary storage devices, like hard disks, floppy disks, and CD-ROM; a carrier wave received from a network such as the Internet; or other forms of ROM or RAM. Accordingly, embodiments of the invention are not limited to the above described embodiments and examples, but instead is defined by the appended claims in light of their full scope of equivalents.

CLAIMS

What is claimed is:

1. A method for managing calls directed to a plurality of communications devices with a user, the method comprising:

receiving user-defined preferences regarding handling of calls directed to the plurality of communications devices;

storing the user-defined preferences;

receiving an indication that a first one of the communications devices has moved within wireless communication range of a terminal;

forwarding calls intended for at least two of the communications devices to a second one of the communications devices in response to receipt of the indication and based on the user-defined preferences;

receiving a second indication that the first communications device has moved outside of wireless communication range of the terminal;

terminating the forwarding of calls to the second communications device in response to receipt of the second indication; and

forwarding calls intended for at least two of the communications devices to the first communications device in response to receipt of the second indication.

2. The method as recited in claim 1, where receiving an indication comprises receiving an indication using a protocol comprising one of Bluetooth, IEEE 802.11(b), or IEEE 802.11(g).

3. The method as recited in claim 1, further comprising:

receiving an indication that the first communications device has deactivated wireless communication with the terminal.

4. The method as recited in claim 1, where the user-defined preferences include a preference regarding forwarding calls to the first communications device when the first communications device is not within wireless communication range of the terminal.

5. The method as recited in claim 1, where the user-defined preferences include a preference regarding forwarding a notification regarding a call based on the received indication.

6. The method as recited in claim 5, further comprising:

receiving, in response to the notification, an instruction regarding handling of the call.

7. The method as recited in claim 6, where the instruction regarding handling of the call includes an instruction regarding forwarding the call to a user specified device.

8. A system for managing a plurality of communications devices associated with a user, the system comprising:

at least one processor configured to:

receive user-defined preferences regarding handling of calls directed to each of the communications devices,

store the user-defined preferences,

receive an indication regarding wireless communications between a first communications device and a second communications device,

forward calls intended for at least two of the communications devices to a third communications device in response to receipt of the indication,

receive a second indication that the first communications device has moved outside of wireless communication range of the second communications device,

terminate the forwarding of calls intended for the at least two of the communications devices to the third communications device in response to receipt of the second indication, and

forward calls intended for the at least two of the communications devices to the first communications device in response to receipt of the second indication.

9. The system as recited in claim 8, where the at least one processor is configured to receive an indication regarding wireless communications using a protocol comprising at least one of Bluetooth, IEEE 802.11(b), or IEEE 802.11(g).

10. The system as recited in claim 8, where the indication indicates that the first communications device has moved within wireless communication range of the second communications device.

11. The system as recited in claim 8, where the at least one processor is further configured to receive a third indication that the first communications device has deactivated wireless communication with the second communications device.

12. The system as recited in claim 8, where the user-defined preferences include a preference regarding forwarding a notification regarding a call based on whether the at least one processor

received an indication regarding wireless communications between the first communications device and the second communications device.

13. The system as recited in claim 11, where the at least one processor is further configured to:

receive, in response to the notification, an instruction regarding handling of the call.

14. The system as recited in claim 11, where the instruction regarding handling of the call includes an instruction regarding forwarding the call to a user specified device.

15. A system for managing a plurality of communications devices associated with a user, the system comprising:

at least one processor configured to:

receive user-defined preferences regarding handling of calls directed to each of the communications devices,

store the user-defined preferences,

receive an indication regarding wireless communications between a first communications device and a second communications device, and

forward calls intended for at least two of the communications devices to a third communications device in response to receipt of the indication,

where the user-defined preferences include a preference indicating that calls intended for at least the third communications device and a fourth communications device are to be forwarded to the first communications device when the first communications device is not within wireless communications range of the second communications device.

16. A system for managing calls directed to a plurality of communications devices associated with a user of a communications network, comprising:

means for receiving user-defined preferences regarding handling of calls directed to the plurality of communications devices;

means for receiving an indication regarding wireless communications between a first communications device and a second communications device;

means for forwarding calls intended for at least two of the communications devices to a third communications device when the indication indicates that the first communications device is within range of the second communications device; and

means for forwarding calls intended for at least two of the communications devices to the first communications device when the indication indicates that the first communications device is not within range of the second communications device.

17. A non-transitory computer-readable medium that includes instructions for performing a method for managing calls directed to one or more communications devices associated with a user of a communications network, comprising:

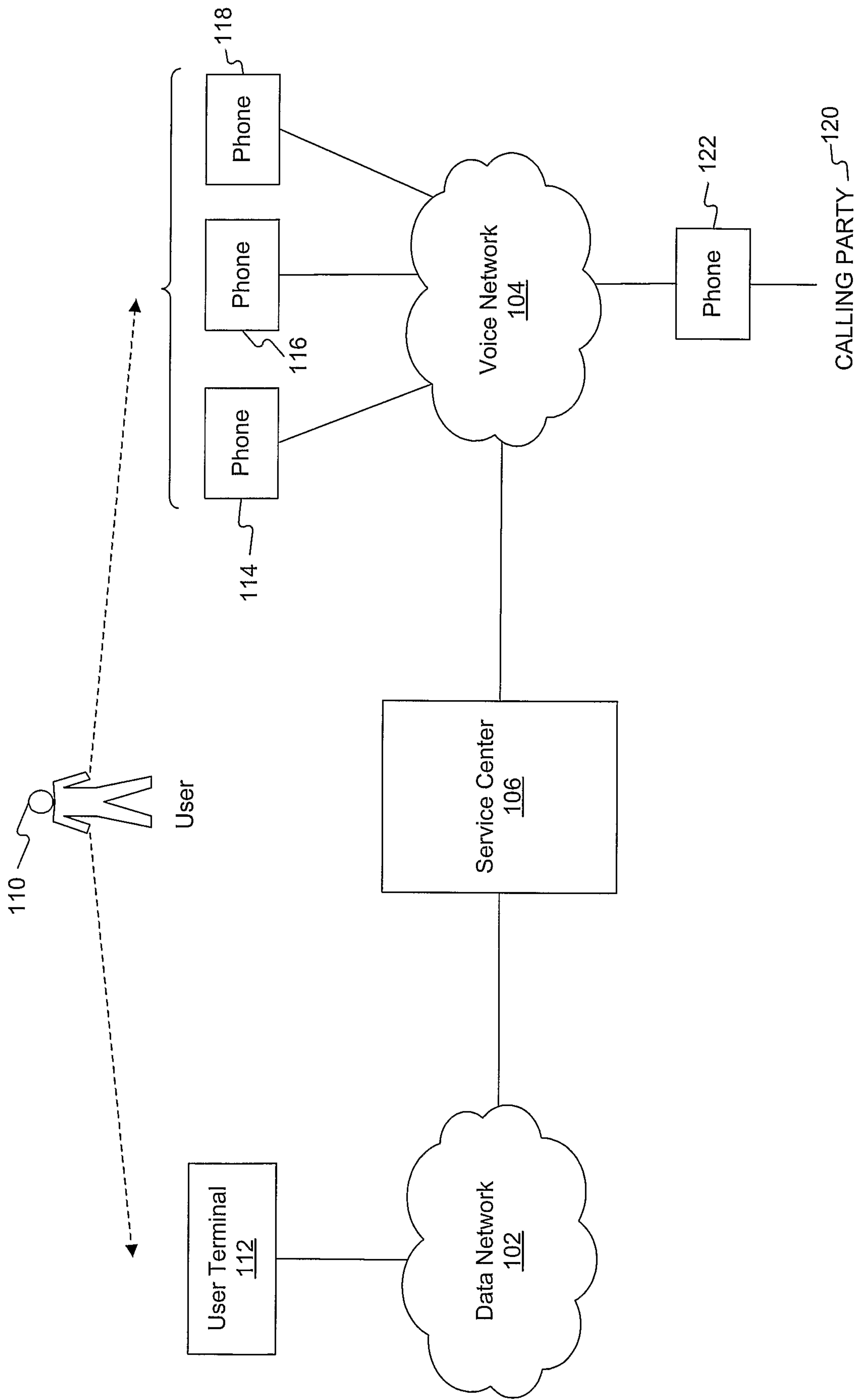
receiving user-defined preferences regarding handling of calls directed to at least one of the communications devices;

storing the user-defined preferences;

receiving an indication regarding wireless communications between a first communications device and a second communications device;

forwarding calls intended for at least two of the communications devices to a third communications device when the indication indicates that the first communications device is within range of the second communications device; and

forwarding calls intended for the third communications device to the first communications device when the indication indicates that the first communications device is not within range of the second communications device.



100

Figure 1

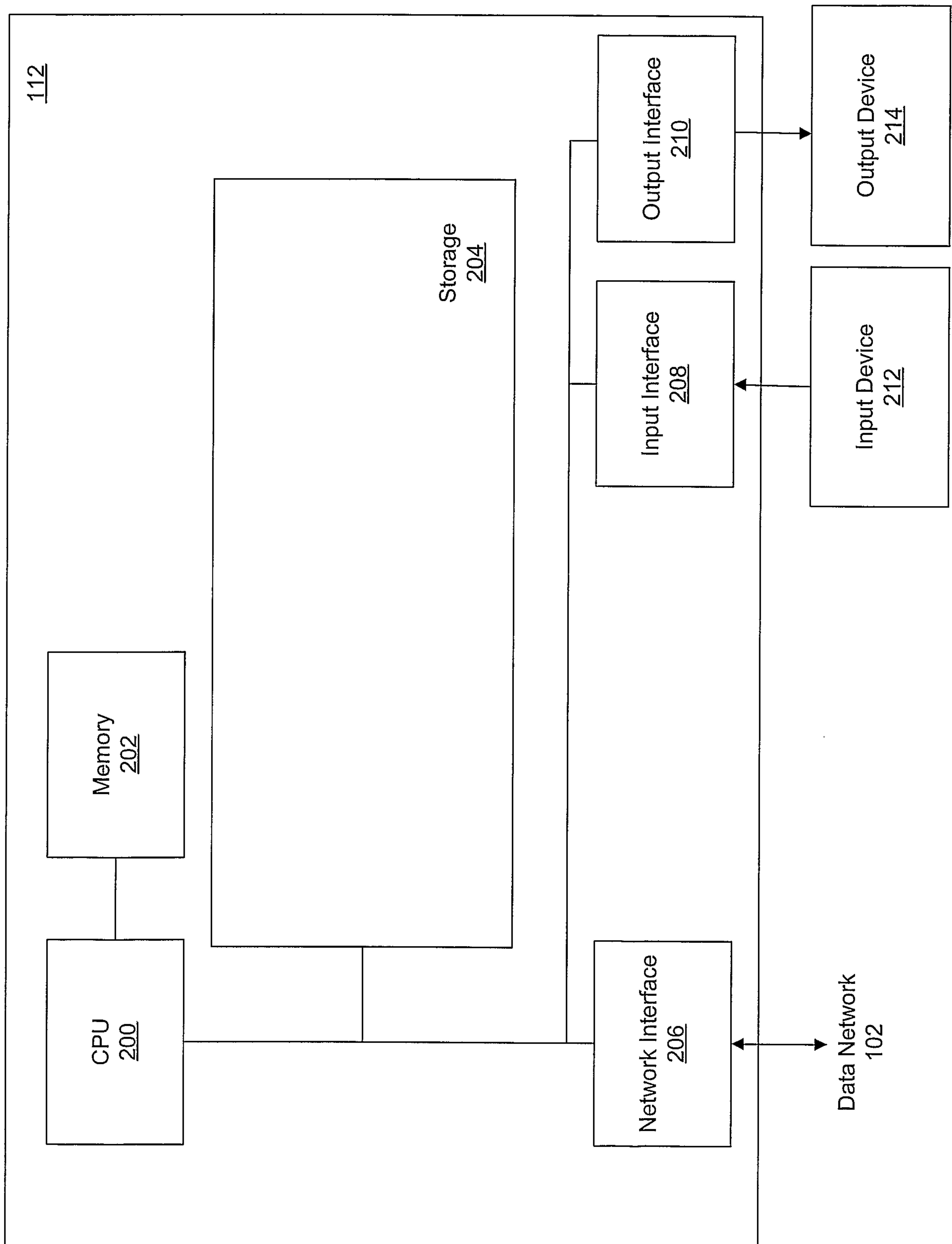


Figure 2

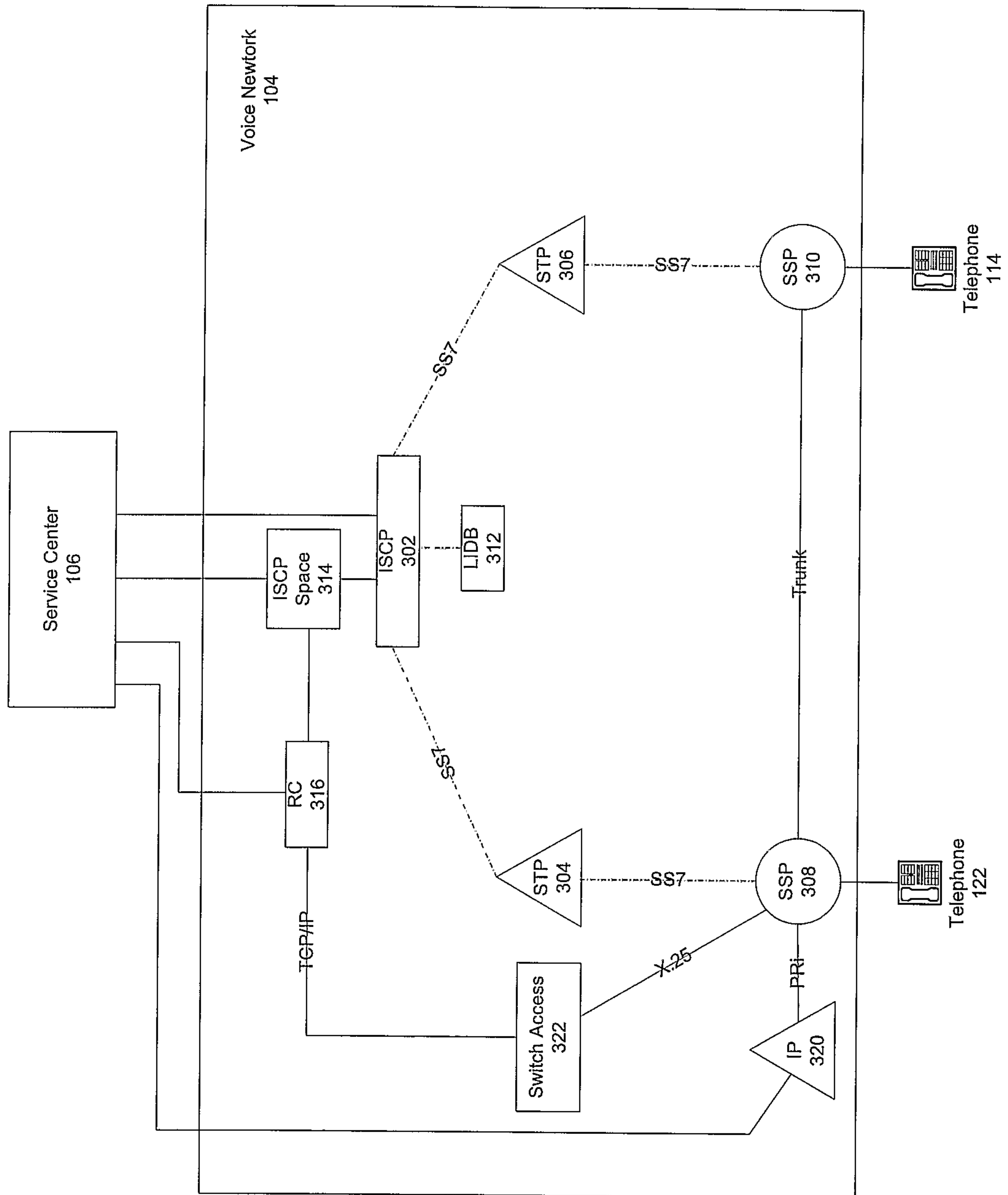


Figure 3

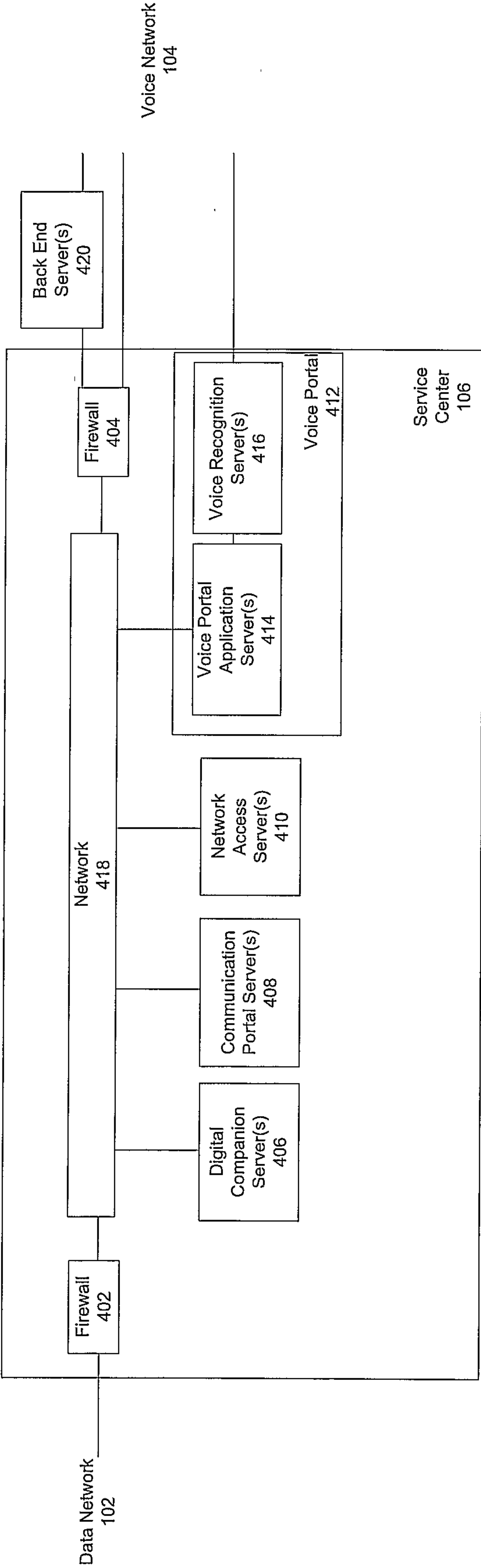


Figure 4

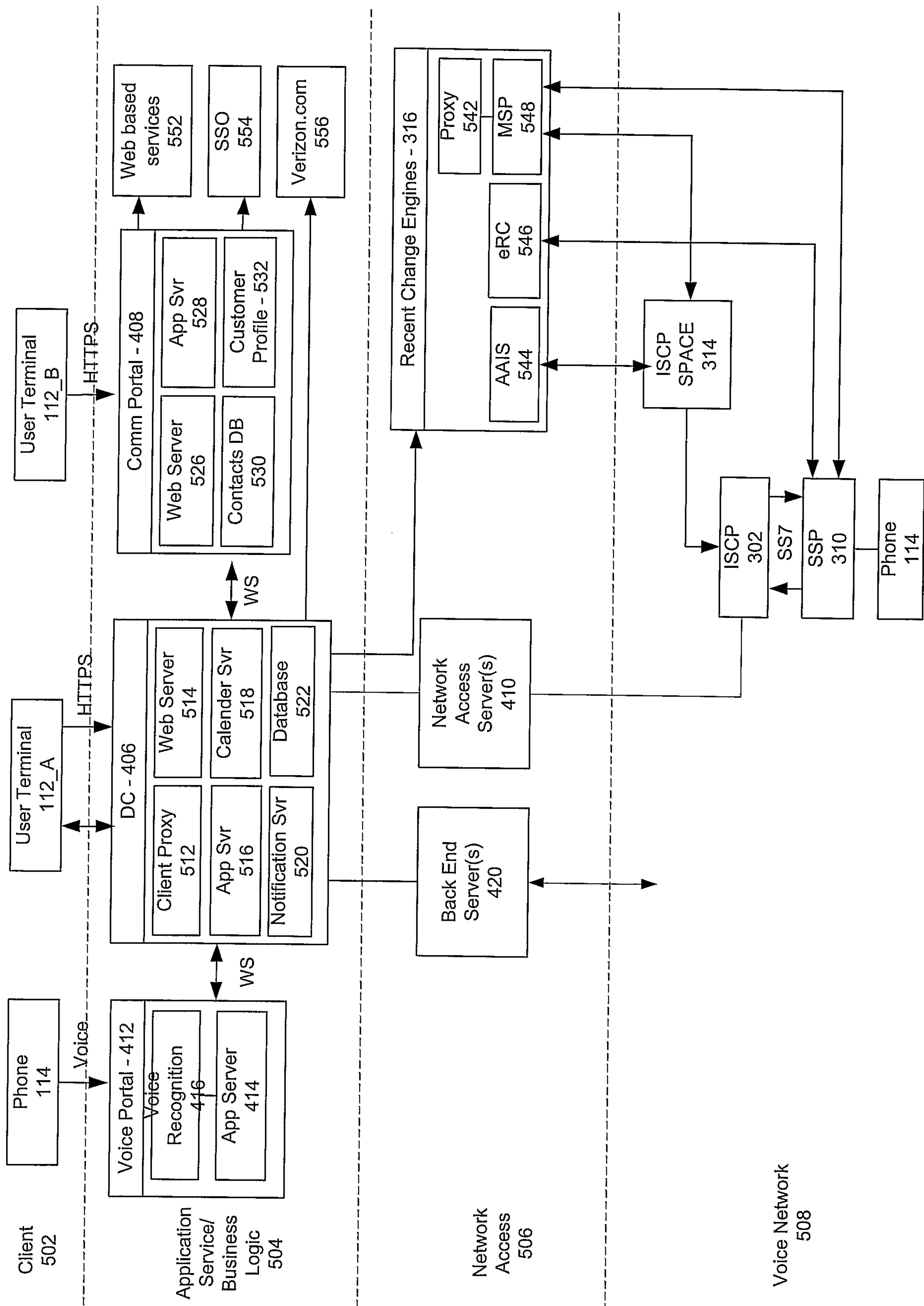


Figure 5

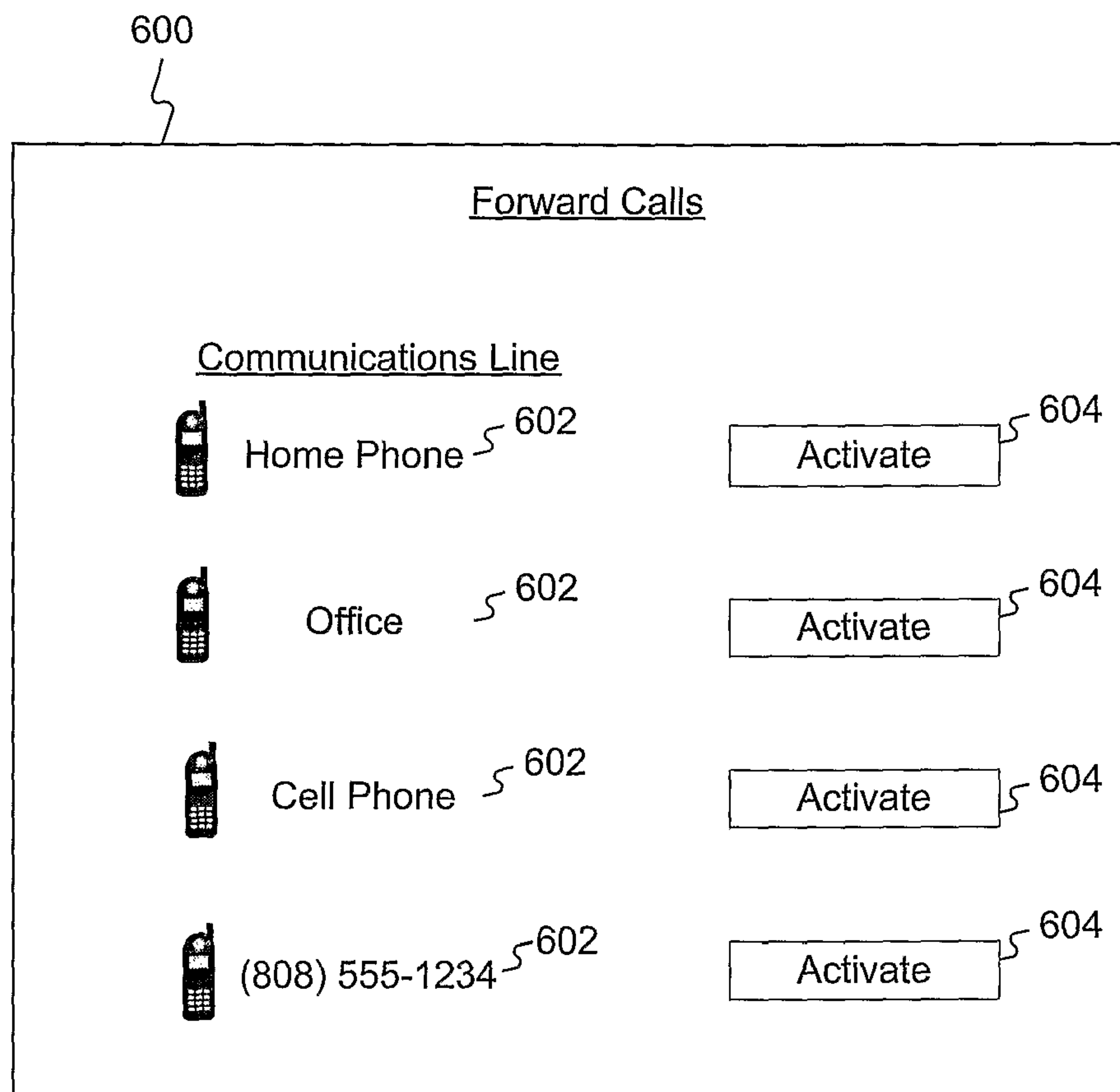


Figure 6

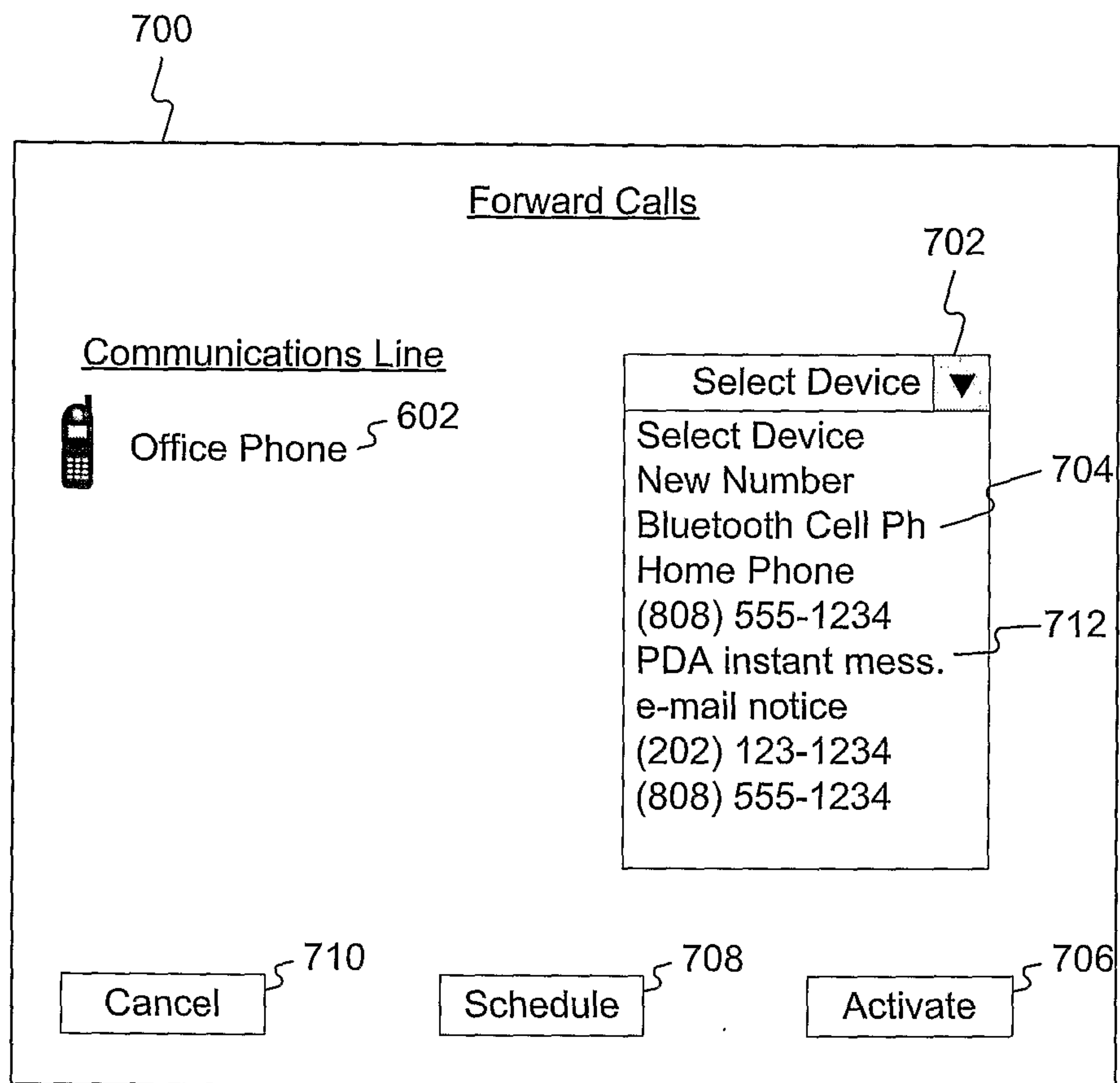


Figure 7

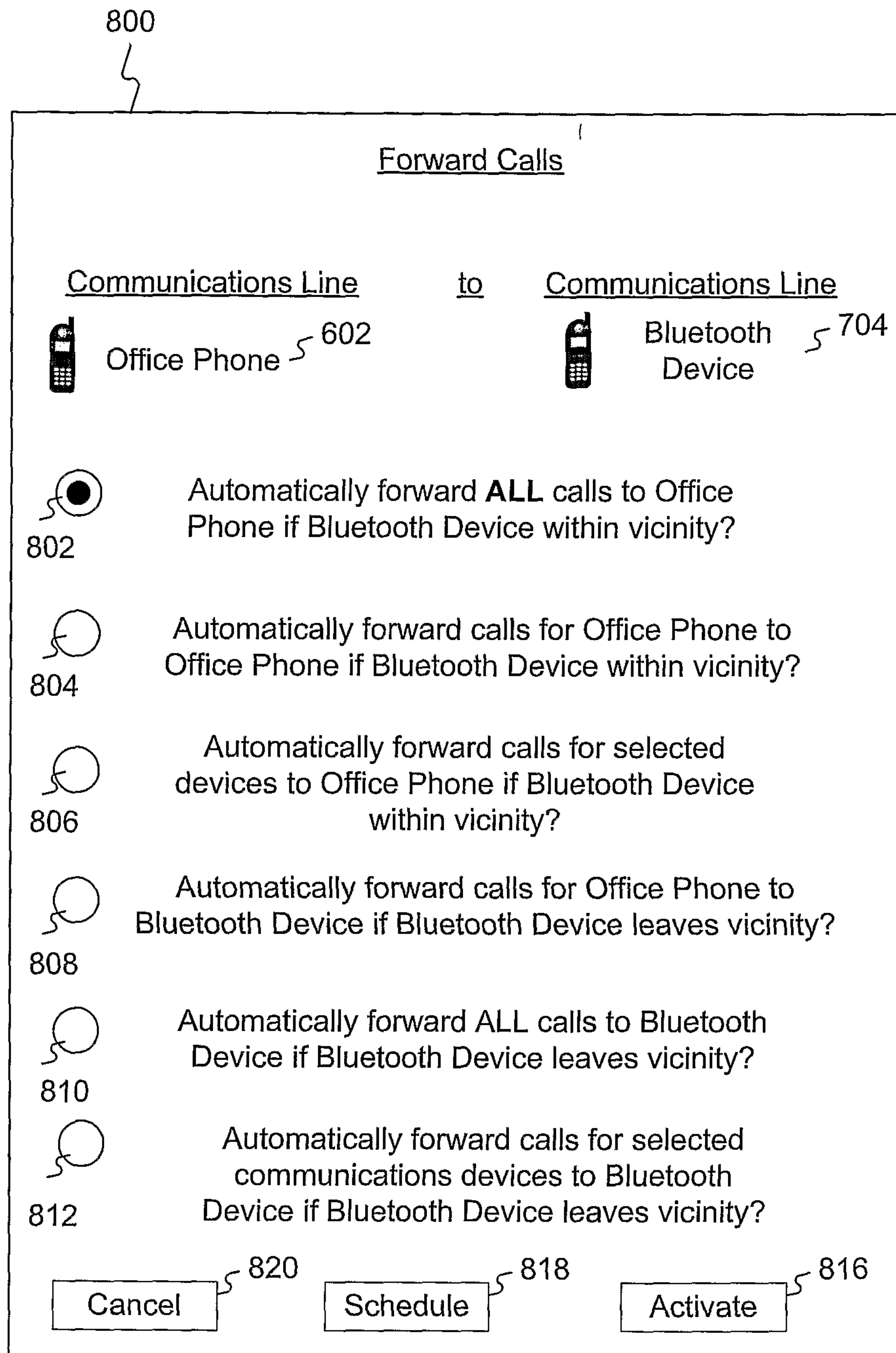


Figure 8

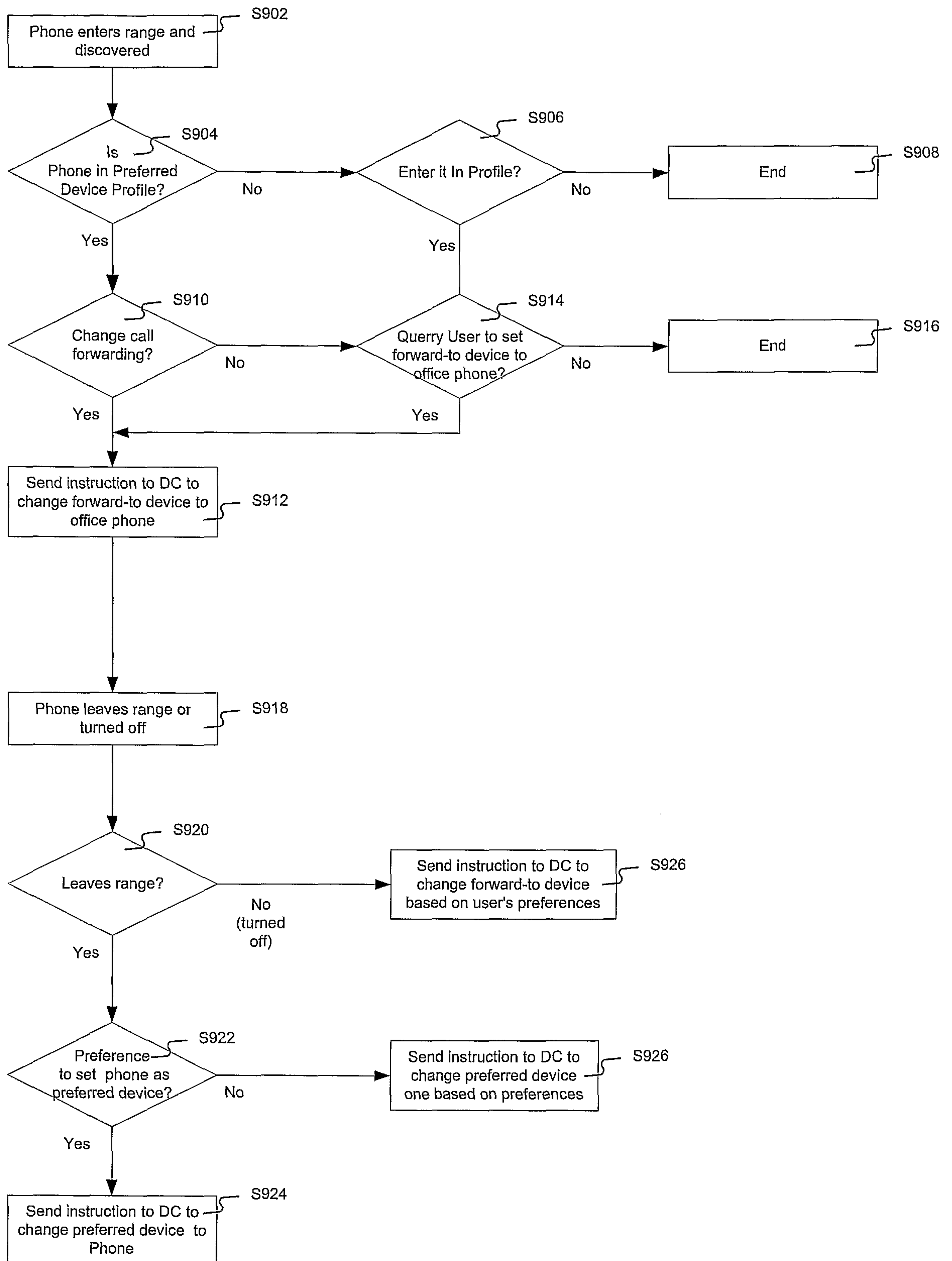


Figure 9

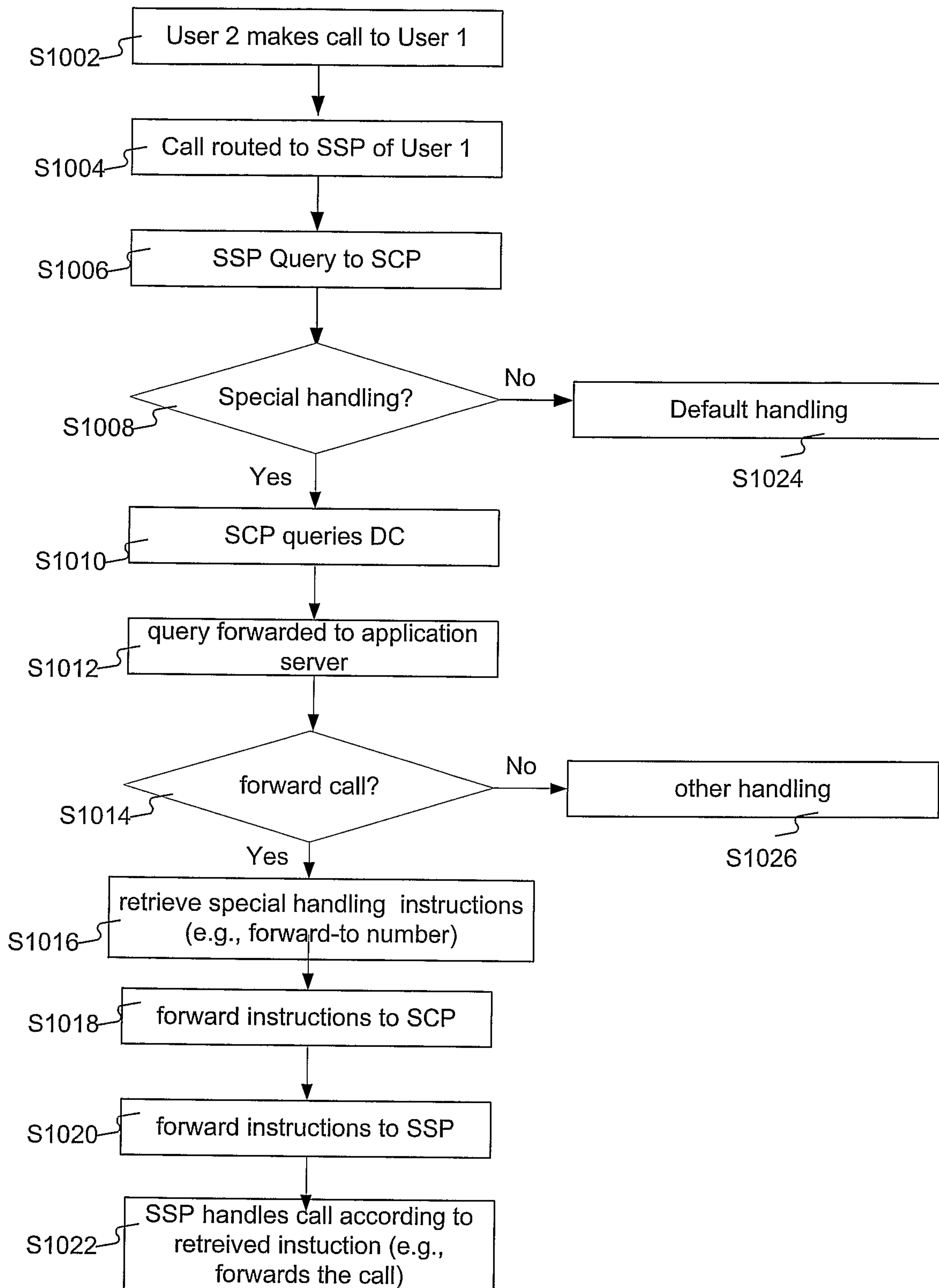


Figure 10

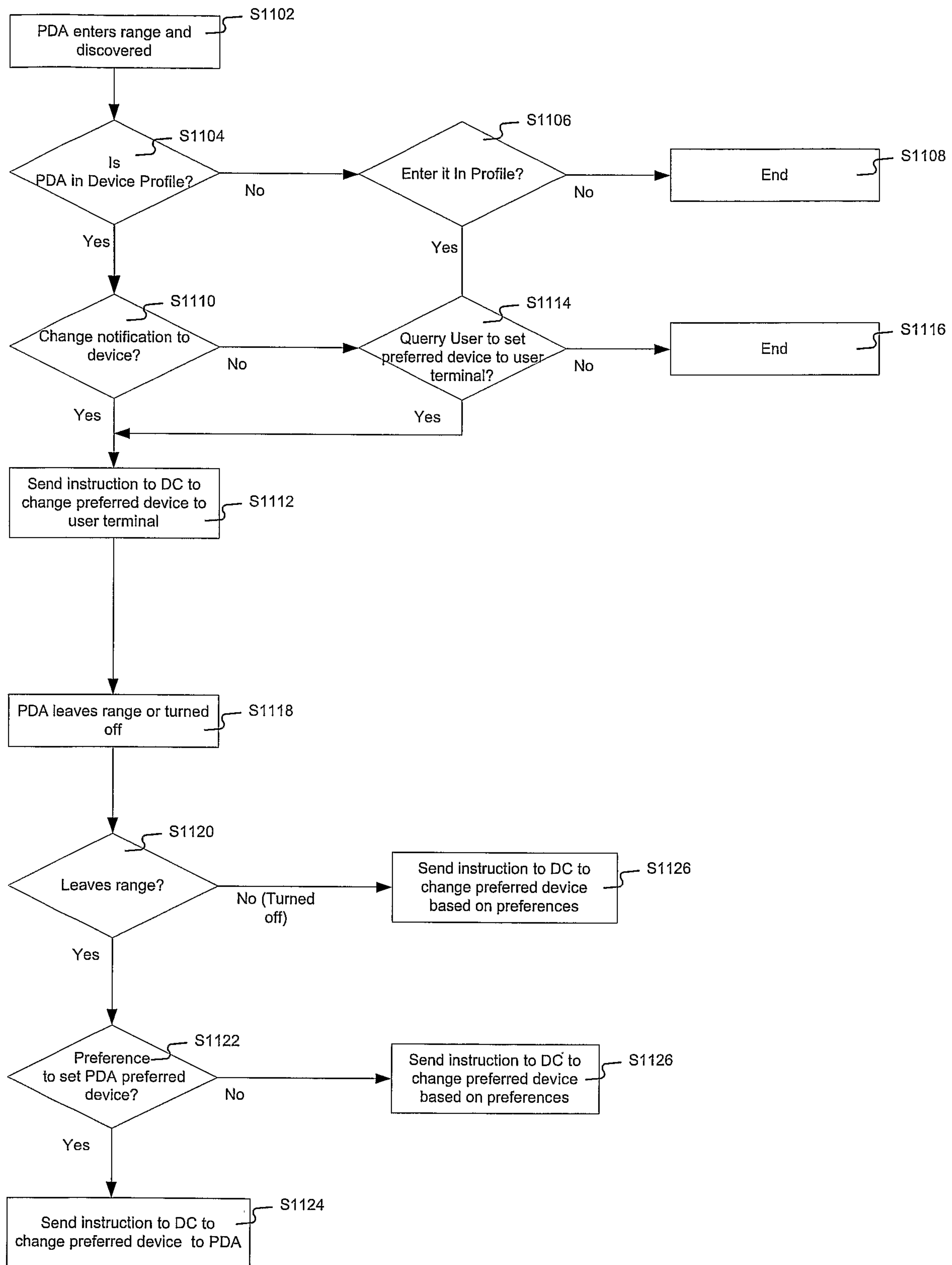


Figure 11

