

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

(19) World Intellectual Property Organization International Bureau



(43) International Publication Date
7 July 2005 (07.07.2005)

PCT

(10) International Publication Number
WO 2005/062485 A1

(51) International Patent Classification⁷:

H04B 5/00

(21) International Application Number:

PCT/US2003/037165

(22) International Filing Date:

18 November 2003 (18.11.2003)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

10/298,753 18 November 2002 (18.11.2002) US

(71) Applicant: **IXI MOBILE, INC. [US/US]**; Suite 600, 275 Shoreline Drive, Redwood City, CA 94065 (US).

(72) Inventors: **HALLER, Amit**; 2208 Bettina Avenue, Belmont, CA 94002 (US). **FORNELL, Peter**; 1355 Hoodview Lane, Lake Oswego, OR 97034 (US). **ITZCHAK, Avraham**; Havered 19 Street, 43523 Ra'anana (IL). **HAPARNAS, Ziv**; 3 Bergson Street, 69106 Tel Aviv (IL).

(74) Agent: **DENIRO, Kirk, J.**; Vierra Magen Marcus Harmon & DeNiro LLP, 685 Market Street, Suite 540, San Francisco, CA 94105 (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, 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, PL, PT, RO, RU, SD, SE, SG, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, 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).

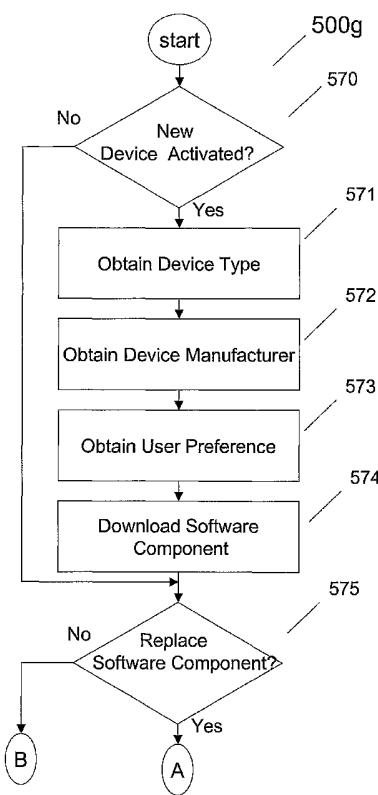
Published:

— with international search report

[Continued on next page]

(54) Title: A METHOD, SYSTEM AND COMPUTER READABLE MEDIUM FOR DOWNLOADING A SOFTWARE COMPONENT TO A DEVICE IN A SHORT DISTANCE WIRELESS NETWORK

(57) Abstract: A method, system, and computer readable medium allows downloading of a software component to a short distance wireless network in response to device information and/or user information. In an embodiment of the present invention, the device information includes type of device, manufacturer of device, where purchased, when activated in the short distance wireless network. In an embodiment of the present invention, user information includes a user preference, price plan, usage, promotional plan and/or replacement plan. In an embodiment of the present invention, device information is included in a short-range radio signal generated from the device to a cellular device. In an embodiment of the present invention, software components are downloaded from a processing device in a Wide Area Network (WAN) coupled to the short distance wireless network.



WO 2005/062485 A1



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.

**A METHOD, SYSTEM AND COMPUTER READABLE MEDIUM
FOR DOWNLOADING A SOFTWARE COMPONENT TO A DEVICE IN
A SHORT DISTANCE WIRELESS NETWORK**

5

10

Inventors

Amit Haller
Peter Fornell
Avraham Itzchak
Ziv Haparnas

15

Related Application

This application is a continuation-in-part of U.S. Patent Application No. 10/023,525, entitled "A Method, System and Computer Readable Medium for Making A Business Decision in Response to Information from a Short Distance Wireless Network," filed on December 18, 2001, Attorney Docket No. IXIM-01003US0, which is incorporated herein by reference.

25 This invention relates generally to a network.

Background of the Invention

A wireless communication device, such as a cellular telephone, is typically a node of a WAN or communication network. The cellular telephone may also be a part of a short distance wireless network for

-2-

communicating with other user devices, such as a laptop, printer, Personal Digital Assistant ("PDA") and/or headset. For example, Bluetooth™ technology (www.Bluetooth.com) provides wireless communications between devices in a short distance wireless network.

5 When a user purchases a device for a short distance wireless network, software may need to be added to the device and/or short distance wireless network in order to operate properly in the user's short distance wireless network and function as intended. A user of the device may desire to load software into the device to enhance functionality, but
10 10 may not have the technical ability. Further, a user, retailer, distributor or manufacturer may not have the proper software or version of the software to operate with the user's short distance wireless network. Similarly, a new version of software may have been recently released; yet, the purchased device comes with a compact disk storing the older
15 15 version of the software and the user prefers or requires the new version. Also, a retailer, distributor or manufacturer may not be aware of the preferences of the user's short distance wireless network.

20 20 In addition, a telecommunication operator is interested in providing added value and functionality to a user of a telecommunication network, while increasing revenue.

Therefore, it is desirable to provide a method, a system, and a computer readable medium that easily and conveniently provides a software component to a device in a short distance wireless network

-3-

with little or no user, retailer, distributor or manufacturer intervention.

Likewise, it is desirable to provide added functionality and value to a wireless device, while increasing telecommunication operator revenue.

5

SUMMARY OF THE INVENTION

A method, system, and computer readable medium provides a software component to a device in a short distance wireless network responsive to device information according to embodiments of the present invention.

10 According to an embodiment of the present invention, a method comprises the steps of obtaining device information from a device in a short distance wireless network and downloading a software component to the device in response to the device information.

According to an embodiment of the present invention, the
15 obtaining step further comprises the steps of generating a short range radio signal, containing the device information, from the device, to a cellular device and, generating a cellular signal, containing the device information, from the cellular device to a processing device in a wide area network.

20 According to an embodiment of the present invention, the software component is downloaded in response to a user preference.

According to an embodiment of the present invention, the software component is downloaded in response to a date.

-4-

According to an embodiment of the present invention, the software component is downloaded in response to where the device was purchased.

According to an embodiment of the present invention, the 5 software component is downloaded in response to a user price plan.

According to an embodiment of the present invention, the software component is downloaded in response to a user usage.

According to an embodiment of the present invention, the software component is downloaded in response to a manufacturer of the 10 device.

According to an embodiment of the present invention, the device is a Bluetooth™ device communicating with a cellular device.

According to an embodiment of the present invention, the device is a messaging terminal.

15 According to an embodiment of the present invention, the software component is an instant messaging terminal software component.

According to an embodiment of the present invention, the device includes a short-range radio processor and a 2.4 GHZ or 5.7 GHZ 20 transceiver.

According to an embodiment of the present invention, the device is selected from a group consisting of a desktop computer, a laptop

-5-

computer, a personal digital assistant, a headset, a pager, a printer, a watch, a thin terminal, a digital camera and an equivalent.

According to an embodiment of the present invention, the short distance wireless network is a Bluetooth™ network.

5 According to an embodiment of the present invention, a method comprises the steps of generating a short-range radio signal, containing device information, from a device, to a cellular device. A cellular signal is generated, containing the device information, from the cellular device to a processing device in a wide area network. A software component is

10 downloaded to the device in response to the device information and user information.

According to an embodiment of the present invention, a system comprises a device to generate a short-range radio signal containing device information. A cellular device generates a cellular signal, containing the device information, responsive to the short-range radio signal. A processing device, having a database containing a plurality of software components, provides a first software component in the plurality of software components in response to the device information.

According to an embodiment of the present invention, the

20 database includes a user preference and the first software component is downloaded in response to the device information and the user preference.

-6-

An article of manufacture, including a computer readable medium, comprises a short-range radio software component to receive a short-range radio signal, containing device type information, from a device in a short distance wireless network. A cellular software component 5 generates a cellular signal, containing the device type information, in a cellular network and receives a software component for the device.

Other aspects and advantages of the present invention can be seen upon review of the figures, the detailed description, and the claims that follow.

10

BRIEF DESCRIPTION OF THE FIGURES

Figs. 1a-b illustrates a system according to an embodiment of the present invention.

Fig. 2 illustrates thin terminals and a wireless device according to 15 an embodiment of the present invention.

Figs. 3a-b are hardware block diagrams of devices according to an embodiment of the present invention.

Fig. 4 is a software block diagram architecture for providing information from a short distance wireless network according to an 20 embodiment of the present invention.

Figs. 5a-h are flowcharts illustrating providing a software component in response to device information from a short distance wireless network according to an embodiment of the present invention.

-7-

Fig. 6 illustrates a software block diagram architecture of server 101 according to an embodiment of the present invention.

DETAILED DESCRIPTION

5 I. System Overview

The following description and claims relate to a method, a system, and a computer readable medium for providing a software component responsive to device information from a short distance wireless network 116 and user information, as illustrated by Fig. 1a, 10 according to an embodiment of the present invention.

The information from a short distance wireless network 116, in an embodiment of the present invention, includes usage information of a WAN 105, coupled to short distance wireless network 116, that may include a telecommunication cellular network. The usage information 15 includes 1) a type of device (e.g. cellular telephone 106, laptop 107d, PDA 107b) accessing WAN 105 or causing WAN 105 to be accessed, 2) a manufacturer of the device accessing WAN 105 or causing WAN 105 to be accessed, 3) a type of data transferred (e.g. voice, image, video) over WAN 105, and 4) a period of time accessing WAN 105 or causing WAN 20 105 to be accessed, singly or in combination, in an embodiment of the present invention.

A software component is provided to device 106 and/or terminals 107 in response to information obtained from short distance wireless

-8-

network 116 as illustrated in Fig. 1b. In an embodiment of the present invention, the software component is provided in response to device information including 1) a type of device and/or terminal, 2) manufacture of the device and/or terminal, 3) where a device and/or terminal was purchased, and/or 4) activation date. In an embodiment of the present invention, user information includes 1) user's preference and/or profile, 2) user's price plan, 3) user's usage, 4) promotional plan and/or 5) user's replacement plan. In an embodiment of the present invention, device information is obtained from short distance wireless network 116 and 10 user information is obtained from server 101.

In an embodiment of the present invention, a short distance wireless network 116 is a network of processing devices, such as a personal computer or headset, that span a relatively small physical area, wherein at least one device generates and receives a short-range radio signal for communicating with another device in the network. In an embodiment of the present invention, a short-range radio signal can travel between approximately 0 and approximately 1000 feet. An example of a short distance wireless network includes a network of devices formed by Bluetooth™, HomeRF, 802.11 technologies, singly or 15 in combination, or an equivalent. In an embodiment of the present invention, each processing device in a short distance wireless network has its own processing unit that executes a software component stored on the processing device memory, but also may access data and 20

-9-

devices on the short distance wireless network. In an embodiment of the present invention, a wire, and in particular an Ethernet, provides communication between two or more processing devices in a short distance wireless network. In an alternate embodiment, electromagnetic signals provide wireless communication between one or more processing devices in a short distance wireless network. In still another embodiment, both wires and electromagnetic signals provide communication between processing devices in a short distance wireless network.

10 In an embodiment of the present invention, a WAN includes multiple LANs and/or short distance wireless networks connected over a relatively large distance. Telephone lines and electromagnetic signals, singly or in combination, couple the LANs and/or short distance wireless networks in a WAN. In an embodiment of the present invention, WAN 15 105 includes a cellular network generating and receiving cellular signals 111. In an embodiment of the present invention, a cellular network is defined as a communications system dividing a geographic region into sections, called cells. In an analog embodiment of the present invention, the purpose of this division is to make the most use out of a limited 20 number of transmission frequencies. In an analog embodiment of the present invention, each connection, or for example conversation, requires its own dedicated frequency, and the total number of available frequencies is about 1,000. To support more than 1,000 simultaneous

-10-

conversations, cellular systems allocate a set number of frequencies for each cell. Two cells can use the same frequency for different conversations so long as the cells are not adjacent to each other.

Fig. 1a illustrates system 100 according to an embodiment of the 5 present invention. System 100 includes other devices, or terminals 107, coupled to wireless device 106. In an embodiment of the present invention, device 106 and one or more terminals 107 communicate to form a short distance wireless network 116. In an embodiment of the present invention, terminals 107 are coupled to device 106 by short- 10 range radio signals 110 to form short distance wireless network 116. In an embodiment of the present invention, some or all of terminals 107 may have wired connections. In an embodiment of the present invention, terminals 107 include watch 107a, PDA 107b, headset 107c and laptop computer 107d. In an alternate embodiment, fewer or more terminals 15 are used in short distance wireless network 116. In an alternate embodiment, terminals 107 include a desktop computer, a pager, a printer, a thin terminal, messaging terminal, a digital camera or an equivalent. In an embodiment of the present invention, terminals 107 include a Bluetooth™ 2.4 GHz transceiver. Likewise, device 106 20 includes a Bluetooth™ 2.4 GHZ transceiver. In an alternate embodiment of the present invention, a Bluetooth™ 5.7 GHz transceiver is used. Hardware for device 106 and terminals 107 is illustrated in Figs 3a-b in an embodiment of the present invention.

-11-

In alternate embodiments of the present invention, other local wireless technologies, such as 802.11 or HomeRF signals, are used to communicate between device 106 and terminals 107.

In an embodiment of the present invention, WAN 105 is coupled 5 to device 106. In an embodiment of the present invention, WAN 105 includes a cellular network transmitting and receiving cellular signals 111. In an embodiment of the present invention, cellular signals 111 are transmitted using a protocol, such as a Global System for Mobile communications ("GSM") protocol. In alternate embodiments, a Code 10 Division Multiple Access ("CDMA"), CDMA 2000, Universal Mobile Telecommunications System ("UMTS"), Time Division Multiple Access ("TDMA"), or General Packet Radio Service ("GPRS") protocol or an equivalent is used.

In an embodiment of the present invention, WAN 105 includes 15 carrier backbone 104, server 101-102 and Internet 103. In an embodiment of the present invention, IP packets are transferred between the components illustrated in Fig. 1a. In alternate embodiments of the present invention, other packet types are transferred between the components illustrated in Fig. 1a.

20 In an embodiment of the present invention, a WAN 105 includes an IP public or private network, such as a corporate secured network using a Virtual Private Network ("VPN").

-12-

In an alternate embodiment of the present invention, device 106 is coupled to a WAN 105 by an Ethernet, Digital Subscriber Line ("DSL"), or cable modem connection, singly or in combination.

In an embodiment of the present invention, device 106 is a 5 cellular handset or telephone. In an alternate embodiment of the present invention, device 106 is a cellular enabled PDA, wireless modem and/or wireless laptop computer.

In an embodiment of the present invention, WAN 105 is coupled to a wireless carrier internal network or carrier backbone 104. In an 10 embodiment of the present invention, server 102 is coupled to carrier backbone 104. In an alternate embodiment of the present invention, carrier backbone 104 is coupled to Internet 103. Server 101 is coupled to Internet 103. In an embodiment of the present invention, servers 101 and 102 provide information, such as a web site having web pages or 15 application software components, to terminals 107 by way of device 106. In an embodiment of the present invention, terminals 107 share services and communicate by way of device 106.

In an embodiment of the present invention, server 101 includes rates schedule software component 601, application service software 20 component 602, message generation software component 603, user database 604, promotional plan generation software component 605, price plan generation software component 606 and invoice generation software component 607, singly or in combination, as illustrated in Fig. 6

-13-

User database 604 includes information on users of short distance wireless networks in an embodiment of the present invention.

For example, user database 604 includes a record for user 120 that includes usage information 610a, status information 611a, price plan

5 612a and replacement plan 613a, singly or in combination, in an embodiment of the present invention.

Usage information 610a includes telecommunication WAN usage of user 120 devices' in a short distance wireless network 116. For example, usage information 610a may store that PDA 107b accessed

10 WAN 105, via device 106, to email two images between 3:45 p.m. and 3:47 p.m. on Monday, November 26, 2001. In an alternate embodiment, more or less detail may be stored. In an embodiment of the present invention, usage information 610a includes 1) types of devices and/or terminals presently used in a user's short distance wireless network

15 (Types), 2) respective manufacturer of the devices and/or terminals (Man.), 3) respective software components and version currently used (Sftw.), 4) user profile or preference—for example, user 120 is an AOL user and needs an AOL client for instant messaging (Pref.). In an alternate embodiment of the present invention, where (Retailer) or when

20 (Date) a device or terminal was purchased is stored in usage information 610a. In an embodiment of the present invention, a retailer, distributor and/or manufacturer, by way of telephone and/or the Internet, provide where and when the device and/or terminal were purchased to server

-14-

101. In an alternate embodiment of the present invention, where and when the device is purchased (activated) is provided by the device and/or terminal to server 101. For example, a device and/or terminal are sold with a serial number identifying (i.e. prefix) the retailer selling the
5 device and/or terminal. In an embodiment of the present invention, the serial number and activation time is transferred from the device and/or terminal to usage information 610a upon power up and configuration to a user's short distance wireless network.

Status information 611a includes the status or health of devices,
10 software components and batteries in a short distance wireless network 116. For example, status information 611a may indicate PDA 107b has a battery that needs to be replaced. Alternatively, status information 611a may indicate that cellular modem 106 needs to be replaced. Similarly, status information 611a may indicate that cellular device 106 needs an
15 update of an operating system in an embodiment of the present invention.

Price plan 612a includes a price plan for user 120. For example, user 120 has a contract with a telecommunication operator 121 that allows for downloading MP3 music files over WAN 105 to short distance wireless network 116 at \$2.00 per file between 8:00 p.m. and 6:00 a.m.,
20 and \$10.00 per file between 6:00 a.m. and 8:00 p.m. This pricing plan encourages users to download large files during off peak usage times of WAN 105 and also allows for the telecommunication operator 121 to

-15-

generate increased revenue. A user also benefits by obtaining data, such as music files that are not time sensitive, in economical manner. Price plan 612a also includes a maximum periodic charge for unlimited usage of a particular type of device and/or data type in an embodiment 5 of the present invention.

Price plan 612a also includes whether a user has chosen or purchased an option to have a software component downloaded to device 106 and/or terminals 107 in an embodiment of the present invention. For example, if a user has usage above a certain threshold 10 minimum, telecommunication operator 121 provides a free software component, such as a ring tone or messaging terminal client to a device or terminal in short distance wireless network 116 by way of cellular signals 111. Similarly, a telecommunication operator 121 provides software components to a new device 106 and/or terminals 107 that may 15 be purchased by a user from a particular distributor or retailer. In still a further embodiment of the present invention, telecommunication operator 121 provides a software component to a device 106 and/or terminals 107 during a predetermined promotional period of time. For example, if a user purchases a new headset 107c during a 20 predetermined promotional period of time, telecommunication operator 121 will provide the necessary software components for headset 107c to operate in short distance wireless network 116. In an embodiment of the present invention, the software components for headset 107c provided

-16-

by the telecommunication operator are more advanced than the software provided with headset 107c. Other similar price plans may be used for other types of or manufacturers of devices, data and/or time periods to increase telecommunication operator 121 revenue and also provide

5 value added services to customers.

Replacement plan 613a includes a replacement plan for user 120. For example, a user 120 has a contract with a telecommunication operator 121, or other third party, to provide replacement batteries when a battery of a device, or terminals 107, in short distance wireless network 116 fails or is about to fail. Replacement plan 613a indicates whether a user 120 desires a replacement battery, replacement device, and/or software component to be provided. In an embodiment of the present invention, a replacement battery is mailed to user 120 when a failure or eminent failure of a battery is detected. Telecommunication operator 121 generates additional revenue by selling batteries and user 120 has the value added service of not having to 1) determine whether a battery needs to be replaced and 2) travel and shop for a replacement battery. Likewise, a software component may be provided to replace a defective software component or obsolete software component.

15

20 In still a further embodiment of the present invention, replacement plan 613a indicates whether a user 120 desires a replacement software component, such as a ring tone, game or newly released version of a software component. The replacement software component is provided

-17-

when the new software component is released, on a periodic basis and/or as requested by a user in embodiments of the present invention.

Rates schedule software component 601 stores a schedule of rates for accessing WAN 105 by type of device accessing WAN 105 or 5 causing to access WAN 105, manufacturer of device accessing WAN 105 or causing to access WAN 105, type of data transferred on WAN 105 and time period of accessing WAN 105, singly or in combination, in an embodiment of the present invention. For example, a telecommunication operator 121 may charge \$.25 per minute for a voice 10 call between 6:00 p.m. and 8:00 p.m. and \$1.00 for transferring a 2 megabyte file from a Dell™ laptop in short distance wireless network 116 at midnight. In an another example in which a manufacturer is promoting the purchase of their products by subsidizing telecommunication usage, a user is charged \$1.50 for transferring a 2 15 megabyte file from a Compaq™ laptop at any time during the day when the same user is charged much more when using another manufacturer's laptop. In still another embodiment of the present invention, a user is charged differently depending upon the software application used. For example, a user may be charged a first rate for 20 using an email application program to send an email and a second rate for using a MP3 application software program for downloading a MP3 music file.

-18-

Invoice generation software component 607 generates an invoice 123 for user 120 in an embodiment of the present invention. Invoice 123 is printed out on printer 122 and mailed to user 120, as illustrated in Fig. 1b, in an embodiment of the present invention. In an alternate 5 embodiment of the present invention, invoice 123 is e-mailed to user 120. Invoice generation software component 607 accesses user database 604, and in particular usage information 610a and price plan 612a, in generating invoice 123. In an embodiment of the present invention, invoice generation software component determines if usage 10 times are within price plan maximum charges. In an alternate embodiment, invoice generation software component 607 access rates schedule software component 601 in order to obtain the appropriate rates that are multiplied by usage times in usage information 610a to obtain a total periodic charge on invoice 123.

15 Promotional plan generation software component 605 generates a promotional plan for user 120 or other potential users. Promotional plan generation software component 605 analyzes information in user database 604 in order to determine a plan for providing value to users and additional revenue to operator 121. For example, promotional plan 20 generation software 605 will determine which users download MP3 files during peak WAN load times and may be unsuccessful in completing the download due to dropped signals. Operator 121 may generate a promotional plan provided to these selected users for downloading the

-19-

MP3 files during off peak times at discounted rates. Operator 121 is able to generate added revenue during off peak times and a user 120 is able to receive reduced rates.

Other promotional plans include providing free access time to

5 purchasers of devices having a specific manufacturer. A manufacturer of a headset 107c may want to promote sales of the headset by offering 100 free WAN 105 access minutes. Promotional plan generation software component 605 determines which users in users database 604 has purchased that particular manufactured headset and adjusts the

10 price plan 612a to reflect the 100 free minutes.

Likewise, operator 121 may provide free or discounted devices to user 120 based on usage information 610a. Usage information 610a may indicate that a user does not have a PDA in short distance wireless network 116; yet, user 120 actively uses a cellular telephone. The free or

15 discounted PDA will provide value to user 120 and also provide an opportunity for increased revenue for operator 121 by user 120 also accessing WAN 105 with the new PDA. Thus, both the operator 121 and user 120 benefit by increased revenue and a free PDA, respectively, when operator 121 knows which users in user database 604 tend to use

20 a PDA often.

Price plan generation software component 606 generates a price plan for user 120 based on information in user database 604. For example, price plan generation 606 compares usage information 610a

-20-

and replacement plan 613a to existing price plans to determine if user 120 can obtain additional services. For example, if user 120 uses a large amount of access time on WAN 105, but does not have a replacement plan, price generation software component generates a price plan that

5 puts a maximum charge on usage time, saving user 120 charges, if user 120 signs up for a battery replacement plan. The new price plan may be mailed or emailed to user 120 in an embodiment of the present invention. In an embodiment of the present invention, promotional plan generation 605 stores a list of retailers (Retailer) participating in a

10 promotional and/or a promotional period of time (Prom. Time).

Application service software component 602 includes software components that can be downloaded directly to a targeted terminal in terminal 107 in an embodiment of the present invention. Accordingly, a user 120 does not have to travel to a telecommunication operator service department, or other third party vendor, to have the software loaded into a terminal in order to obtain the added service. For example, user 120 has a MP3 headset manufactured by Sony™ and another MP3 headset manufactured by Panasonic™ in short distance wireless network 116. Based on information obtained from short distance wireless network 116, telecommunication operator 121 or another third party downloads 1) an application software component to the Sony™ headset that enables free MP3 downloads from a website and 2) an application software component to the Panasonic™ headset that

-21-

enables special effects. The software application components could not be downloaded to the targeted terminal or terminals without first obtaining information about the terminals, such as manufacturer and type, in short distance wireless network 116.

5 Message generation software component 603 generates a message to short distance wireless network 116, and in particular to device 106 or terminals 107. In an embodiment of the present invention, the message may include software for preventing a particular device from having access to WAN 105. In an alternate embodiment, message
10 generation software component 603 generates the results of promotional plan generation software component 605 and/or price plan generation software component 606 to operator 121. Based on these results, operator 121 may change rates in rates schedule software component 601. In an alternate embodiment of the present invention, message
15 generation software component 603 generates a message to a third party to provide a replacement device, software component or battery to user 120.

 In an embodiment of the present invention, server 101 generates a message transferred over WAN 105 to device 106 to obtain
20 information from short distance wireless network 116. In an embodiment of the present invention, the message is an Internet/Protocol ("IP") message. In an embodiment of the present invention, the information from short distance wireless network 116 includes the type of terminals,

-22-

including terminal manufacturer, accessing WAN 105, the type of data transferred on WAN 105, and the period of time when the data is transferred on WAN 105, singly or in combination. In an embodiment of the present invention, the information is transferred in response to a user input. In an alternate embodiment of the present invention, the information is generated periodically from device 106, or from terminals 107 generating a Bluetooth™ message to device 106 that then generates cellular signals 111 to WAN 105. In an embodiment of the present invention, device 106 stores device information, such as device type, model and manufacturer, of terminals 107 in short distance wireless network 116. Device 106 collects and logs the usage of various terminals 107 accessing WAN 105 in an embodiment of the present invention. This logged information and/or device information may then be transferred to server 101 periodically, in response to a message request or user input.

Server 102, coupled to carrier backbone 104, has similar software components described above and bypasses Internet 103 in an alternate embodiment of the present invention.

20 II. Hand-held Device/Terminal Hardware

Fig. 2 illustrates embodiments of terminals 107 and device 106. In an embodiment of the present invention, there are two types of terminals: 1) smart terminals and 2) thin terminals. In an alternate

-23-

embodiment of the present invention, smart terminals execute user logic and applications. Smart terminals have a relatively powerful processing unit, operating system and applications. Their main needs from a short distance wireless network 116 are access to a WAN 105 through TCP/IP and other network services such as storage and execution. For example, a laptop computer 107d and PDA 107b are smart terminals. Thin terminals have a relatively low power processing unit and operating system. They are mainly used as peripherals to an application server in a short distance wireless network 116 and their main task is user interaction, rendering output for a user and providing an application server with a user's input. For example, a watch 107a or messaging terminals can be thin terminals.

Fig. 2 illustrates thin terminals. Voice terminal 204 includes a display 204b and a retractable keypad 204a. Messaging Terminal 203 is illustrated in a closed position with a hinge 203a used to open and close terminal 203. Terminal 203 also includes a miniature QWERTY keyboard and display when opened.

In an embodiment of the present invention, device 201 is a cellular modem and includes a clip 202 for a belt.

Fig. 3a illustrates a hardware block diagram of device 106 in an embodiment of the present invention. Device 106 includes both internal and removable memory. In particular, device 106 includes internal FLASH (or Electrically Erasable Programmable Read-Only Memory

-24-

(“EEPROM”) and static Random Access Memory (“SRAM”) 302 and 303, respectively. Removable FLASH memory 304 is also used in an embodiment of the present invention. Memories 302, 303, and 304 are coupled to bus 305. In an embodiment of the present invention, bus 305 5 is an address and data bus. Application processor 301 is likewise coupled to bus 305. In an embodiment of the present invention, processor 301 is a 32-bit processor.

Bluetooth™ processor 307 is also coupled to bus 305. Bluetooth™ RF circuit 309 is coupled to Bluetooth™ processor 307 and 10 antenna 313. Processor 307, RF circuit 309 and antenna 313 transceive and receive short-range radio signals to and from terminals 107, illustrated in Fig. 1a, or device 350 illustrated in Fig. 3b.

Cellular, such as GSM, signals are transmitted and received using digital circuit 306, analog circuit 308, transmitter 310, receiver 311 15 and antenna 312. Digital circuit 306 is coupled to bus 305. In alternate embodiments, device 106 includes a display, a speaker, a microphone, a keypad and a touchscreen, singly or in combination.

Fig. 3b illustrates device 350 that is a hand-held device in an embodiment of the present invention. Device 350, in an embodiment of 20 the present invention, is one of the terminals 107 illustrated in Fig. 1a. Similar to device 106, device 350 includes SRAM and FLASH memory 351 and 352, respectively. Memories 351 and 352 are coupled to bus 357. In an embodiment of the present invention, bus 357 is an address

-25-

and data bus. Keypad 353 is also coupled to bus 357. Short-range radio signals are transmitted and received using Bluetooth™ processor 354 and Bluetooth™ RF circuit 355. Antenna 356 is coupled to Bluetooth™ RF circuit 355. In an embodiment of the present invention, 5 antenna 356 transmits and receives short-range radio signals. In alternate embodiments, device 350 includes a display, a speaker, a microphone, a keypad and a touchscreen, singly or in combination. As one of ordinary skill in the art would appreciate, other hardware components would be provided for device 350 in alternate embodiments 10 of the present invention. For example in an embodiment in which device 350 is a laptop computer 107d, a disk drive and other input/output components are present.

III. Software

15 Fig. 4 illustrates a software architecture 500 for device 106 illustrated in Fig. 3a according to an embodiment of the present invention. In an embodiment of the present invention, software 500 is stored in FLASH memory 302 of device 106. In an alternate embodiment of the present invention, software components 414, 415 20 and 416 are stored in FLASH memory 353 in a terminal of terminals 107. In an embodiment of the present invention, software components referenced in Fig. 4 represent a software program, a software object, a software function, a software subroutine, a software method, a software

-26-

instance, and a code fragment, singly or in combination. In an alternate embodiment, functions performed by software components illustrated in Fig. 4 are carried out completely or partially by hardware.

In an embodiment of the present invention, software 500, or 5 components of software 500, is stored in an article of manufacture, such as a computer readable medium. For example, software 500 is stored in a magnetic hard disk, an optical disk, a floppy disk, CD-ROM (Compact Disk Read-Only Memory), RAM (Random Access Memory), ROM (Read-Only Memory), or other readable or writeable data storage 10 technologies, singly or in combination. In yet another embodiment, software 500, or components thereof, is downloaded from server 102 illustrated in Fig. 1a.

Software 500 includes telecommunication software or physical 15 layer protocol stacks, in particular cellular communications software 403 and short-range radio communications software 402. In an embodiment, communication software 403 is a GPRS baseband software component used with processor 306 to transmit and receive cellular signals. In an embodiment, communication software 402 is a Bluetooth™ baseband 20 software component used with processor 307 to transmit and receive short-range radio signals. Other telecommunication software may be used as illustrated by other basebands 401.

In an embodiment of the present invention, operating system ("OS") 405 is used to communicate with telecommunications software

-27-

402 and 403. In an embodiment of the present invention, operating system 405 is a Linux operating system, EPOC operating system available from Symbian software of London, United Kingdom or a PocketPC or a Stinger operating system available from Microsoft®
5 Corporation of Redmond, Washington or Nucleus operating system, available from Accelerated Technology, Inc. of Mobile, Alabama. Operating system 405 manages hardware and enables execution space for device software components.

Media abstraction layer 404 allows operating system 405 to
10 communicate with basebands 403, 402 and 401, respectively. Media abstraction layer 404 and other abstraction layers, described herein, translate a particular communication protocol, such as GPRS, into a standard command set used by a device and/or terminal. The purpose of an abstraction layer is to isolate the physical stacks from the rest of the
15 device software components. This enables future usage of different physical stacks without changing any of the upper layer software and allows the device software to work with any communication protocol.

Telecommunication usage software component 414 and device status software component 415 are used to provide information from a
20 short distance wireless network 116 in order to provide a software component according to an embodiment of the present invention. In an alternate embodiment of the present invention, software components 414 and 415 are combined and/or partitioned into more software

-28-

components. As described above application service software component 416 is loaded into device 106 or terminals 107 from server 101 in an embodiment of the present invention. In an alternate embodiment of the present invention, software components 414 and 415 5 are in either device 106 or in a single terminal, or combination of terminals, in terminals 107

In an embodiment of the present invention, telecommunication software component 414 keeps track of the usage of WAN 105 by device 106 and terminals 107. Telecommunication software component 10 414 stores which device or terminal in short distance wireless network 116 requested access to WAN 105, the type of data transferred and the period of time. This tracked usage information is then transferred to user database 604 in server 101, and in particular usage information 610a.

In an embodiment of the present invention, device status software component 415 keeps track of devices (including terminals 107) or batteries in short distance wireless network 116 that have failed or are about to fail. This status information is then transferred to user database 604 in server 101, and in particular status information 611a.

In an embodiment of the present invention, telecommunication usage software component 414, device status software component 415, operating system 405 and Bluetooth™ Baseband software component 402 are used to generate and receive short-range radio signals 110 that include usage and status information.

-29-

Furthermore, Graphics User Interface (“GUI”) 417 is provided to allow a user-friendly interface.

Figs. 5a-f illustrate methods for providing a software component in response to information from a short distance wireless network 116

5 according to an embodiment of the present invention. In an embodiment, the methods are performed, in part or completely, by software components illustrated in Figs. 4 and 6. In an embodiment of the present invention, a logic box or step illustrated in Figs. 5a-f may represent an execution of a software component, such as a software

10 program, a software object, a software function, a software subroutine, a software method, a software instance, a code fragment, singly or in combination. In an alternate embodiment of the present invention, a logic box or step represents execution of a software component, hardware operation or user operation, singly or in combination. In an

15 alternate embodiment of the present invention, fewer or more logic boxes or steps are carried out in the methods illustrated in Figs. 5a-f.

Fig. 5a illustrates method 500a according to an embodiment of the present invention. Information from short distance wireless network 116 is obtained as illustrated by logic block 510a. As described above, 20 the information is WAN usage information and/or status information of device 106 and terminals 107. A business decision is then made as illustrated by logic block 502a. As described above, a business decision includes providing a software component to a user in an embodiment of

-30-

the present invention. In alternate embodiments, an object is not provided.

Fig. 5b illustrates method 500b according to an embodiment of the present invention. Information is obtained as in method 500a and 5 illustrated by logic block 501. A determination is made in logic block 502 whether user information, such as user database 604, is available. If user information is available, logic transitions to logic block 503; otherwise, control passes to logic block 504. In logic block 503, user information, such as usage information 610a and/or status information 10 611a, is obtained. A determination is made in logic block 504 whether an object, such as a software component, is provided to a user. If an object is to be provided, control transitions to logic block 505 where an object is provided to a user. Otherwise, method 500b ends.

Methods 505c-f in Figs. 5c-f, respectfully, illustrate providing an 15 object, such as a software component, to a user, as illustrated by logic block 505 in Fig. 5b, in embodiments of the present invention. As one of ordinary skill in the art would appreciate, there are numerous other methods that are included in providing an object to a user which are within the scope of the present claims.

20 Method 505c, shown in Fig. 5c, illustrates providing an invoice 123 to a user 120 responsive to information from short distance wireless network 116. In an embodiment of the present invention, the information is obtained from device 106 that has stored usage information of device

-31-

106 and terminals 107. A price plan is obtained from user information, such as user database 604, as illustrated by logic block 510. A type of device using a telecommunication network, such as WAN 105, manufacture of the device, period of time of usage, and type of data 5 transferred on the telecommunication network is determined in logic blocks 511-514. In an embodiment of the present invention, this information is stored in usage information 610a after being obtained from device 106. The amount of charges for each usage occurrence is determined as illustrated in logic block 515. In an embodiment of the 10 present invention, a price plan and rate schedules in rate schedules software component 601 are used to calculate charges for invoice 123. An invoice 123 is printed as illustrated in logic block 516 and invoice 123 is provided to user 120 as illustrated by logic block 517.

Method 505d, shown in Fig. 5d, illustrates providing a user 120 15 with a replacement device, software component or replacement battery in response to information from a short distance wireless network 116. A determination of whether a replacement device, software component or battery is needed in logic block 520. In an embodiment of the present invention, status information 610a is queried to determine if a device, 20 software component or battery needs to be replaced. Replacement plan 613a is then queried to determine if user 120 has signed up for or agreed to the replacement service. If user 120 has signed up for the replacement service, a replacement device, software component or

-32-

battery is packaged and mailed as illustrated by logic block 521 and 522 or provided as a replacement software component to a device and/or terminal in short distance wireless network 116. In an alternate embodiment of the present invention, manufacturers, distributors or 5 retailers of replacement devices, software components and replacement batteries perform logic blocks 521 and 522, respectively. Similarly, logic block 520 includes generating a message from operator 121 to manufacturers, distributors or retailers of replacement devices, software components and replacement batteries to provide the replacement 10 device and/or battery to user 120.

Method 500e, shown in Fig. 5e, illustrates providing a price plan 152 to a user 120 or potential user. Usage information is obtained as illustrated in logic block 550. In an embodiment of the present invention, usage information is obtained from usage information 610a in user 15 database 604. A price plan 152 is then calculated as illustrated in logic block 551. For example, if user 120 rarely uses cellular telephone 106 and generates a large number of emails from PDA 107b, a price plan that caps charges for emails from PDA 107b and charges by the minute for voice usage on cellular telephone 106 would be calculated and 20 provided to user 120 as illustrated by logic block 552. A price plan 152 may be hand delivered, verbalized, emailed or mailed to user 120 or a potential user in embodiments of the present invention. A promotional plan 151 may be similarly provided.

-33-

Method 500f, shown in Fig. 5f, illustrates downloading a software component 416 for adding service to short distance wireless network 116. A determination is made whether a user requests additional service as illustrated in logic block 560. In an embodiment of the 5 present invention, user 120 mails, emails or telephones operator 121 to request the service. Application service software 416 is downloaded from server 101 by application service software component 602 as illustrated by logic block 561.

Method 500g, shown in Figs. 5g-h, illustrates downloading a 10 software component 416 to short distance wireless network 116. A determination is made whether a new terminal and/or device has been activated in short distance wireless network 116 as illustrated by logic block 570. In an embodiment of the present invention, a newly activated device/terminal generates a short-range radio signal to device 106. In an 15 embodiment of the present invention, the short-range radio signal includes device information, such as a device type, a device manufacturer, where the device was purchased, and/or current date. Obtaining a device type and device manufacturer is illustrated by logic blocks 571 and 572. In an embodiment of the present invention, device 20 information is obtained by generating a message, containing the device information, in a cellular signal from device 106 to WAN 105, and in particular to server 101. In an alternative embodiment of the present invention, device information is obtained by retrieving device information

-34-

stored in the memory of device 106. A user preference is obtained as illustrated by logic block 573. In an embodiment of the present invention, a user preference is obtained by retrieving a user preference from user record 120 associated with the user of short distance wireless network 116. In particular, a user preference, such as being an AOL user, is retrieved from usage information 610a. Based upon a device type, device manufacturer and/or user preference, an appropriate software component is downloaded from application service software 602 to device 106, and ultimately to the newly activated device/terminal as illustrated by logic block 574. In an alternative embodiment of the present invention, application service software 602 is downloaded only to device 106.

A determination is made whether a software component is to be replaced as illustrated by logic block 575. If a software component is to be replaced, method 500g transitions to logic block 580; otherwise, method 500g transitions to logic block 583. In an embodiment of the present invention, application service software 602 access user record 120, and in particular replacement plan 613a to determine which users have a software component replacement plan as illustrated by logic block 580. Application software component 602 then compares existing software components, from usage information 610a, in short distance wireless network 116 with a list of newly released software components to determine whether any existing software components need to be

-35-

replaced as illustrated by logic block 581. The identified software components are then downloaded as described above and illustrated by logic block 582. For example, if a user has signed up for a new software game for PDA 107b on a monthly basis, application software component 5 602 replaces monthly the previous software game with a newly released or previously unused software game.

A determination is made whether a promotional plan relating to software components is underway as illustrated by logic block 583. For example, advanced or additional software components are added to a 10 new device purchased and activated during a set promotional period of time. Similarly, advanced or additional software components are added to a device purchased from a participating promotional retailer. An activation date for a device/terminal, which has recently entered a short distance wireless network, is obtained as described above and 15 illustrated by logic block 584. Similarly, where the device/terminal was purchased is obtained as described above and illustrated by logic block 585. In an embodiment of the present invention, a user may obtain a discounted or free software component based on usage. For example, if a user has over a minimum number of minutes accessing WAN 105, a 20 user may have a free ring tone downloaded. In an embodiment of the present invention, a user's price plan 612a is accessed and compared to usage information 610a to determine whether a free or discounted software component is to be downloaded as illustrated by logic block

-36-

586. In an embodiment of the present invention, a promotional period of time and/or participating promotional retailer is also accessed from promotional plan generation 605 and compared to obtained device information in order to determine whether a promotional software 5 component should be downloaded as illustrated by logic block 586. A promotional software component is then downloaded as described above and illustrated by logic block 587. Method 500g then ends.

IV. Conclusion

10 The foregoing description of the preferred embodiments of the present invention has been provided for the purposes of illustration and description. It is not intended to be exhaustive or to limit the invention to the precise forms disclosed. Obviously, many modifications and variations will be apparent to practitioners skilled in the art. The 15 embodiments were chosen and described in order to best explain the principles of the invention and its practical applications, thereby enabling others skilled in the art to understand the invention for various embodiments and with the various modifications as are suited to the particular use contemplated. It is intended that the scope of the 20 invention be defined by the following claims and their equivalents.

-37-

What is claimed is:

- 1) A method, comprising the steps of:
obtaining device information from a device in a short distance
5 wireless network; and,
downloading a software component to the device in response to
the device information.
- 2) The method of claim 1, wherein the obtaining step further
10 comprises the steps of:
generating a short range radio signal, containing the device
information, from the device, to a cellular device; and,
generating a cellular signal, containing the device information,
from the cellular device to a processing device in a wide area network.
15
- 3) The method of claim 1, wherein the software component is
downloaded in response to a user preference.
- 4) The method of claim 1, wherein the software component is
20 downloaded in response to a date.
- 5) The method of claim 1, wherein the software component is
downloaded in response to where the device was purchased.
25
- 6) The method of claim 1, wherein the software component is
downloaded in response to a user price plan.
- 7) The method of claim 1, wherein the software component is
downloaded in response to a user usage.

-38-

- 8) The method of claim 1, wherein the software component is downloaded in response to a manufacturer of the device.

- 9) The method of claim 1, wherein the device is a Bluetooth™ device communicating with a cellular device.
5

- 10) The method of claim 1, wherein the device is a messaging terminal.
10

- 11) The method of claim 1, wherein the device is a cellular device.
15

- 12) The method of claim 10, wherein the software component is an instant messaging terminal software component.
15

- 13) The method of claim 1, wherein the device includes a short-range radio processor and a 2.4 GHZ transceiver.
14)

- 14) The method of claim 1, wherein the device includes a short-range radio processor and a 5.7 GHZ transceiver.
20

- 15) The method of claim 1, wherein the device is selected from a group consisting of a desktop computer, a laptop computer, a personal digital assistant, a headset, a pager, a printer, a watch, a thin terminal, a
25 digital camera and an equivalent.
16)

- 16) The method of claim 1, wherein the short distance wireless network is a Bluetooth™ network.

-39-

17) A method, comprising the steps of:
generating a short range radio signal, containing device
information, from a device, to a cellular device;
generating a cellular signal, containing the device information,
5 from the cellular device to a processing device in a wide area network;
and,
downloading a software component to the device in response to
the device information and user information.

10 18) A system, comprising:
a device to generate a short-range radio signal containing device
information;
a cellular device to generate a cellular signal, containing the
device information, responsive to the short-range radio signal; and,
15 a processing device, having a database containing a plurality of
software components, to provide a first software component in the
plurality of software components in response to the device information.

19) The system of claim 18, wherein the database includes a
20 user preference and the first software component is downloaded in
response to the device information and the user preference.

20) The system of claim 18, wherein the first software
component is downloaded in response to the device information and a
25 date.

21) The system of claim 18, wherein the first software
component is downloaded in response to the device information and
where the device was purchased.

-40-

22) The system of claim 18, wherein the first software component is downloaded in response to a user price plan.

23) The system of claim 18, wherein the database includes a 5 user usage plan and the first software component is downloaded in response to the device information and the user usage.

24) The system of claim 18, wherein the software component is downloaded in response to the device information including a 10 manufacturer of the device.

25) The system of claim 18, wherein the device is a Bluetooth™ device.

15 26) The system of claim 18, wherein the device is a messaging terminal.

27) The system of claim 18, wherein the first software component is an instant messaging terminal software component.

20 28) The system of claim 18, wherein the device includes a short-range radio processor and a 2.4 GHZ transceiver.

29) The system of claim 18, wherein the device includes a 25 short-range radio processor and a 5.7 GHZ transceiver.

30) The system of claim 18, wherein the device is selected from a group consisting of a desktop computer, a laptop computer, a personal digital assistant, a headset, a pager, a printer, a watch, a thin 30 terminal, a digital camera and an equivalent.

-41-

- 31) The system of claim 18, wherein the device and cellular device are in a short distance wireless network.
- 32) The system of claim 18, wherein the processing device is 5 in a wide area network including a cellular network.
- 33) An article of manufacture, including a computer readable medium, comprising:
 - 10 a short-range radio software component to receive a short-range radio signal, containing device type information, from a device in a short distance wireless network; and,
 - a cellular software component to generate a cellular signal, containing the device type information, in a cellular network and receive a software component for the device.

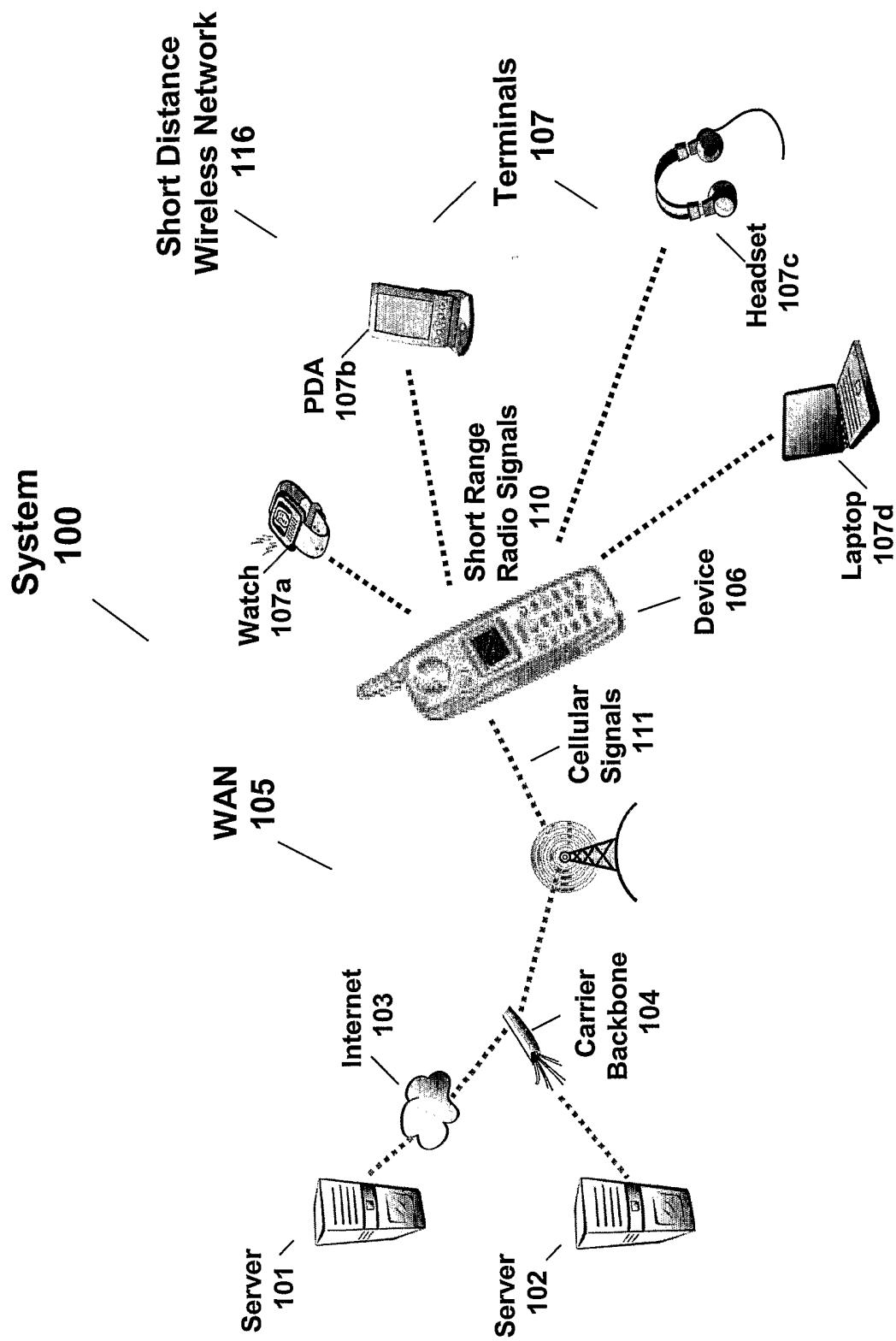


Fig. 1a

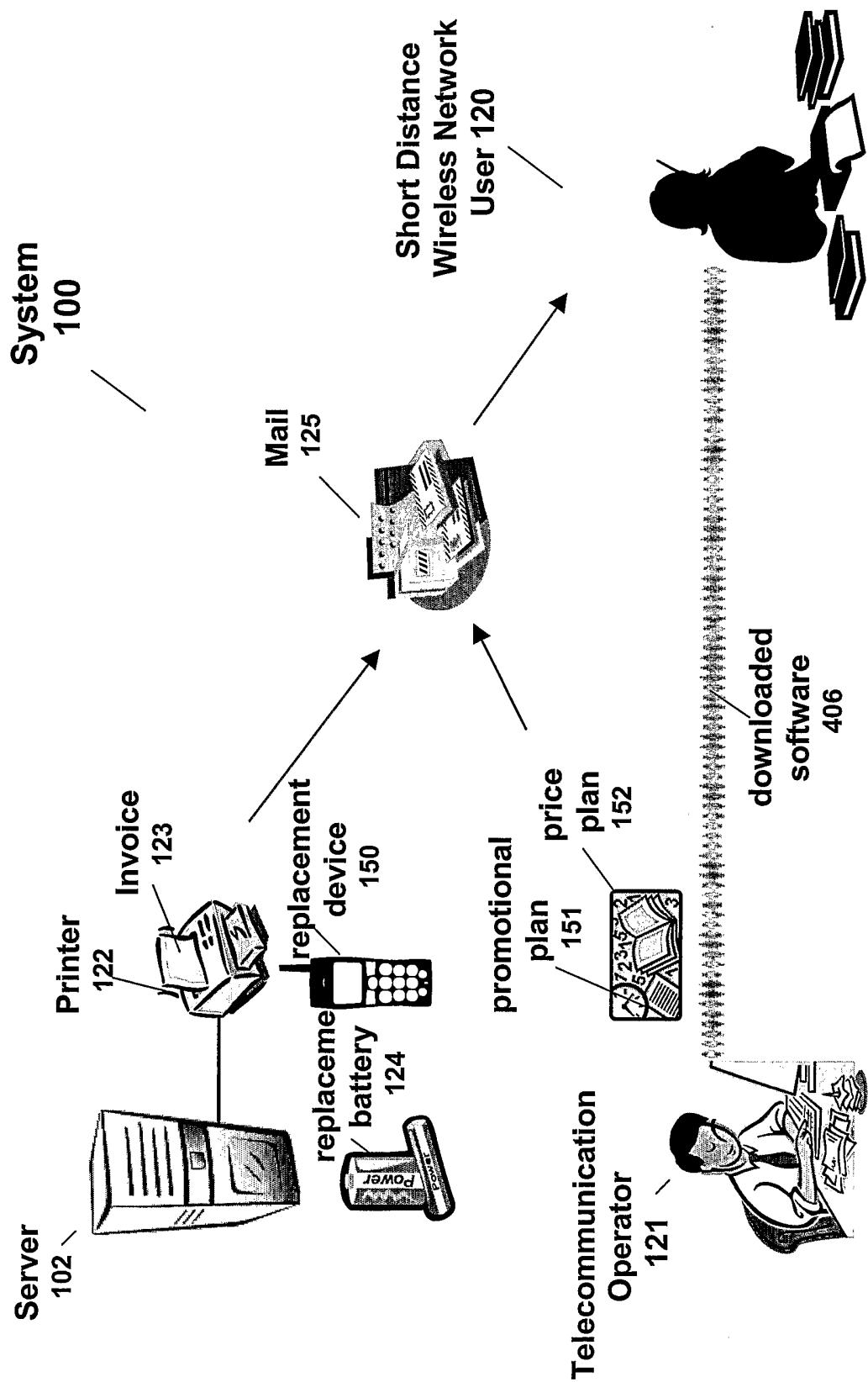


Fig. 1b

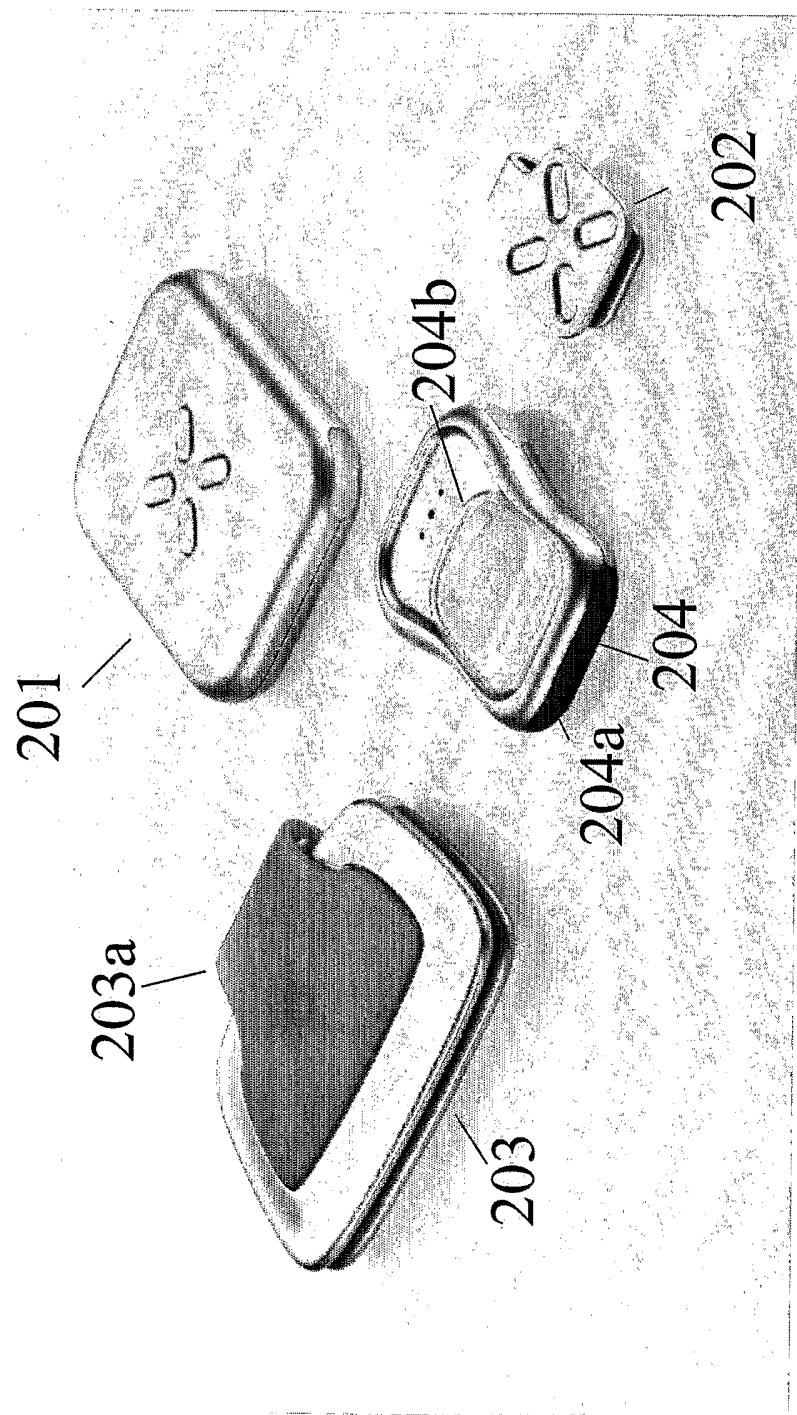


Fig. 2

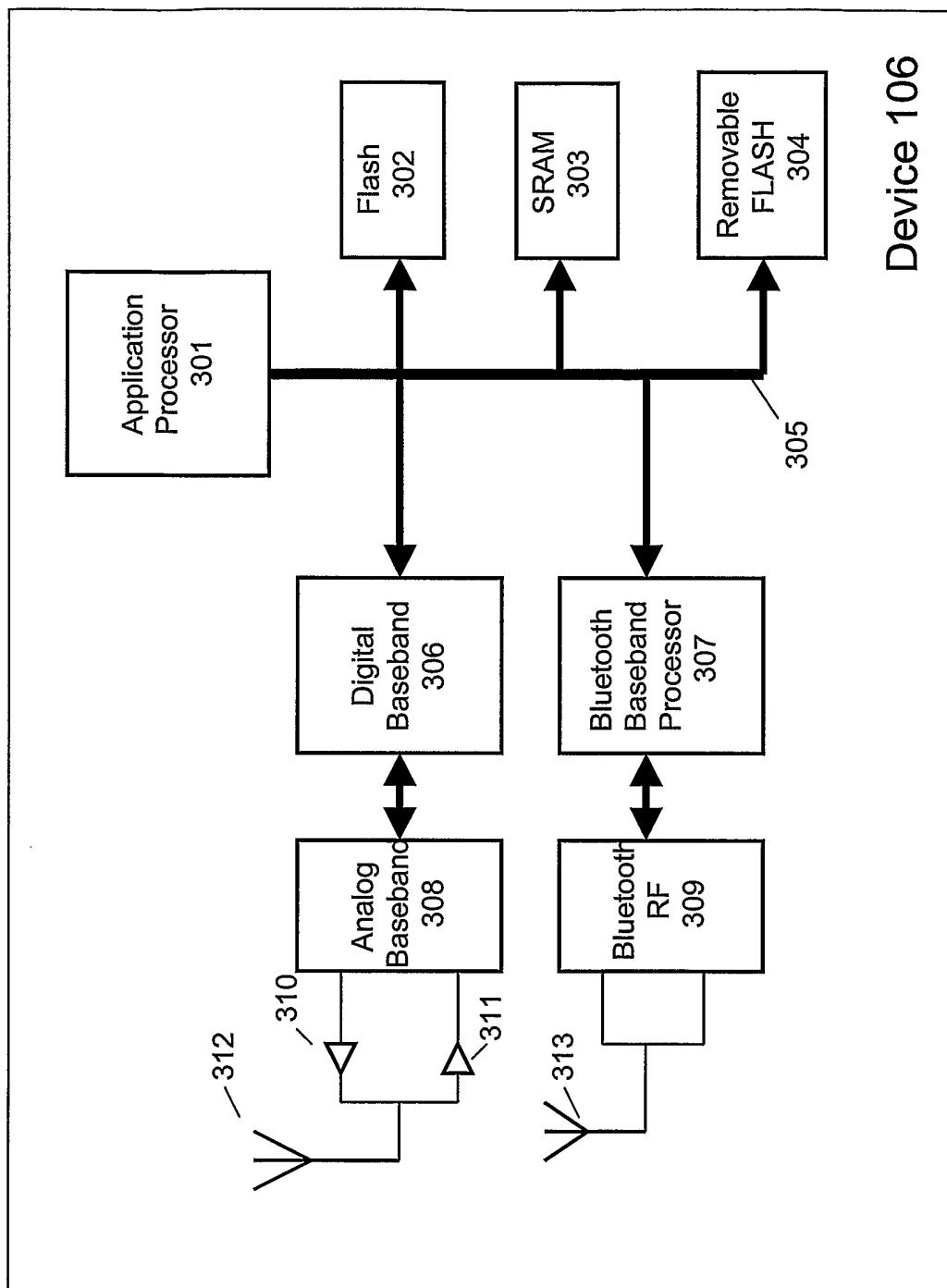


Fig. 3a

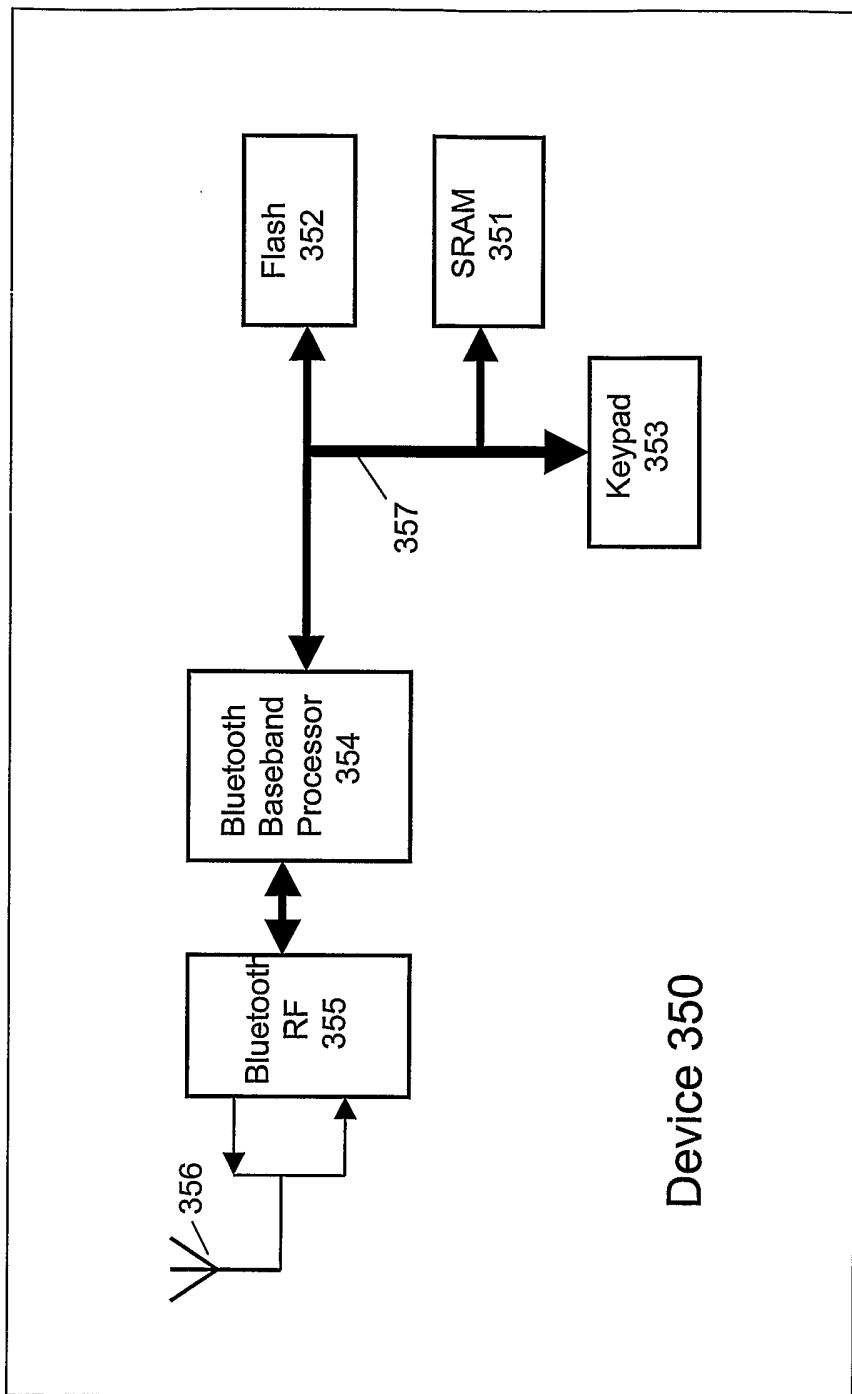


Fig. 3b

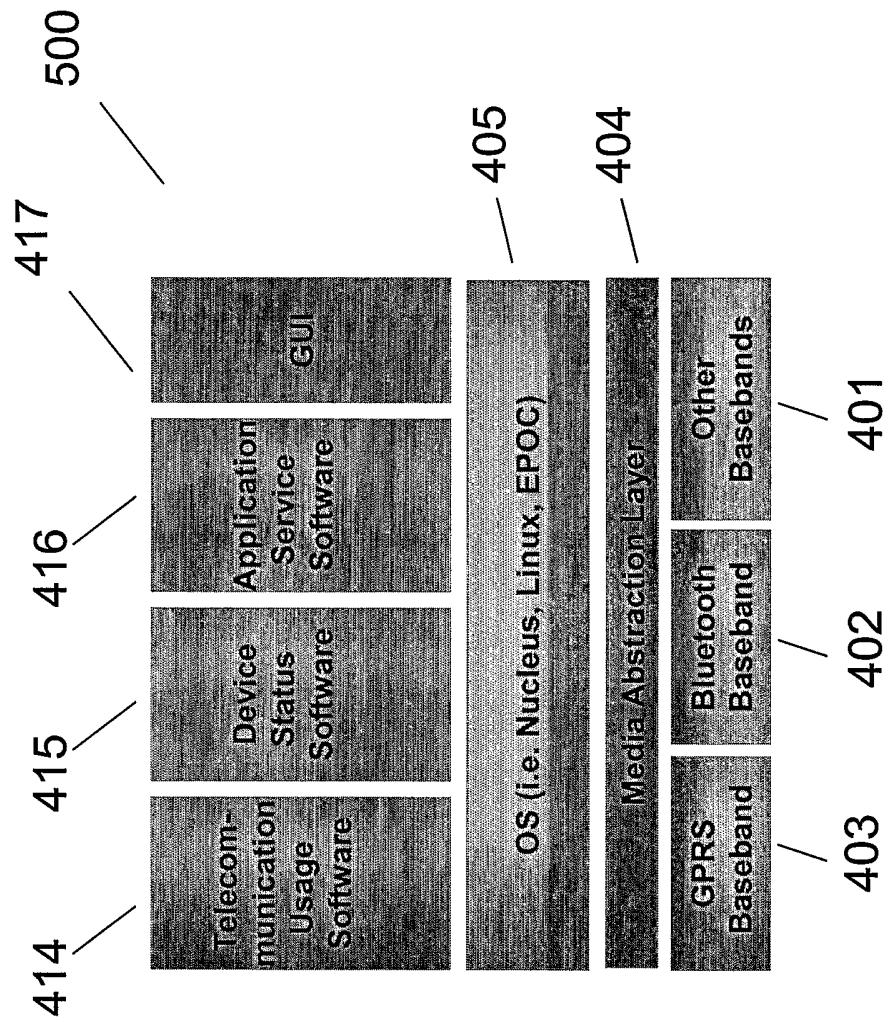


Fig. 4

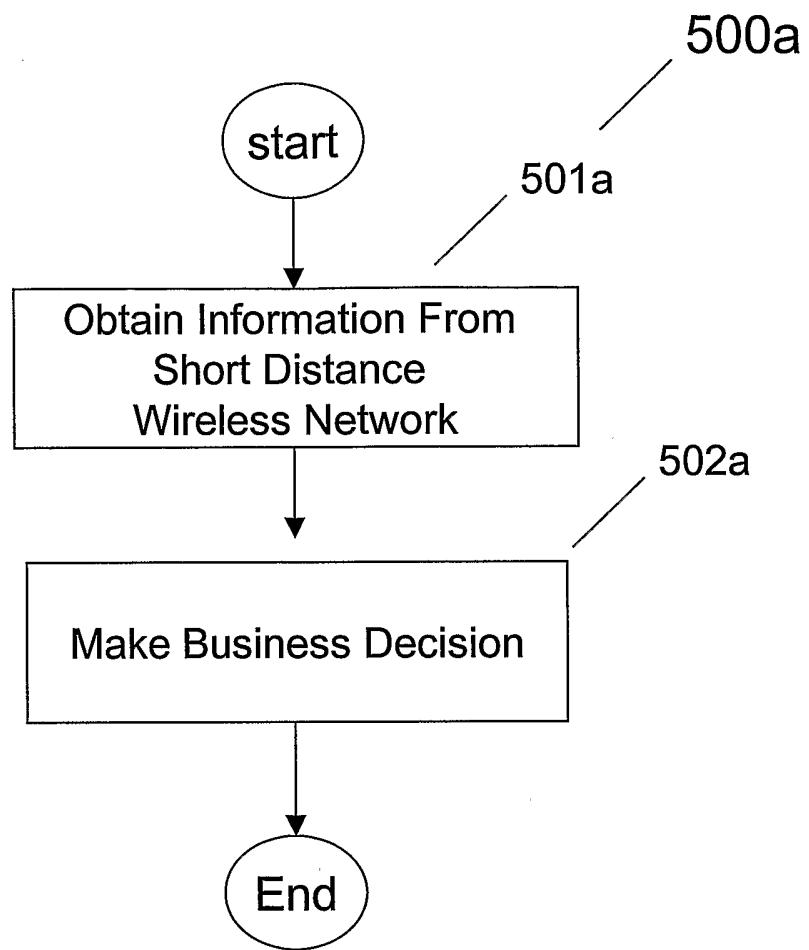


Fig. 5a

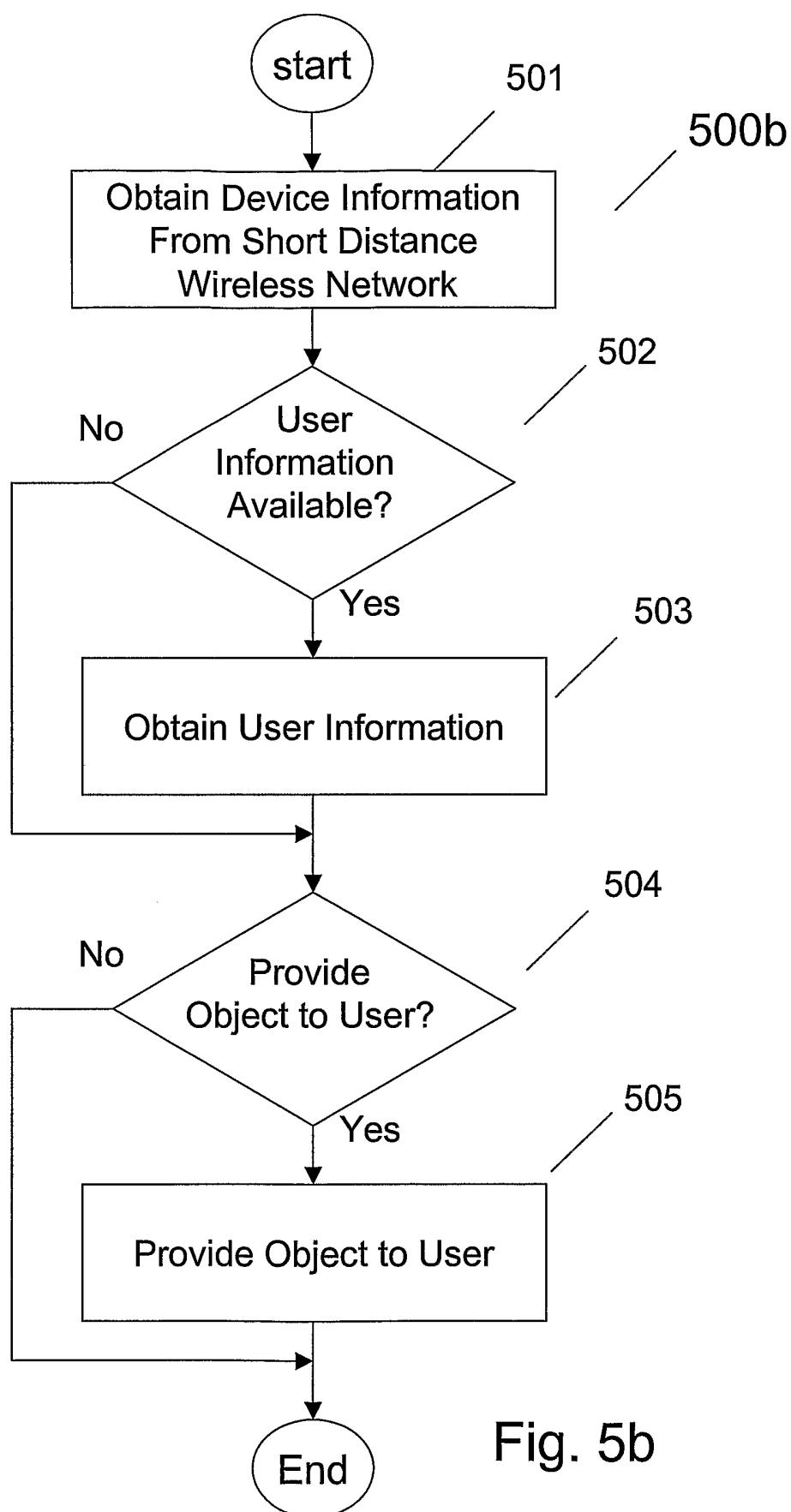


Fig. 5b

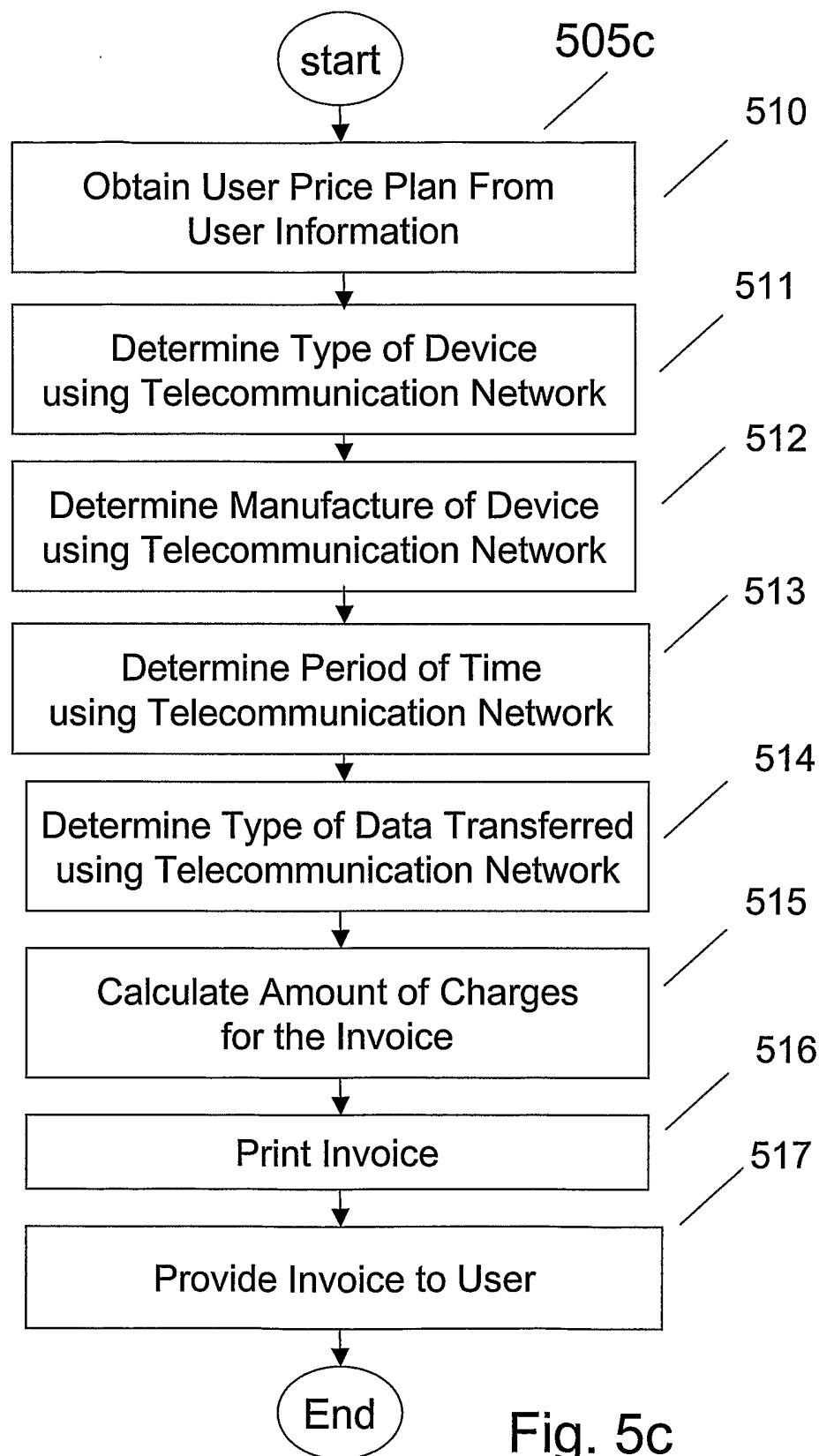


Fig. 5c

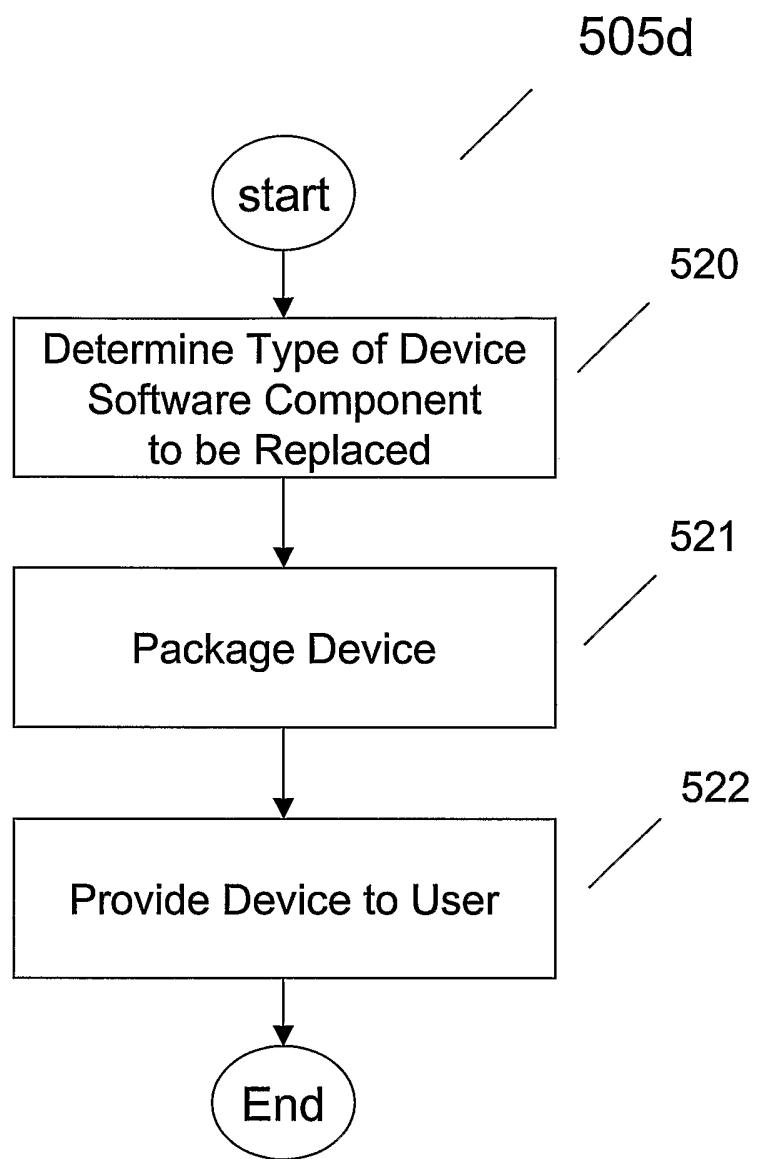


Fig. 5d

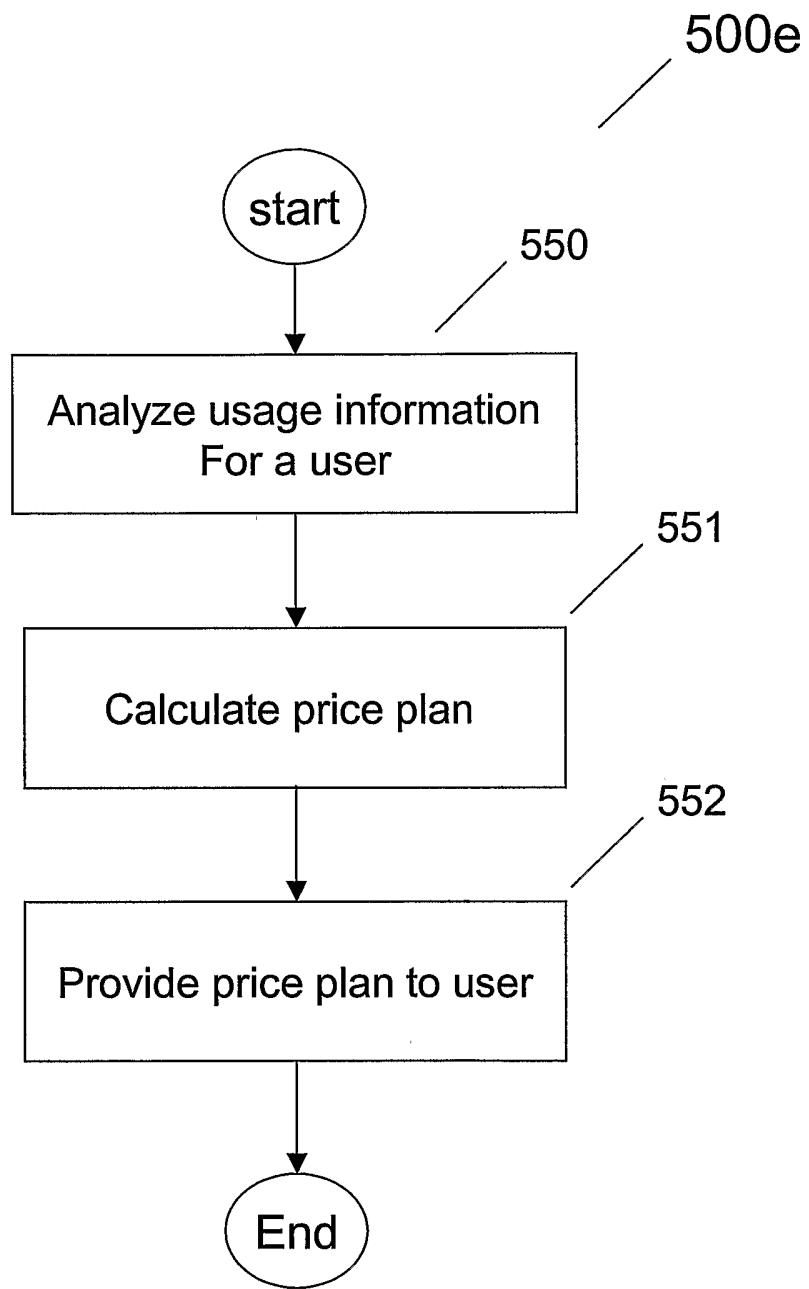


Fig. 5e

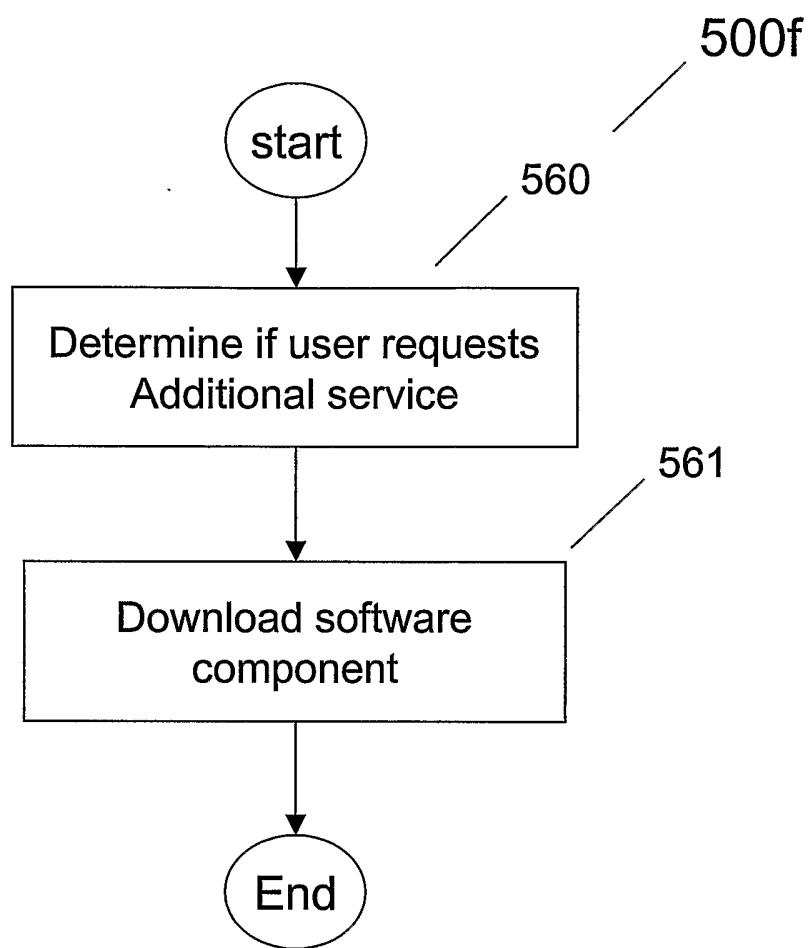
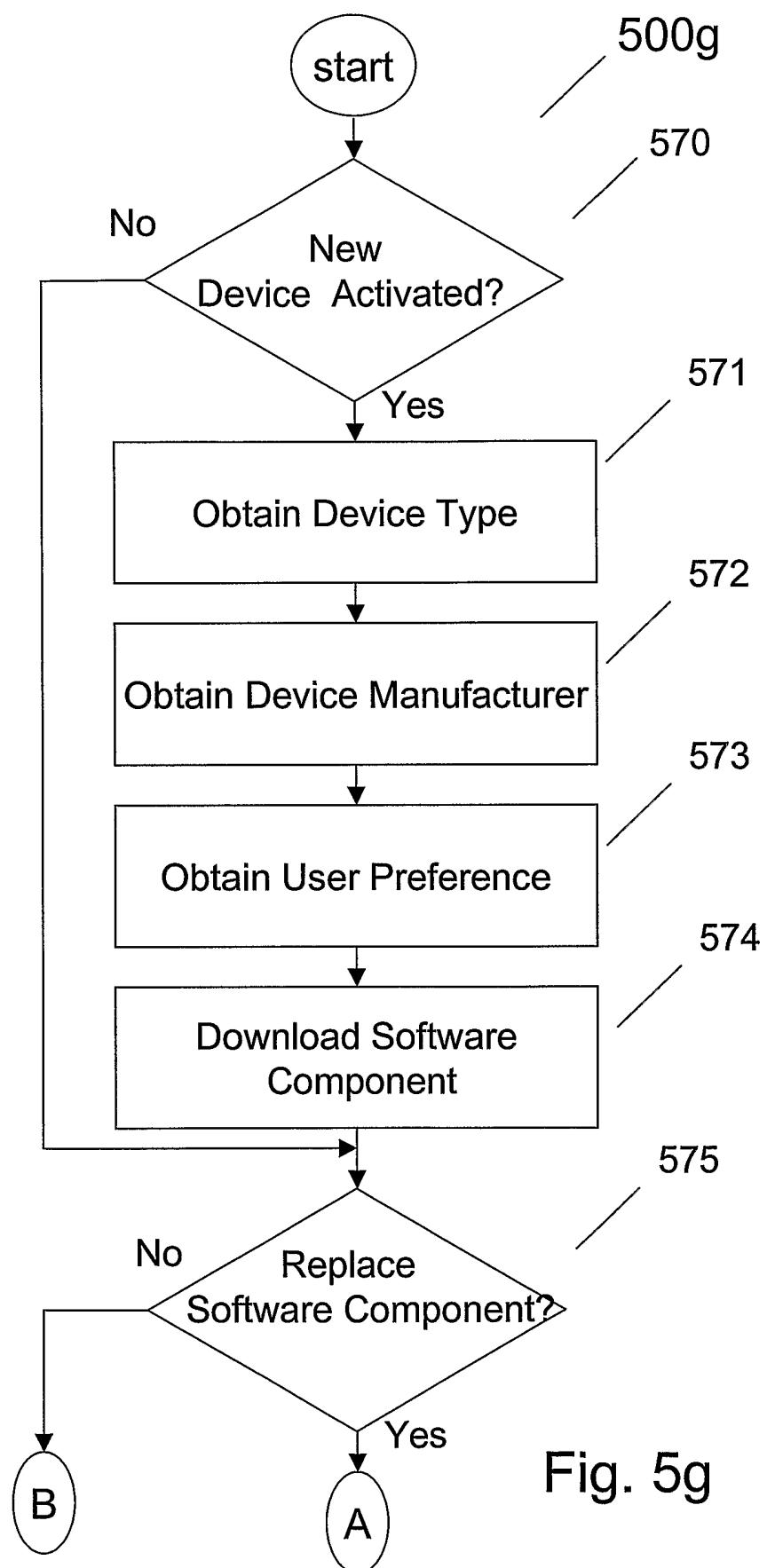


Fig. 5f



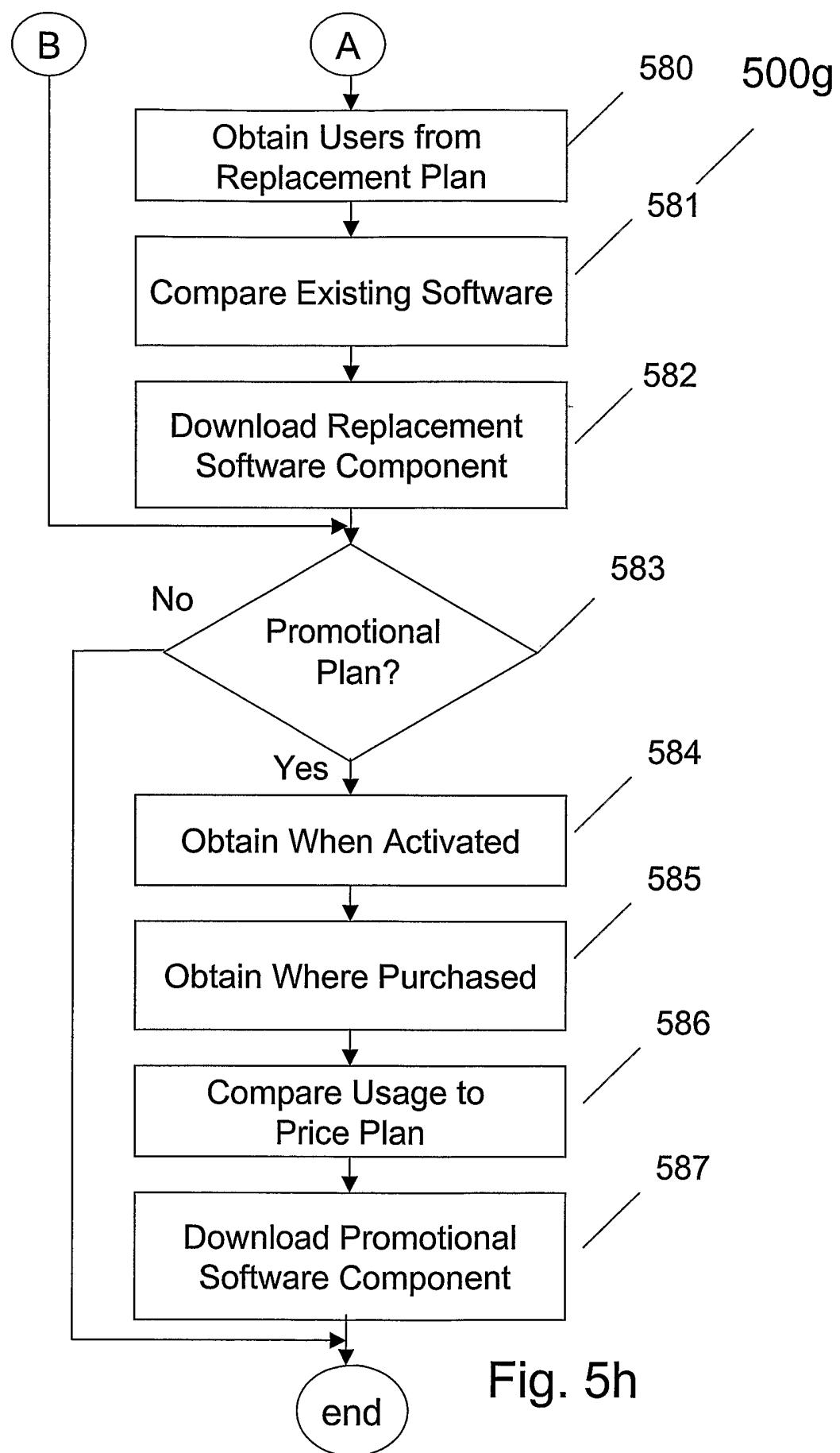


Fig. 5h

Server
/ 101

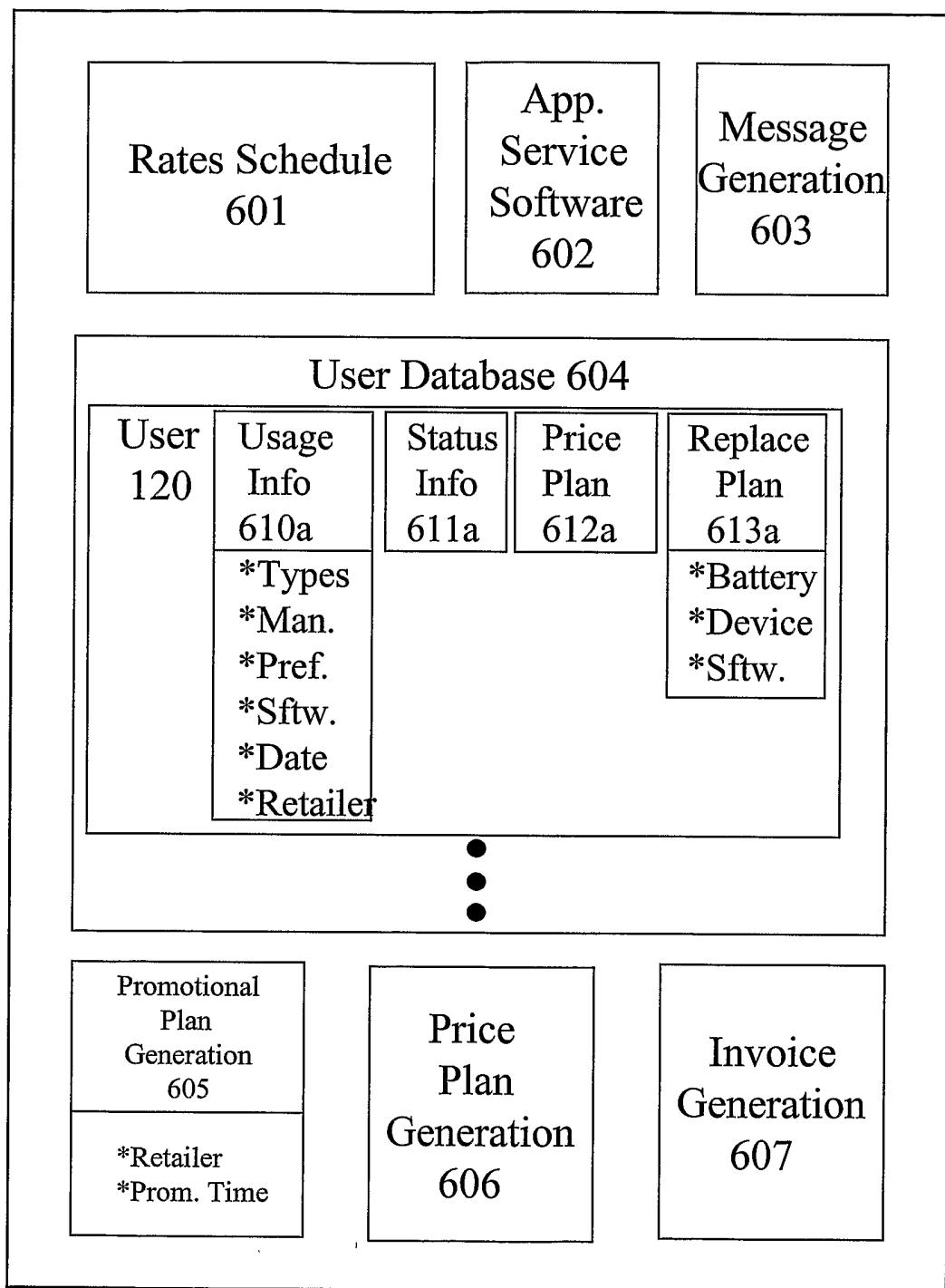


Fig. 6

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/37165

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : H04B 005/00
US CL : 455/041,419,41.2,414.2,426.1

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 455/041,419,41.2,414.2,426.1

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y,P	US 2003/0027563 A1 (HERLE et al) 06 February 2003, pg. 2; 0016	1-2,4-24,-26,28,30-36,39
Y,P	US 6,636,489 B1 (FINGERHUT), 21 October 2003, col.3; 1-19	1-2,3,4,5,6,7,8-12,19,21,23,24-27,28,30-36
Y,P	US 2003/0078036 A1 (CHANG et al) 24 April 2003, pg. 5; 0084	3-19
Y,P	US 2003/0013438 A1 (DARBY), 16 January 2003, col. 3; 19-33	12,27
Y	US 2002/0142762 A1 (CHMAYTELLI) 03 October 2002, pg.3; 0033	4,20
Y,P	US 6,532,366 B1 (CHUNG et al) 11 March 2003, col.3;65-col. 4;8	6,22
Y,P	US 2003/0060188 A1 (GIDRON et al), 27 March 2003, pg. 6;0057	7,23
Y	US 6,343,276 B1 (BARNETT) 29 January 2002, col.6; 29-35	14,29

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"B" earlier application or patent published on or after the international filing date

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"O" document referring to an oral disclosure, use, exhibition or other means

"&" document member of the same patent family

"P" document published prior to the international filing date but later than the priority date claimed

Date of the actual completion of the international search

Date of mailing of the international search report

21 April 2004 (21.04.2004)

24 MAY 2004

Name and mailing address of the ISA/US

Authorized officer

Mail Stop PCT, Attn: ISA/US
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

[Signature]
KENNETH WIEDER

Facsimile No. (703) 305-3230

Telephone No. 703 305-7608