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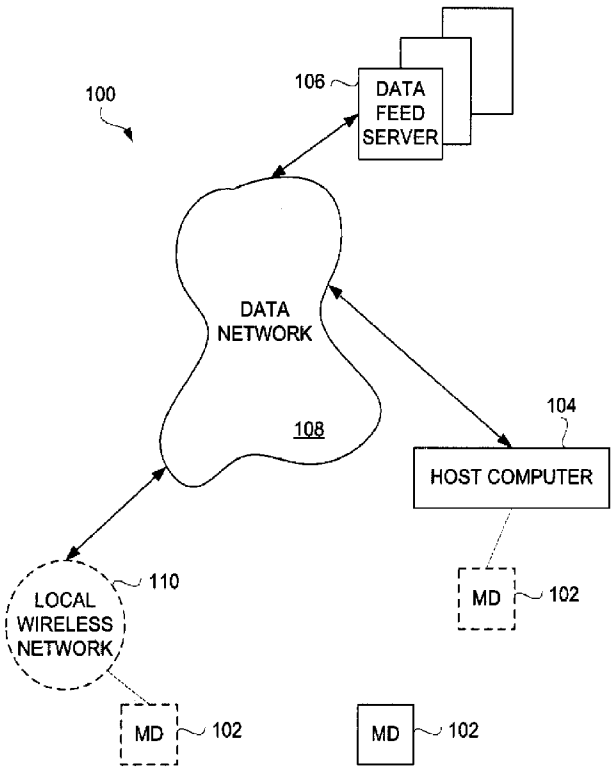

FIG. 1

(57) Abstract: Improved methods, computer readable media and systems that facilitate data acquisition by mobile electronic devices are disclosed. One aspect pertains to content acquisition between mobile electronic devices that are within range of a local wireless network. Another aspect pertains to content acquisition by mobile electronic devices capable of communicating across a peer-to-peer wireless network. According to still another aspect, as the user profile changes, electronic data being delivered to and/or presented on the mobile electronic device can dynamically change. In other words, the electronic data being delivered and/or presented can be selected, customized or targeted for characteristics of the dynamic user profile.

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WIRELESS DATA ACQUISITION FOR MOBILE ELECTRONIC DEVICES

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The present invention relates to mobile electronic devices and, more particularly, to wireless data acquisition for mobile electronic devices.

Description of the Related Art

[0002] Portable electronic devices, such as mobile phones, MP3 players and Personal Digital Assistants (PDAs), are often used by individuals on a personal basis. In other words, it is not uncommon for a person to carry a portable electronic device with them throughout their day. Often, these portable electronic devices store media data for use by their user. In the case of digital media players or PDAs, media data is typically downloaded from a host computer when the digital media player or PDA is connected to the host computer by way of a cable. In the event that a digital media player or PDA supports wireless communication, it is possible that the downloading of media data to the digital media player or PDA could be performed in a wireless manner. In the case of mobile phones, media data (such as songs or ring tones) are downloaded over the wireless communication network (i.e., cellular phone network).

[0003] However, as portable electronic devices become more versatile, more interactive and more pervasive, it is advantageous for portable electronic devices to acquire data from other portable electronic devices. Thus, there is need to facilitate wireless data acquisition by portable media devices.

[0004] Moreover, many people carry at least one mobile electronic device every day and through out the day. These mobile electronic devices tend to be very important digital tools or companions for users. Examples of some common mobile electronic devices are Personal Digital Assistants (PDAs), digital media players, mobile phones, and portable computers. Some mobile electronic devices are able to access wireless networks with network browsers to send and receive data.

[0005] Today, users of network browsers can configure their access webpage (e.g., "MyYahoo" provided by Yahoo! Inc.) for a network browser application (e.g., Safari™ application from Apple Inc.) to be presented with information of interest. However, configured preferences or settings that are used to determine the content for the webpage are fixed; hence, the characteristics for the webpage are fixed until subsequently changed through user interaction to alter the preferences or settings.

[0006] Information of interest to a user can vary during a relatively short period of time, such as an hour, day or week. However, it is too inconvenient for a user to frequently change their configuration preference or settings to obtain information of current interest. Thus, there is a need for improved approaches to provide a user of mobile electronic device with information that is of current interest.

SUMMARY OF THE INVENTION

[0007] The invention pertains to improved methods, computer readable media and systems that facilitate data acquisition by mobile electronic devices.

[0008] One aspect pertains to content acquisition between mobile electronic devices that are within range of a local wireless network. In one embodiment, when a first mobile electronic device and a second mobile electronic device are within range of a common local wireless network, the first mobile electronic device can upgrade (e.g., refresh) at least a portion of its stored content with more recent content that is available from the second mobile electronic device.

[0009] Another aspect pertains to content acquisition by mobile electronic devices capable of communicating across a peer-to-peer wireless network. In one embodiment, when a first mobile electronic device and a second mobile electronic device are capable of communicating over a peer-to-peer wireless network, the first mobile electronic device can effectively make use of network accessibility that is available to the second mobile electronic device.

[0010] Still another aspect pertains to delivery and/or presentation of electronic data to a mobile electronic device in accordance with a dynamic user profile. In one

embodiment, as the user profile changes, the electronic data being delivered to and/or presented on the mobile electronic device can dynamically change. In other words, the electronic data being delivered and/or presented can be selected, customized or targeted for characteristics of the dynamic user profile.

[0011] The invention can be implemented in numerous ways, including as a method, system, device, or apparatus (including graphical user interface and computer readable medium). Several embodiments of the invention are discussed below.

[0012] As a method for delivering data to a mobile electronic device, one embodiment of the invention can, for example, include at least the acts of: obtaining a dynamic user profile; identifying a remotely located data source that is relevant to the dynamic user profile; and delivering digital data from the identified data source to the mobile electronic device.

[0013] As a method for delivering data to a mobile media presentation device, one embodiment of the invention can, for example, include at least the acts of: determining a location of the mobile media presentation device; identifying a data feed associated with the location for the mobile media presentation device; and downloading structured data from the identified data feed to the mobile media presentation device.

[0014] As a computer readable medium including at least executable computer program code tangibly stored thereon for delivering data to a mobile electronic device, one embodiment of the invention can, for example, include at least: computer program code for obtaining a dynamic user profile; computer program code for identifying a remotely located data source that is relevant to the dynamic user profile; and computer program code for delivering digital data from the identified data source to the mobile electronic device so that at least a portion of the data delivered to the mobile electronic device can be subsequently presented at the mobile electronic device.

[0015] As a computer readable medium including at least executable computer program code tangibly stored thereon for delivering data to a mobile media presentation device, one embodiment of the invention can, for example, include at least: computer program code for determining a location of the mobile media presentation device; computer program code for identifying a data source relevant to the location for the mobile media presentation device;

and computer program code for downloading structured data from the identified data source to the mobile media presentation device.

[0016] As a portable electronic device, one embodiment of the invention can, for example, include at least: a network interface configured to access one or more wired or wireless networks; a memory configured to store data; a display configured to display data; and a processor. The processor can be configured to (i) dynamically update a user profile having a plurality of characteristics, (ii) receive digital data relevant to the one or more characteristics of the user profile via the network interface, (iii) store the digital data in the memory, and (iv) present at least a portion of the received digital data on the display.

[0017] As a method for obtaining digital content at a first mobile electronic device, one embodiment of the invention can, for example, include at least: discovering a second mobile electronic device that is wirelessly accessible to the first mobile electronic device; determining whether the second mobile electronic device is trusted; receiving information pertaining to shareable content available from the second electronic device; determining desired content for the first mobile electronic device from the shareable content available from the second mobile electronic device; and obtaining the desired content from the second mobile electronic device.

[0018] As a computer readable medium including at least executable computer program code tangibly stored thereon for obtaining digital data at a first mobile electronic device, one embodiment of the invention can, for example, include at least: computer program code for discovering a second mobile electronic device that is wirelessly accessible to the first mobile electronic device; computer program code for receiving information pertaining to shareable content available from the second electronic device; computer program code for determining desired content for the first mobile electronic device from the shareable content available from the second mobile electronic device; and computer program code for obtaining the desired content from the second mobile electronic device.

[0019] As a method for providing wireless access to remote content, one embodiment of the invention can, for example, include at least: discovering a surrogate mobile electronic device in the vicinity of a primary mobile electronic device; determining whether the surrogate mobile electronic device has network availability with respect to a network;

determining whether the surrogate mobile electronic device permits the primary mobile electronic device to utilize at least a portion of its network bandwidth with respect to the network, if it is determined that the surrogate electronic device has network availability with respect to the network; requesting particular content from the network via the surrogate mobile electronic device, if it is determined that the surrogate mobile electronic device permits the primary mobile electronic device to utilize at least a portion of its network bandwidth with respect to the network; and receiving the particular content from the network at the primary mobile electronic device via the surrogate mobile electronic device.

[0020] As a computer readable medium including at least executable computer program code tangibly stored thereon for providing wireless access to remote content, one embodiment of the invention can, for example, include at least: computer program code for discovering a second mobile electronic device in the vicinity of a first mobile electronic device; computer program code for determining whether the second mobile electronic device has network availability with respect to a network; computer program code for determining whether the second mobile electronic device permits the first mobile electronic device to utilize at least a portion of its network bandwidth with respect to the network; computer program code for requesting particular content from the network via the second mobile electronic device; and computer program code for receiving the particular content from the network at the first mobile electronic device via the second mobile electronic device.

[0021] Other aspects and advantages of the invention will become apparent from the following detailed description taken in conjunction with the accompanying drawings which illustrate, by way of example, the principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022] The invention will be readily understood by the following detailed description in conjunction with the accompanying drawings, wherein like reference numerals designate like structural elements, and in which:

[0023] FIG. 1 is a media delivery system according to one embodiment of the invention.

[0024] FIG. 2 is a flow diagram of a data delivery and presentation process according to one embodiment of the invention.

[0025] FIG. 3 is a flow diagram of a data download process according to one embodiment of the invention.

[0026] FIG. 4 is a flow diagram of a data feed download process according to one embodiment of the invention.

[0027] FIG. 5 is a flow diagram of a dynamic presentation process according to one embodiment of the invention.

[0028] FIG. 6 illustrates an exemplary mobile device usage system according to one embodiment of the invention.

[0029] FIGs. 7A-7E are exemplary display screens illustrating information or data that may be presented on a display screen of a mobile device while at different locations.

[0030] FIG. 8 is a block diagram of a wireless content delivery system according to one embodiment of the invention.

[0031] FIG. 9A illustrates the wireless content delivery system illustrated in FIG. 8 in accordance with a first content delivery scenario.

[0032] FIG. 9B illustrates the wireless content delivery system illustrated in FIG. 8 in accordance with a second content delivery scenario.

[0033] FIG. 9C illustrates the wireless content delivery system illustrated in FIG. 8 in accordance with a third content delivery scenario.

[0034] FIGs. 10A and 10B illustrate a data asset update arrangement according to one embodiment of the invention.

[0035] FIG. 11 illustrates a mesh arrangement of mobile media devices according to one embodiment of the invention.

[0036] FIG. 12 is a flow diagram of a content retrieval process according to one embodiment of the invention.

[0037] FIGs. 13A and 13B are flow diagrams of a content update process according to one embodiment of the invention.

[0038] FIG. 14 is a block diagram of a mobile multi-function device according to one embodiment of the invention.

DETAILED DESCRIPTION OF THE INVENTION

[0039] The invention pertains to improved methods, computer readable media and systems that facilitate data acquisition by mobile electronic devices.

[0040] The invention is, for example, well suited for use on a mobile electronic device, such as a portable communication device (e.g., mobile phone) or a wireless, mobile information appliance (e.g., portable media player with wireless transmission capability) having a display for presenting information to its user.

[0041] Embodiments of the various aspects of invention are discussed below with reference to FIGs. 1 – 14. However, those skilled in the art will readily appreciate that the detailed description given herein with respect to these figures is for explanatory purposes as the invention extends beyond these limited embodiments.

[0042] One aspect pertains to delivery and/or presentation of electronic data to a mobile electronic device in accordance with a dynamic user profile. In one embodiment, as the user profile changes, the electronic data being delivered to and/or presented on the mobile electronic device can dynamically change. In other words, the electronic data being delivered and/or presented can be selected, customized or targeted for characteristics of the dynamic user profile. The dynamic user profile can be changed by explicit actions, such as configuration by user settings or preferences, or implicit actions, such as user location or user usage. The user profile can be dynamic in that as one or more actions impacting the user profile are discovered, the user profile can, for example, be updated as appropriate.

[0043] FIG. 1 is a media delivery system 100 according to one embodiment of the invention. The media delivery system 100 supports at least one media device 102. In one embodiment, the mobile device 102 can pertain to a mobile electronic device. One example of a mobile electronic device is a mobile media presentation device, which is a mobile electronic device capable of media presentation. Normally, the media delivery system 100 will support a substantial number of media devices. The media device 102 can couple to a host computer 104. Typically, the media device 102 can be brought within the vicinity of the host computer 104 and then connected either by a wire (e.g., cable or docking device) or by a localized wireless network (e.g., Bluetooth). Once the media device 102 is connected to the host computer 104, the host computer 104 can access information concerning a user profile associated with the user of the mobile device 102. Then, using the user profile, the host computer 104 can interact with at least one of a plurality of data feed servers 106 by way of a data network 108. The data feed server 106 hosts a plurality of different data feeds (or data channels) that are associated with digital content pertaining to different subject matter areas (e.g., different topics, subjects, locations, times, etc.). Based on the user profile, the host computer 104 or the data feed server 106 can select one or a few of the different data feeds to be delivered to the mobile device 102. Here, the selected one or a few of the different data feeds are those of the available data feeds (or channels) that are deemed to be of probable interest to the user. These selected one or a few data feeds can be automatically selected for a user of the mobile device 102. One example of a data feed is a Really Simple Syndication (RSS) feed. More generally, the data feed server 106 can be a data server (or data source) that can provide data to the mobile device 102. The data provided by a data server (or data source) is not limited to data feeds. For example, the data provided by a data server (or data source) can include one or more of auditory, visual and/or other data. Auditory data can, for example, pertain to songs, narrations, or spoken text. Visual data can, for example, pertain to images (e.g., pictures), slideshows or movies. Other data can, for example, include structured data or interpreted data. The structured data or interpreted data can be processed locally by the mobile device which may lead to audio or visual data that can be presented at the mobile device 102.

[0044] In addition, in one embodiment, the media delivery system 110 can permit the mobile device 102 to access the data network 108 without use of the host computer 104. In particular, the media delivery system 100 can include a local wireless network 110. The local wireless network 110 can pertain to a WiFi network, a WiMax network or other wireless network which provides wireless access points that facilitate wireless connection to the data network 108. In such an embodiment, the mobile device 102 can interact with at least one of the plurality of data feed servers 102 by way of the local wireless network 110. However, since the mobile device 102 is mobile, the network connectivity is typically only intermittently available to the mobile device 102. When network connectivity is present, the host computer 104 or the data feed server 106 can deliver one or more of the different data feeds to the mobile device 102.

[0045] FIG. 2 is a flow diagram of a data delivery and presentation process 200 according to one embodiment of the invention. The data delivery and presentation process 200 is, for example, performed by a computing device, such as the host computer 104 or the mobile device 102 illustrated in FIG. 1.

[0046] When the data delivery and presentation process 200 begins, a dynamic user profile for the user of the mobile device can be determined 202. The dynamic user profile can be determined explicitly by the user, implicitly by one or more computing devices, and/or by some combination thereof.

[0047] After the dynamic user profile is determined 202, a data source that might be relevant to the dynamic user profile can be identified 204. Thereafter, data (namely, digital data) from the identified data source can be delivered 206 from the identified data source to the mobile device. For example, with reference to FIG. 1, the data can be delivered 206 to the mobile device by way of the host computer 104 or the local wireless network 110.

[0048] Finally, at least a portion of the data delivered to the mobile device can be presented 208 at the mobile device. Once the data is delivered to the mobile device, the host computer 104 can present some or all of the data in a rapid manner since the data is locally stored on the mobile device. The presentation of the data can be automatic based on availability of the data or location of the mobile device. The

presentation can also be based on user interaction. For example, a user can interact with a user interface for the mobile device to request the data be presented, in which case the data can be rapidly presented.

[0049] Following the block 208, the data delivery and presentation process 200 can end. However, it should be recognized that the data delivery and presentation process 200 can be repeated periodically or as the user profile changes.

[0050] FIG. 3 is a flow diagram of a data download process 300 according to one embodiment of the invention. The data download process 300 is, for example, performed by a computing device, such as the host computer 104 or the mobile device 102 illustrated in FIG. 1.

[0051] The data download process 300 can determine 302 a location of a mobile device. The determination 302 of the location of the mobile device can be directly determined, inferred or predicted. After the location of the mobile device has been determined 302, a data feed associated with the location can be identified 302. Next, structured data from the identified data feed can be downloaded 306 to the mobile device. For example, the structured data can be in a markup language format (e.g., eXtensible Markup Language (XML)). After the structured data is downloaded 306, the data download process 300 can end.

[0052] The location of the mobile device can be determined by a GPS device, by network triangulation, by network address, by network availability, etc. The location of the mobile device can be inferred or predicted in various ways. As one example, the location of the mobile device can be inferred or predicted by usage (e.g., prefix of local telephone callings being made if the mobile device has voice communications capabilities). As another example, the location of the mobile device can be inferred by user events, such as - - a user is on a airline flight to China, then the inferred, future location for the mobile device is China. As another example, if the mobile device includes an electronic calendar for the user, the calendar entries can signal likely location of the mobile device and its user. As still another example, the mobile device can record historical usage and learn the user's normal schedule or routine and thus learn or predict likely locations.

[0053] FIG. 4 is a flow diagram of a data feed download process 400 according to one embodiment of the invention. The data feed download process 400 can, for example, be performed by a computing device, such as the host computer 104 illustrated in FIG. 4. In general, the data feed download process 400 locates data feeds that are likely of interest to a user of a mobile device and then downloads the located data feeds to the mobile device.

[0054] The data feed download process 400 can begin with a decision 402. The decision 402 can determine whether a new user profile exists. For example, a new user profile can be a newly created user profile or a recently updated user profile, such as a dynamic user profile that has been updated. When the decision 402 determines that a new user profile does not exist, the data feed download process 400 can await a new user profile. On the other hand, when the decision 402 determines that a new user profile does exist, the data feed download process 400 can continue in view of the new user profile.

[0055] When the data feed download process 400 continues, one or more data feeds to be presented on the mobile device can be determined 404 based on the new user profile. One of the one or more data feeds can then be selected 406. The selected data feed can then be processed as discussed below. For example, the data feed can be a RSS feed for which an interested party can subscribe to receive occasionally or periodically data feeds. However, more generally, a data feed can be considered one type of data source.

[0056] After the one of the one or more data feeds has been selected 406, a decision 408 can determine whether any data for the data feed is to be downloaded. When the decision 408 determines that there is data for the selected data feed to be downloaded, a decision 410 can determine whether there is adequate space available on the mobile device to store such data. When the decision 410 determines that there is inadequate space available on the mobile device, lower priority data previously stored on the mobile device can be deleted 412. Following the block 412, the data feed download process 400 can return to repeat the decision 410. Once the decision 410 determines that there is adequate space available on the mobile device, data for the

selected data feed can be downloaded 414 to the mobile device. For example, the data for the selected data feed can be downloaded 414 from the computing device, such as the host computer 104, to the mobile device, such as the mobile device 102.

[0057] Following the block 414, or following the decision 408 when there is no data for the selected data feed to be downloaded, a decision 416 can determine whether that are additional data feeds are to be processed. When the decision 416 determines that there are more data feeds to be processed, the data feed download process 400 can return to repeat the block 406 so that another one of the one or more data feeds can be selected and similarly processed. On the other hand, when the decision 416 determines that there are no more data feeds to be processed, the data feed download process 400 can end.

[0058] According to one embodiment of the invention, data from a data source, such as a data feed, can be acquired at a mobile device and thereafter presented at the mobile device. The presentation of the data can be visual and/or audio. The presentation of the data can also be automatic (independent of a user request) or on-demand (in response to a user request).

[0059] FIG. 5 is a flow diagram of a dynamic presentation process 500 according to one embodiment of the invention. The dynamic presentation process 500 can, for example, be performed by a mobile device, such as the mobile device 102 illustrated in FIG. 1.

[0060] The dynamic presentation process 500 can begin with a decision 502. The decision 502 can determine whether an automatic presentation mode is to be utilized. When the decision 502 determines that the automatic presentation mode is not to be used, the dynamic presentation process 500 can await the transition to the automatic presentation mode. On the other hand, when the decision 502 determines that the automatic presentation mode is to be utilized, the dynamic presentation process 500 can continue. In other words, when the automatic presentation mode is to be utilized, the dynamic presentation process 500 can be deemed to be invoked.

[0061] Once the decision 502 determines that the automatic presentation mode is to be utilized, a device context for the mobile device can be determined 504. A decision

506 can then determine whether contextual data is available for presentation. Here, depending upon the device context, contextual data may or may not be available on the mobile device. To the extent that contextual data associated with the device context is available on the mobile device, the contextual data can be dynamically presented 508 on the mobile device. In one implementation, the contextual data is data from a data source that can be selected based upon the device context. The context can, for example, be set or influenced by one or more of: device location, device mode and device usage. For example, a data source providing the contextual data can be a selected one of a plurality of data feeds from which relevant data has been downloaded to the mobile device.

[0062] Once the contextual data is presented 508 on the mobile device, a decision 512 can determine whether the dynamic presentation process 500 should end. When the decision 512 determines that the dynamic presentation process 500 should not end, then the dynamic presentation process 500 returns to repeat the decision 502 and subsequent blocks so that the automatic presentation mode can continue. In this regard, since the device context can change in a dynamic manner, the contextual data being presented 508 can also change in a dynamic manner. Alternatively, when the decision 512 determines that the dynamic presentation process 500 should end, the dynamic presentation process 510 can end.

[0063] Alternatively, when the decision 506 determines that contextual data is not available at the mobile device, other data can be dynamically presented 510 on the mobile device. For example, when contextual data is not available, other data (e.g., on the mobile device) can be chosen by other criteria, such as randomly chosen, and then presented at the mobile device. Following the block 510, the decision 512 can be performed.

[0064] FIG. 6 illustrates an exemplary mobile device usage system 600 according to one embodiment of the invention. With this system 600, it is assumed that a user of a mobile device, such as the mobile device 102 illustrated in FIG. 1, carries the mobile device with them in this exemplary usage scenario.

[0065] In the exemplary usage scenario, the user has a home location 602 in San Francisco, and a work location 604 in Palo Alto. Further, the user in this exemplary scenario (on a particular day) the user leaves the home location 602 to go to the work location 604. Sometime later, the user leaves the work location 604 to visit a retail store location 606 in San Jose, and then returns back to the work location 604. Still further, the user thereafter leaves the work location 604 to attend a class at a university location 608 in Santa Clara. After the class at the university location 608 has ended, the user returns to the home location 602. Additionally, on a different day, the user can leave the home location 602 to travel to a Boston location 610 to visit a work client. Then, from the Boston location 610, the user can travel to a vacation location 612, such as Paris. Thereafter, in this exemplary usage scenario, the user can travel from the vacation location 612 back to the home location 602.

[0066] While the user in this exemplary usage scenario travels between the various different locations 602 - 612, the user's mobile device can recognize the general area in which the user is located. Although the location can be a precise location, in one embodiment, the location can be more general such as a city, town, county or region. For example, in the exemplary usage scenario, the locations pertained to cities, namely, San Francisco, Palo Alto, San Jose, Santa Clara, Boston and Paris. While the mobile device is at any of these general locations, the information or data being presented on the display screens associated with the mobile device can be dynamically determined based on the associated location. In other words, the information or data being presented on the display screens associated with the mobile device can be automatically changed to reflect the general location of the mobile device. However, at particular specific location, the information or data being presented could be associated with the specific location as opposed to the general location.

[0067] Another exemplary usage scenario is a user that spends most of her time in one geographic location but periodically relocates to a different geographical location. For example, a user might spend 80% of their limit at their primary home location (e.g., San Francisco) and 20% of their time at their secondary home location (e.g., Las Vegas). In such case, the information or data delivered and/or presented at a mobile

device can dependent on whether the user is at the primary home location or the secondary home location. This allows the data stored to the mobile device to adapt to the user's location such that when at the different location the mobile device is prepared to rapidly present location-customized data. The location-customized data can also be influenced by user profile or user behavior.

[0068] FIGs. 7A-7E are exemplary display screens illustrating information or data that may be presented on a display screen of a mobile device while at different locations.

[0069] FIG. 7A illustrates a display screen 700 having "Bay Area News" information. The display screen 700 could, for example, be displayed by the exemplary mobile device usage system 600 when the user of the mobile device is at a Bay Area location, including San Francisco, Palo Alto, San Jose or Santa Clara. In this exemplary display screen 700, the "Bay Area News" information includes a local temperature indication, local whether report, and traffic information.

[0070] FIG. 7B illustrates an exemplary display screen 720 corresponding to information regarding the Boston region, which can be displayed to the user while the user of the mobile device is at the client location 610 which is in Boston. The exemplary display screen 720 illustrated in FIG. 7B can contain images concerning Boston as well as Boston events that may be of interest to the user of the mobile device (e.g., sporting event and entertainment event) while being at Boston. In the illustrated example, the sporting event is a World Series baseball game, and the entertainment event is a nightclub party.

[0071] In FIG. 7C, an exemplary display screen 740 illustrates a display screen that can be presented while the user of the mobile device is at the vacation location 612. Here, the exemplary display screen 740 contains information on tourist activities, such as walking tours, museum's and other attractions. The exemplary display screen 740 would be useful to the user of the mobile device while the user (and the mobile device) are on vacation at the vacation location 612. In the example illustrated in FIG. 6, the vacation location 612 corresponds to Paris, France; hence, the exemplary display screen 740 can contain tourist information regarding Paris, France.

[0072] In FIG. 7D, an exemplary display screen 760 illustrates a display screen that can be presented while the user of the mobile device is at the work location 604. Here, the exemplary display screen 760 contains information on job related information that would be of interest to employees or visitors to the work location 604. For example, as shown in FIG. 7D, the job related information being display can pertain to stock price for the company's stock as well as company news.

[0073] In FIG. 7E, an exemplary display screen 780 illustrates a display screen that can be presented while the user of the mobile device is at the retail store location 606. Here, the exemplary display screen 780 contains information pertinent to the retail store. For example, as show in FIG. 7D, the information being displayed can indicate those products on sale at the retail store location 606.

[0074] In these exemplary display screens shown in FIGs. 7A-7E, the information or data being presented has been selected, customized or targeted for the geographic location of the mobile electronic device however determined, inferred or estimated.

[0075] In a similar fashion, display screens can present information or data that is dependent on one or more characteristics of a dynamic user profile besides or in addition to location. For example, a user on vacation in Paris that likes museums could be presented with the exemplary display screen 612, whereas another user on vacation in Paris that likes antiques could be presented with an exemplary display screen providing information on antique stores or event in Paris.

[0076] A user profile is a profile of a user of a device, i.e., the mobile device. The user profile represents the user. The user profile can be set manually by the user or set automatically by the device. A dynamic user profile is a user profile that has an automatic aspect that can cause the user profile to change. User settings can be controlled by hardware or software that enable a user to make selections. Examples of user settings include language settings, topics of interest, geographic interests, user schedule, etc. Accordingly, certain digital data can be promoted to certain users with particular user profiles.

[0077] According to another embodiment of the invention data being delivered to mobile devices can be dependent on not only location (e.g., present location, recent

locations or frequent locations) but also user demographics. The user demographics can be acquired from a user profile. The user demographics can also be impacted by location. Hence, by classify users with demographic categories, the data delivered to users can be targeted, selected, personalized or customized for such users. As one example, data delivered can be information or data pertaining to digital data (e.g., digital media assets) available from a media repository (e.g., online media store) that are likely to be of interest to a user of a particular demographic category. Certain digital data can be promoted to certain users with particular demographics using this embodiment.

[0078] According to another embodiment of the invention data being delivered to mobile devices can be dependent on a behavior profile. Here, instead of a demographic classification, the data to be deliver to a user can be dependent on a behavior profile. The behavior profile can be formed based on locations, user settings, user actions, and/or device usage. Hence, by using behavior profiles, the data delivered to users can be targeted, selected, personalized or customized for such users. As one example, data delivered can be information or data pertaining to digital data (e.g., a digital feed) available from a media repository (e.g., RSS feed source) that is likely to be of interest to a user having a particular behavior profile. Certain digital data can be promoted to certain users with particular behavior profiles using this embodiment.

[0079] Since data is able to be delivered to the mobile electronic devices automatically, such as dependent on location, data to be presented is resident (e.g., stored or cached) on the mobile electronic devices. Because the data is locally resident, the data can be presented (e.g., displayed) quickly and efficiently without any need for network access. For example, the exemplary display screens shown in FIGs. 7A-7E can be rapidly presented to users of the mobile electronic devices. In one implementation, the data can be presented in an automatic fashion (without requiring user interaction to cause its presentation). In another implementation, the data can be presented on-demand when requested by a user (such as by user input to the mobile electronic device).

[0080] According to one embodiment, data can be delivered from an information server to a recipient device in an efficient manner. In one implementation, data being delivered can be associated with a template that is present on the recipient device. Accordingly, only data need to be transmitted to the recipient device since the format and other presentation configurations can be controlled by the template. The recipient device can be a mobile device or a host computer. For additional detail on templates, see U.S. Application No. 11/899,024, filed September 4, 2007, and entitled "USER INTERFACE ELEMENTS CLONING AND TRANSITIONS," which is hereby incorporated herein by reference.

[0081] Another aspect pertains to content acquisition between mobile electronic devices that are within range of a local wireless network. In one embodiment, when a first mobile electronic device and a second mobile electronic device are within range of a common local wireless network, the first mobile electronic device can upgrade (e.g., refresh) at least a portion of its stored content with more recent content that is available from the second mobile electronic device. Another aspect pertains to content acquisition by mobile electronic devices capable of communicating across a peer-to-peer wireless network. In one embodiment, when a first mobile electronic device and a second mobile electronic device are capable of communicating over a peer-to-peer wireless network, the first mobile electronic device can effectively make use of network accessibility that is available to the second mobile electronic device.

[0082] FIG. 8 is a block diagram of a wireless content delivery system 800 according to one embodiment of the invention. The wireless content delivery system 800 allows content (i.e., digital data) to be transferred between different electronic devices so as to deliver content to one or more electronic devices.

[0083] The wireless content delivery system 800 can include a mobile electronic device 802. The mobile electronic device 802 is a mobile electronic device that has wireless capabilities. For example, the mobile electronic device 802 can be a mobile electronic device that supports at least wireless data transfer. As an example, the mobile electronic device 802 can be a personal media device having Bluetooth, 802.11 and/or other wireless capability.

[0084] The wireless content delivery system 800 can also include a wireless data network 804. Although the mobile electronic device 802 is mobile and therefore easily transported by its user, the mobile electronic device 802 will at times be able to wirelessly connect to the wireless data network 804. The wireless data network 804 can also be coupled to a wired data network 806. The wired data network 806 is typically a global network but could also be a local area network or a wide area network. One example of a global network is the Internet.

[0085] The wireless content delivery system 800 can also include a client 808 that is associated with the mobile electronic device 802. Typically, the client 808 and the mobile electronic device 802 can be associated by way of a common user. The client 808 is, for example, a computing device, such as a personal computer. In any case, the mobile electronic device 802 can connect with the client 808. In one implementation, the mobile electronic device 802 can physically connect with the client 808 by way of a cable or a dock. In another implementation, the mobile electronic device 802 can wirelessly connect to the client 808 such as via a short range wireless network (e.g., Bluetooth network). The client 808 can in turn be coupled to the wired data network 806.

[0086] When the mobile electronic device 802 is connected (wirelessly or wired) with the client 808, the mobile electronic device 802 can receive content from the client 808. Typically, the client 808 would have received (at that time or previously) such content from the wired data network 806.

[0087] The wireless content delivery system 800 can further include a content repository 810 and a content server 812. The content being provided to the mobile electronic device 802 can, for example, be provided from the content repository 810 or the content server 812. Although the content server 812 is illustrated in FIG. 8, the wireless content delivery system 800 typically includes a plurality of different content servers geographically distributed yet operatively connected to the wired data network 806. The content repository 810 can, in one embodiment, correspond to or be associated with an online store that sells, rents or otherwise distributes digital data assets, such as digital media items. The wireless content delivery system 800 may

include a plurality of different content repositories geographically distributed yet operatively connected to the wired data network 806.

[0088] The wireless content delivery system 800 can also support other mobile electronic devices, such as mobile electronic device 814 and mobile electronic device 816 illustrated in FIG. 8. The mobile electronic device 814 can communicate with the wireless data network 804 when the mobile electronic device 814 is within range of the wireless data network 804. The mobile electronic device 814 can communicate with the mobile electronic device 802 via the wireless data network 804, or can communicate with either the content repository 810 or the content server 812 via the wireless data network 804 and the wired data network 806.

[0089] Still further, the mobile electronic device 816, in one embodiment, is capable of wirelessly communicating with the mobile electronic device 814 over a short range wireless network, such as a peer-to-peer wireless network. As such, the mobile electronic device 816 can receive data that is stored on, or otherwise unavailable to, the mobile electronic device 814. In one embodiment, the mobile electronic device 816 can receive data resident on the mobile electronic device 814 that is more current than corresponding data stored on the mobile electronic device 816. In another embodiment, the mobile electronic device 816 can interact with the mobile electronic device 814 to cause the mobile electronic device 814 to request certain data from a remote resource, such as the content repository 810 or the content server 812.

[0090] In one embodiment, one mobile device can discover another mobile device within its vicinity. The mobile devices can then wirelessly transfer data from one mobile device to the other. Typically, the mobile devices are associated with persons (users). The mobile devices, or their users, can control, request or influence the particular data content being delivered. The device or user control can be provided in real-time or in advance through use of settings, such as preferences. In one implementation, the mobile devices can act automatically without user input to transfer data from one mobile device to another. For example, a background process can operate to discover other mobile devices within its vicinity and to initiate data transfer as appropriate (e.g., as configured via preference settings).

[0091] In another embodiment, one mobile device can discover another mobile device having network availability within its vicinity. For example, the network availability can pertain to access to a global data network, such as the Internet. When the other device with network availability is discovered, the mobile device can wirelessly communicate with the other device so as make use of the network availability to request and receive content from the global data network via the other mobile device.

[0092] The content delivery described is particularly suited for delivery of content. In one embodiment, the content can be media data. "Media data," as used herein, is digital data that pertains to at least one of audio, video, and images. Some examples of specific forms of media data (which can be referred to as "media items") include, but are not limited to, songs, albums, audiobooks, playlists, movies, music videos, photos, computer games, podcasts, audio and/or video presentations. News, financial and/or sports data can also be considered media data. Media data is also referred to as media content herein.

[0093] FIG. 9A illustrates the wireless content delivery system 800 illustrated in FIG. 8 in accordance with a first content delivery scenario. In the first content delivery scenario, it is assumed that a digital asset (DA-a) is a resident on the content server 812. The digital asset (DA-a) can be provided to the content repository 810 for further distribution, rental or sale. In this example, in the content repository 810 also stores a digital asset (DA-b). The client 808 and the mobile electronic device 802 are associated with a user that has an interest in the digital asset (DA-a). The user can express their interest in various digital assets through use of category selections, user profile, usage history, user preferences, etc. The client 808 can operate to interact with the content repository 810 via the wired data network 806 to receive the digital asset (DA-a). Then, when a connection is available between the client 808 and the mobile electronic device 802, the digital asset (DA-a) can be delivered from the client 808 to the mobile electronic device 802. In this example, the digital asset (DA-a) has migrated from the content repository 810 or the content server 812 to the mobile electronic device 802.

[0094] FIG. 9B illustrates the wireless content delivery system 800 illustrated in FIG. 8 in accordance with a second content delivery scenario. The second content delivery

scenario can follow from the first content delivery scenario. In the second content delivery scenario, it is assumed that a digital asset (DA-a) is currently resident on the mobile electronic device 802. When the mobile electronic device 814 is within range of the wireless data network 804, the mobile electronic device 814 can operate to discover whether any other mobile electronic devices are accessible to the wireless data network 804. For example, when the mobile electronic device 802 is also within range of the wireless data network 804, the mobile electronic device 814 can discover the availability of the mobile electronic device 802. Thereafter, since the user associated with in the mobile electronic device 814 has an interest in the digital asset (DA-a), the digital asset (DA-a) can be delivered from the mobile electronic device 802 to the mobile electronic device 814 via the wireless data network 804. In this example, the digital asset (DA-a) has migrated from the content repository 810 or the content server 812 to the mobile electronic device 802. Here, it is assumed that the mobile electronic device 814 did not previously have the digital asset (DA-a) but subsequently can receive the digital asset (DA-a) from the mobile electronic device 802 via the wireless data network. However, in another variation of this content delivery scenario, the mobile electronic device 814 initially has an older version of the digital asset (DA-a), whereby the mobile electronic device can thus receive a newer version of the digital asset (DA-a) from the mobile electronic device 802 via the wireless data network.

[0095] FIG. 9C illustrates the wireless content delivery system 800 illustrated in FIG. 8 in accordance with a third content delivery scenario. The third content delivery scenario can follow from the second content delivery scenario. In the third content delivery scenario, it is assumed that a digital asset (DA-a) is currently resident on the mobile electronic device 814 (e.g., by way of the first content delivery scenario and the second content delivery scenario). In this embodiment, the mobile electronic device 816 may not be within range of the wireless data network 804. However, the mobile electronic device 816 may be in range of the mobile electronic device 814 so that a peer-to-peer wireless network (or peer-to-peer wireless connection) can be established. When the peer-to-peer network can be established between the mobile electronic device 816 and the mobile electronic device 814, the digital asset (DA-a) when deemed of interest to the user, can be delivered from the mobile electronic device 814 to the

mobile electronic device 816. In this example, the digital asset (DA-a) has migrated from the mobile electronic device 814 to the mobile electronic device 816.

[0096] Hence, considering the first content delivery scenario together with the second content delivery scenario and the third content delivery scenario, a digital asset (DA-a) is able to migrate across various networks and through various devices in a controlled manner. Namely, it in this particular example, the digital asset (DA-a) has migrated from the content repository 810 or the content server 812 to the mobile electronic devices 802, 814 and 816.

[0097] FIGs. 10A and 10B illustrate a data asset update arrangement according to one embodiment of the invention. FIG. 10A illustrates a data asset update arrangement 1000 according to one exemplary implementation. The data asset update arrangement 1000 concerns updating data assets on a mobile electronic device. More particularly, the data asset update arrangement 1000 concerns exchange of data assets with respect to a mobile electronic device 1002 and a mobile electronic asset device 1004 that are wirelessly connected via a wireless link 1006. For example, with reference to FIG. 8, the wireless link 1006 can be established via the wireless data network 804 and/or a peer-to-peer wireless network. In the exemplary implementation illustrated in FIG. 10A, the mobile electronic device 1002 initially stores a set of digital assets, namely, DA-A-1, DA-C-1 and DA-E-1; and the mobile electronic device 1004 initially stores a set of digital assets, namely, DA-A-2, DA-B-1, DA-C-1 and DA-D-1. The digital assets can pertain to content, such as media data. When the wireless link 1006 is present, the mobile electronic devices 1002 and 1004 can communicate with one another to determine whether each has any digital assets that the other is interested in. More particularly, in this particular example, the mobile electronic device 1002 includes digital assets A, C and E, with each such digital asset being a first version. Also, in this particular example, the mobile electronic device 1004 includes digital assets A, B, C and D, with digital assets B and C being first versions, digital asset A being a second version and digital asset D being a sixth version. Accordingly, the mobile electronic device 1002 can communicate with the mobile electronic device 1004 to determine that the mobile electronic device 1004 has second version (i.e., a later version) of the digital

asset A, whereas the mobile electronic device 1002 has the first version of the digital asset A. Hence, the mobile electronic device 1002 can receive the second version of these digital asset A from the mobile electronic device 1004. The mobile electronic device 1004, on the other hand, does not receive any versions of digital assets A or C from the mobile electronic device 1002, since such digital assets are of the same version as is already stored thereon.

[0098] FIG. 10B illustrates a data asset update arrangement 1000' according to one exemplary implementation. The data asset update arrangement 1000' represents the data asset update arrangement 1000 illustrated in FIG. 10A after the update for these digital asset A has been performed. Although not illustrated in FIG. 10B, updates to the digital assets can optionally also update the mobile electronic device 1002 to include the sixth version of the digital asset D provided by the mobile electronic device 1004. The updating with respect to the digital asset D can, for example, depend upon whether the user of the mobile electronic device 1002 has an interest in the digital asset D. For example, if the user of the mobile electronic device 1002 does not have an interest in a digital asset D, then the mobile electronic device 1002 can decline to receive (or not request) the digital asset D. In addition, although not illustrated in FIG. 10B, updates to the digital assets can optionally also update the mobile electronic device 1004 to include the first version of the digital asset E provided by the mobile electronic device 1002. The updating with respect to the digital asset E can, for example, depend upon whether the user of the mobile electronic device 1004 has an interest in the digital asset E. For example, if the user of the mobile electronic 1004 device does not have an interest in a digital asset D, then the mobile electronic device 1002 can decline to receive (or not request) the digital asset D.

[0099] FIG. 11 illustrates a mesh arrangement 1100 of mobile media devices according to one embodiment of the invention. The mesh arrangement 1100 includes a base mobile electronic device 1102 that can distribute digital data wirelessly to mobile electronic device 1104 and mobile electronic device 1106 by coming within vicinity of such devices. In turn, the mobile electronic device 1104 can wirelessly distribute digital data to mobile electronic device 1108 and mobile electronic device 1110. Also, the

mobile electronic device 1106 can wirelessly distribute digital data to mobile electronic device 1112 and mobile electronic device 1114. The digital data can be the same digital data that is able to be distributed by the mesh arrangement 1100 from one mobile electronic device to another mobile electronic device. In this manner, digital data can be distributed or delivered in a viral manner based on short range wireless connections that are available between mobile electronic devices. One advantage of such a distribution network of mobile electronic devices is that a particular mobile electronic device may not frequently (or even ever) connect to a global network to receive updated digital data, but instead could come within the vicinity of other mobile electronic devices who themselves, or some other device that they have come in contact with, have recently connected it to a global network. Another advantage of such a distribution network is that one mobile electronic device can unicast, broadcast or anycast certain content to one or more other mobile electronic devices that are within the vicinity. For example, a classified add or a party invitation can be wireless distributed (e.g., wireless viral distribution) from one initial mobile electronic device to many other mobile electronic devices just through data transfer between various mobile electronic devices as they become in vicinity of one another. As another example, an online media store might distribute a freely distributable media item (e.g., song), and after download to a mobile electronic device, the media item can be virally distributed to various other mobile electronic devices. Similarly, other types of data, such as news data, widget data, RSS feeds (e.g., podcasts), etc., can be distributed in a viral manner.

[00100] FIG. 12 is a flow diagram of a content retrieval process 1200 according to one embodiment of the invention. The content retrieval process 1200 can, for example, pertain to processing performed on a mobile electronic device (MED). The mobile electronic device performing the content retrieval process 1200 can, for example, pertain to the mobile electronic device 814 illustrated in FIG. 8. In general, the content retrieval process 1200 can be initiated upon request of the user of the mobile electronic device or performed automatically by the mobile electronic device itself (e.g., such as in a background mode).

[00101] The content retrieval process 1200 can begin with a decision 1202 that determines whether another mobile electronic device has been discovered. Here, in the mobile electronic device performing the content retrieval process 1200 can operate to discover other mobile electronic devices within its general vicinity. For example, using wireless technologies, the mobile electronic device performing the content retrieval process 1200 can periodically attempt to locate other mobile electronic devices within its vicinity which it might wirelessly communicate with. When the decision 1202 determines that a mobile electronic device has not been discovered, the content retrieval process 1200 can wait until a mobile electronic device is discovered.

[00102] On the other hand, when the decision 1202 determines that a mobile electronic device has been discovered, a connection can be established 1204 between the mobile electronic device performing the content retrieval process 1200 and the discovered mobile electronic device. Next, a decision 1206 can determine whether the discovered mobile electronic device is trusted. When the decision 1206 determines that the discovered mobile electronic device is not trusted, then the connection between the two devices can be closed 1222 and the content retrieval process 1200 re-started. In this case, since many discovered mobile electronic device are likely not trusted, content is not retrieved from such discovered mobile electronic devices because such content may be unreliable or damaging.

[00103] Alternatively, when the decision 1206 determines that the discovered mobile electronic device is trusted, a list of shareable content can be requested 1208. Here, the mobile electronic device performing the content retrieval process 1200 can request 1208 the list of shareable content from the discovered mobile electronic device. In one embodiment, the discovered mobile electronic device maintains a list or other data structure that identifies content available to be shared with a requesting mobile electronic device. After the list of shareable content has been requested 1208, a decision 1210 can determine whether the list of sharable content has been received. Here, the decision 1210 determines whether the list of shareable content has been received from the discovered mobile electronic device. When the decision 1210

determines that the list of shareable content has not yet been received, then the content retrieval process 1200 awaits receipt of the list of shareable content.

[00104] Once the decision 1210 determines that the requested list of shareable content has been received, the list of shareable content can be processed 1212 to identify desired content. The desired content is content of interest to a user of the mobile electronic device. The user of the mobile electronic device can, for example, express their interest in content (digital assets) through use of category selections, user profile, usage history, user preferences, etc. The desired content can also be updated content that is more current (i.e., fresher) than corresponding content resident on the mobile electronic device.

[00105] After the list of shareable content is processed 1212 to identify desired content, desired content can be requested 1214. Here, the desired content represents some or all of the shareable content that was identified in the list of shareable content. Once the desired content is requested 1214, a decision 1216 can determine whether the desired content has been received. When the decision 1216 determines that the desired content has not yet been received, the content retrieval process 1200 can await receipt of the desired content. Once the decision 1216 determines that the desired content has been received, the desired content can be stored 1218. Thereafter, the content retrieval process 1200 can closes 1220 the connection between the mobile electronic device performing the content retrieval process 1200 and the discovered mobile electronic device. After the connection has been closed 1220, the content retrieval process 1200 can return to repeat the decision 1202 and subsequent blocks so that content retrieval can again be performed between different mobile electronic devices. To the extent that a mobile electronic device receives desired content from various different mobile electronic devices, the mobile electronic device can aggregate the desired data it receives from the various different mobile electronic devices.

[00106] FIGs. 13A and 13B are flow diagrams of a content update process 1300 according to one embodiment of the invention. The content update process 1300 is, for example, performed by a mobile electronic device, such as the mobile electronic device 816 illustrated in FIG. 8. In general, the content update process 1300 can be initiated

upon request of a user of the mobile electronic device or performed automatically by the mobile electronic device itself (e.g., such as in a background mode).

[00107] The content update process 1300 can begin with a decision 1302 that determines whether another mobile electronic device has been discovered. When the decision 1302 determines that another mobile electronic device has not been discovered, the content update process 1300 can wait until a mobile electronic device has been discovered.

[00108] When the decision 1302 determines that another mobile electronic device has been discovered, a connection can be established 1304 between the mobile electronic device performing the content update process 1300 and the discovered mobile electronic device. The discovered mobile electronic device can then be queried 1306 for network availability. Here, the mobile electronic device performing the content update process 1300 can query 1306 the discovered mobile electronic device for information regarding any networks that might be available to the discovered mobile electronic device. In one implementation, the network of interest is a localized wireless network (e.g., 802.11 network). Next, a decision 1308 can determine whether a response to the query has been received. When the decision 1308 determines that a response has not yet been received, the content update process 1300 can await such a response.

[00109] On the other hand, once the decision 1308 determines that a response to the query has been received, a decision 1310 can determine whether network capacity at the discovered mobile electronic device is available for use. In one embodiment, the mobile electronic device performing in the content update process 1300 can operate to determine whether the discovered mobile electronic device has network availability that can be at least partially utilized for the benefit of the mobile electronic device performing the content update process 1300. For example, if the discovered mobile electronic device has access to a global data network (e.g., the Internet), the mobile electronic device performing the content update process 1300 may desire to utilize a least a portion of this available network capacity so long as permitted by the discovered mobile electronic device. The discovered mobile electronic device can, for example, access a

global data network by way of a wireless network (e.g., such as provided at a wireless hotspot). Hence, when the decision 1310 determines that the discovered mobile electronic device has network availability that is permitted to be utilized by the mobile electronic device performing the content update process 1300, then the content update process 1300 can request 1312 content from the available network via the discovered mobile electronic device. In one implementation, the request 1312 for content can be performed on an automatic basis, such as by a background process. In another implementation, and the request for content can be performed at the behest of a user on a manual basis, such as through use of graphical user interface controls.

[00110] After the content has been requested 1312, a decision 1314 can determine whether the requested content has been received. When the decision 1314 determines that the requested content has not yet been received, the content update process 1300 can await receipt of the requested content. Alternatively, when the decision 1314 determines that the requested content has been received, the content update process 1300 can continue. When the content update process 1300 continues, the received content can be processed and/or stored 1316 at the mobile electronic device performing the content update process 1300.

[00111] Next, a decision 1318 can determine whether the content update process 1300 is done. For example, when all of the received content has been processed and/or stored 1316, the mobile electronic device performing the content update process 1300 has been updated. The updating may require a plurality of different requests for content. Hence, when the decision 1318 determines that the content update process 1300 is not done, the content update process 1300 can return to repeat the block 1312 so that an additional request for content can be performed. On the other hand, when the decision 1318 determines that the content update process 1300 is done, the connection between the mobile electronic device performing the content update process 1300 and the discovered mobile electronic device can be closed 1320. Additionally, when the decision 1310 determines that the discovered mobile electronic device does not have any network availability that is permitted to be utilized by the mobile electronic device performing the content update process 1300, then the content update process

1300 can proceed to close 1320 the connection. Following the block 1320, the content update process 1300 can end.

[00112] Additional information on wireless data sharing, exchange, transfer or delivery for portable electronic devices, see U.S. Patent Publication No. 20070161402 and U.S. Patent Publication No. 20070155307, of which both hereby incorporated herein by reference.

[00113] Mobile media devices can also be referred to as portable media devices. Portable media devices can, for example, be portable digital media players (e.g., MP3 players) or other portable multi-function devices (e.g., mobile telephones or Personal Digital Assistants). Portable media devices, such as portable media players or other portable multi-function devices, can also be small and highly portable and have limited processing resources. Often, portable devices are hand-held devices, such as hand-held media players or hand-held multi-function devices, which can be easily held by and within a single hand of a user. Portable devices can also be pocket-sized, miniaturized or wearable.

[00114] FIG. 14 is a block diagram of a mobile multi-function device 1400 according to one embodiment of the invention. The mobile multi-function device 1400 can, for example, include the circuitry of one or more of the mobile electronic devices 102 illustrated in FIG. 1 and/or one or more of the mobile electronic devices 802, 814 or 816 illustrated in FIG. 8. The mobile multi-function device 1400 includes hardware and software components to provide at least two functions, namely, a media playback function and a wireless voice communications function. When providing media playback, the mobile multi-function device 1400 can operate as a media player capable of playing (including displaying) media items. The media items can, for example, pertain to audio items (e.g., audio files or songs), videos (e.g., movies) or images (e.g., photos), as different types of media assets. Media assets can also include any combinations of these different type of media assets with other data. When providing wireless voice communications, the mobile multi-function device 1400 can operate a mobile telephone (e.g., cellular phone).

[00115] The mobile multi-function device 1400 includes a processor 1402 that pertains to a microprocessor or controller for controlling the overall operation of the mobile multi-function device 1400. The mobile multi-function device 1400 stores media data pertaining to media items in a file system 1404 and a cache 1406. In one embodiment, the file system 1404 is implemented by a storage disk or a plurality of disks. In another embodiment, the file system 1404 is implemented by EEPROM or Flash type memory. The file system 1404 typically provides high capacity storage capability for the mobile multi-function device 1400. However, since the access time to the file system 1404 is relatively slow, the mobile multi-function device 1400 can also include a cache 1406. The cache 1406 is, for example, Random-Access Memory (RAM) provided by semiconductor memory. The relative access time to the cache 1406 is substantially shorter than for the file system 1404. However, the cache 1406 does not have the large storage capacity of the file system 1404. Further, the file system 1404, when active, consumes more power than does the cache 1406. The power consumption is often a concern when the mobile multi-function device 1400 is a portable mobile multi-function device that is powered by a battery (not shown). The mobile multi-function device 1400 also includes a RAM 1420 and a Read-Only Memory (ROM) 1422. The ROM 1422 can store programs, utilities or processes to be executed in a non-volatile manner. The ROM 1422 can be implemented by an EEPROM or Flash type memory so as to provide writable non-volatile data storage. The RAM 1420 provides volatile data storage, such as for the cache 1406.

[00116] To support wireless voice communications, the mobile multi-function device 1400 includes a transceiver 1426. The transceiver 1426 supports wireless communication with a wireless network (such as a wireless cellular network). To support certain wireless networks, such as a GSM network, the multi-function device 1400 can also include a SIM card 1428. The SIM card 1428 includes an identifier (e.g., SIM identifier) can be used by the mobile multi-function device 1400 to gain access and utilize the wireless network.

[00117] The mobile multi-function device 1400 also includes a user input device 1408 that allows a user of the mobile multi-function device 1400 to interact with the mobile

multi-function device 1400. For example, the user input device 1408 can take a variety of forms, such as a button, keypad, dial, etc. Still further, the mobile multi-function device 1400 includes a display 1410 (screen display) that can be controlled by the processor 1402 to display information to the user. A data bus 1411 can facilitate data transfer between at least the file system 1404, the cache 1406, the processor 1402, and the CODEC 1412.

[00118] In one embodiment, the mobile multi-function device 1400 serves to store a plurality of media items (e.g., songs) in the file system 1404. When a user desires to have the mobile multi-function device play a particular media item, a list of available media items is displayed on the display 1410. Then, using the user input device 1408, a user can select one of the available media items. The processor 1402, upon receiving a selection of a particular media item, supplies the media data (e.g., audio file) for the particular media item to a coder/decoder (CODEC) 1412. The CODEC 1412 then produces analog output signals for a speaker 1414. The speaker 1414 can be a speaker internal to the mobile multi-function device 1400 or external to the mobile multi-function device 1400. For example, headphones or earphones that connect to the mobile multi-function device 1400 would be considered an external speaker.

[00119] The mobile multi-function device 1400 also includes a bus interface 1416 that couples to a data link 1418. The data link 1418 allows the mobile multi-function device 1400 to couple to a host device (e.g., host computer or power source). The data link 1418 can also provide power to the mobile multi-function device 1400.

[00120] The mobile multi-function device 1400 illustrated in FIG. 14 represents only one embodiment of a mobile device suitable for use with the invention. Other embodiments can be significantly different. For example, other embodiments need not provide a wireless voice communications function.

[00121] The various aspects, embodiments, implementations or features of the invention can be used separately or in any combination.

[00122] The invention is preferably implemented by software, hardware, or a combination of hardware and software. The invention can also be embodied as computer readable code on a computer readable medium. The computer readable

medium is any data storage device that can store data which can thereafter be read by a computer system. Examples of the computer readable medium generally include read-only memory and random-access memory. More specific examples of computer readable medium are tangible and include Flash memory, EEPROM memory, memory card, CD-ROM, DVD, hard drive, magnetic tape, and optical data storage device. The computer readable medium can also be distributed over network-coupled computer systems so that the computer readable code is stored and executed in a distributed fashion.

[00123] The advantages of the invention are numerous. Different aspects, embodiments or implementations may, but need not, yield one or more of the following advantages. One advantage of the invention is that it operates to dynamically receive digital information at a mobile electronic device without user interaction to specifically request such information. The digital information being dynamically (e.g., automatically) received can be determined based on location, usage, configuration or user's interests. Another advantage of the invention is that digital information being received can be determined based on a dynamically determined user profile or behavior profile. Still another advantage of the invention is that digital assets can be provided or made available to targeted users of mobile electronic devices based on a current location of the mobile electronic device, former locations of the mobile electronic device and/or likely future locations of the mobile electronic device. Still another advantage of the invention is that mobile electronic devices can operate to present digital information dynamically without user interaction to specifically request that such information be presented. Yet another advantage of the invention is that it is suitable for use when network connectivity is intermittent. Still another advantage of certain embodiment of the invention is that users of mobile electronic devices can perceive their devices as being persistently connected to a network, even though the devices may only occasionally connected to the network (e.g., the Internet). Another advantage is that digital data can be transmitted between mobile electronic devices (e.g., trusted mobile electronic devices) so as to update content on mobile electronic devices using updated content available from other mobile electronic devices. Yet another advantage of the

invention is that one mobile electronic device can make use of network availability of another mobile electronic device.

[00124] The many features and advantages of the present invention are apparent from the written description. Further, since numerous modifications and changes will readily occur to those skilled in the art, the invention should not be limited to the exact construction and operation as illustrated and described. Hence, all suitable modifications and equivalents may be resorted to as falling within the scope of the invention.

CLAIMS

1. A method for obtaining digital content at a first mobile electronic device, said method comprising:

discovering a second mobile electronic device that is wirelessly accessible to the first mobile electronic device;

determining whether the second mobile electronic device is trusted;

receiving information pertaining to shareable content available from the second electronic device;

determining desired content for the first mobile electronic device from the shareable content available from the second mobile electronic device; and

obtaining the desired content from the second mobile electronic device.

2. A method as recited in claim 1, wherein said method further comprises:

establishing, after said discovering, a wireless connection between the first mobile electronic device and the second mobile electronic device.

3. A method as recited in claim 2, wherein said obtaining comprises:

receiving the desired content at the first mobile electronic device from the second mobile electronic device via the wireless connection.

4. A method as recited in claim 3, wherein said obtaining comprises:

storing the received desired content at the first mobile electronic device.

5. A method as recited in claim 1, wherein said obtaining comprises:

requesting the desired content from the second mobile electronic device;

receiving the desired content at the first mobile electronic device from the second mobile electronic device via the wireless connection; and

storing the received desired content at the first mobile electronic device.

6. A method as recited in any of claims 1-5, wherein the received information pertaining to shareable content available from the second electronic device comprises a list of available shareable content.

7. A method as recited in claim 6, wherein said determining of the desired content comprises:

processing the list of available shareable content to determine the desired content.

8. A method as recited in claim 7, wherein the desired content is content of interest to a user of the first mobile electronic device.

9. A method as recited in claim 7, wherein the desired content is updated content that is more current than corresponding content resident on the first mobile electronic device.

10. A computer readable medium including at least executable computer program code tangibly stored thereon for obtaining digital data at a first mobile electronic device, said computer readable medium comprising:

computer program code for discovering a second mobile electronic device that is wirelessly accessible to the first mobile electronic device;

computer program code for receiving information pertaining to shareable content available from the second electronic device;

computer program code for determining desired content for the first mobile electronic device from the shareable content available from the second mobile electronic device; and

computer program code for obtaining the desired content from the second mobile electronic device.

11. A computer readable medium as recited in claim 10, wherein said computer readable medium comprises:

computer program code for determining whether the second mobile electronic device is trusted.

12. A computer readable medium as recited in claim 11, wherein the second mobile electronic device is deemed trusted if the second mobile electronic device has a cryptographic key that authenticates the second electronic device.

13. A computer readable medium as recited in any of claims 10-12, wherein the desired content is updated content that is more current than corresponding content resident on the first mobile electronic device.

14. A method for providing wireless access to remote content, said method comprising:

(a) discovering a surrogate mobile electronic device in the vicinity of a primary mobile electronic device;

(b) determining whether the surrogate mobile electronic device has network availability with respect to a network;

(c) determining, if said determining (b) determines that the surrogate electronic device has network availability with respect to the network, whether the surrogate

mobile electronic device permits the primary mobile electronic device to utilize at least a portion of its network bandwidth with respect to the network;

(d) requesting, if said determining (c) determines that the surrogate mobile electronic device permits the primary mobile electronic device to utilize at least a portion of its network bandwidth with respect to the network, particular content from the network via the surrogate mobile electronic device; and

(e) receiving the particular content from the network at the primary mobile electronic device via the surrogate mobile electronic device.

15. A method as recited in claim 14, wherein said method comprises:

establishing, after said discovering (a) and prior to said determining (c), a wireless connection between the primary mobile electronic device and the surrogate mobile electronic device,

wherein said determining (c), requesting (d) and receiving (e) are performed using the wireless connection.

16. A method as recited in claim 15, wherein said method comprises:

storing the received particular content at the primary mobile electronic device.

17. A method as recited in claim 15, wherein said method comprises:

subsequently closing the wireless connection.

18. A method as recited in claim 15, wherein the wireless connection is a direct wireless connection between the primary mobile electronic device and the surrogate mobile electronic device.

19. A computer readable medium including at least executable computer program code tangibly stored thereon for providing wireless access to remote content, said computer readable medium comprising:

computer program code for discovering a second mobile electronic device in the vicinity of a first mobile electronic device;

computer program code for determining whether the second mobile electronic device has network availability with respect to a network;

computer program code for determining whether the second mobile electronic device permits the first mobile electronic device to utilize at least a portion of its network bandwidth with respect to the network, if said computer program code for determining determines that the second electronic device has network availability with respect to the network;

computer program code for requesting particular content from the network via the second mobile electronic device, if said computer program code for determining determines that the second mobile electronic device permits the first mobile electronic device to utilize at least a portion of its network bandwidth with respect to the network; and

computer program code for receiving the particular content from the network at the first mobile electronic device via the second mobile electronic device.

20. A computer readable medium as recited in claim 19, wherein said computer readable medium comprises:

computer program code for establishing a wireless connection between the first mobile electronic device and the second mobile electronic device,

wherein the wireless connection is a connection over a peer-to-peer network between the first mobile electronic device and the second mobile electronic device.

21. A method for delivering data to a mobile electronic device, said method comprising:

obtaining a dynamic user profile;

identifying a remotely located data source that is relevant to the dynamic user profile; and

delivering digital data from the identified data source to the mobile electronic device.

22. A method as recited in claim 21, wherein said method comprises:

determining whether the dynamic user profile has changed; and

repeating said identifying, said delivering and said presenting if said determining determines that the dynamic user profile has changed.

23. A method as recited in claim 21, wherein the data source is a data feed.

24. A method as recited in claim 21, wherein the mobile electronic device is a mobile media presentation device.

25. A method as recited in claim 21, wherein said method further comprises:

subsequently presenting, at the mobile electronic device, at least a portion of the digital data delivered to the mobile electronic device.

26. A method as recited in claim 21,

wherein said identifying of a remotely located data source comprises determining one or more data feeds that are relevant to the dynamic user profile, and

wherein said delivering of digital data from the identified data source comprises (i) determining digital data for the one or more data feeds to be downloaded to the mobile electronic device; and (ii) downloading and storing the digital data from the one or more data feeds to the mobile electronic device.

27. A method as recited in claim 26, wherein said presenting at least a portion of the digital data delivered to the mobile electronic device comprises (i) selecting an appropriate one of the one or more data feeds that are stored on the mobile electronic device based on a current device context of the mobile electronic device; and (ii) displaying data associated with the appropriate one of the one or more data feeds.

28. A method as recited in claim 21,

wherein said identifying of a remotely located data source comprises determining one or more data feeds that are relevant to the dynamic user profile, and

wherein said delivering of digital data from the identified data source comprises (i) determining digital data for the one or more data feeds to be downloaded to the mobile electronic device; (ii) deleting previously stored digital data from other data feeds from the mobile electronic device if additional storage space for storage of the digital data from the one or more data feeds to the mobile electronic device is needed; and (iii) downloading the digital data from the one or more data feeds to the mobile electronic device.

29. A method as recited in claim 21, wherein the dynamic user profile automatically updates.

30. A method as recited in claim 21, wherein at least a portion of the dynamic user profile is inferred.

31. A method for delivering data to a mobile media presentation device, said method comprising:

determining a location of the mobile media presentation device;

identifying a data feed associated with the location for the mobile media presentation device; and

downloading structured data from the identified data feed to the mobile media presentation device.

32. A method as recited in claim 31, wherein said method is performed without user interaction with the mobile media presentation device.

33. A method as recited in claim 31, wherein said method further comprises:

subsequently presenting at least a portion of the structured data from the identified data feed stored at the mobile media presentation device.

34. A method as recited in claim 33, wherein said presenting is automatically performed without any user interaction with the mobile media presentation device to request such presenting.

35. A method as recited in claim 31,

wherein said determining of the location of the mobile media presentation device predicts at least one future location for the mobile media presentation device; and

wherein said identifying of the data feed comprising identifying at least one data feed that is associated with the at least one future location.

36. A computer readable medium including at least executable computer program code tangibly stored thereon for delivering data to a mobile electronic device, said computer readable medium comprising:

computer program code for obtaining a dynamic user profile;

computer program code for identifying a remotely located data source that is relevant to the dynamic user profile;

computer program code for delivering digital data from the identified data source to the mobile electronic device so that at least a portion of the data delivered to the mobile electronic device can be subsequently presented at the mobile electronic device.

37. A computer readable medium including at least executable computer program code tangibly stored thereon for delivering data to a mobile media presentation device, said computer readable medium comprising:

computer program code for determining a location of the mobile media presentation device;

computer program code for identifying a data source relevant to the location for the mobile media presentation device; and

computer program code for downloading structured data from the identified data source to the mobile media presentation device.

38. A portable electronic device, comprising:

a network interface configured to access one or more wired or wireless networks;

a memory configured to store data;

a display configured to display data; and

a processor operatively connected to said network interface, said memory and said display, said processor being configured to (i) dynamically update a user profile having a plurality of characteristics, (ii) receive digital data relevant to the one or more

characteristics of the user profile via said network interface, (iii) store the digital data in said memory, and (iv) present at least a portion of the received digital data on the display.

39. A portable electronic device as recited in claim 38, wherein as the user profile dynamically updates, said portable electronic device operates to automatically interact with a remote server to receive digital data relevant to the one or more characteristics of the updated user profile.

40. A portable electronic device as recited in claim 39, wherein the received digital data is associated with a data feed hosted by the remote server, whereby the data feed is relevant to the one or more characteristics of the updated user profile.

41. A portable electronic device as recited in claim 39, wherein the user profile is automatically updated without explicit user interaction with said portable electronic device to alter the user profile.

42. A portable electronic device as recited in claim 38,

wherein the user profile is updated without user interaction with said portable electronic device to alter the user profile, and

wherein once the user profile is updated, said processor operates to receive additional digital data relevant to the one or more characteristics of the updated user profile via said network interface without user interaction with said portable electronic device to request the additional digital data.

43. A portable electronic device as recited in claim 38, wherein at least one of the characteristics of the one or more characteristics of the user profile is a location for said mobile electronic device.

44. A system for performing the methods recited in any of claims 1-9, 14-18 or 20-35.

45. A computer system for executing the computer program code stored in the computer readable medium as recited in any of claims 10-13, 19, 20, 36 or 37.

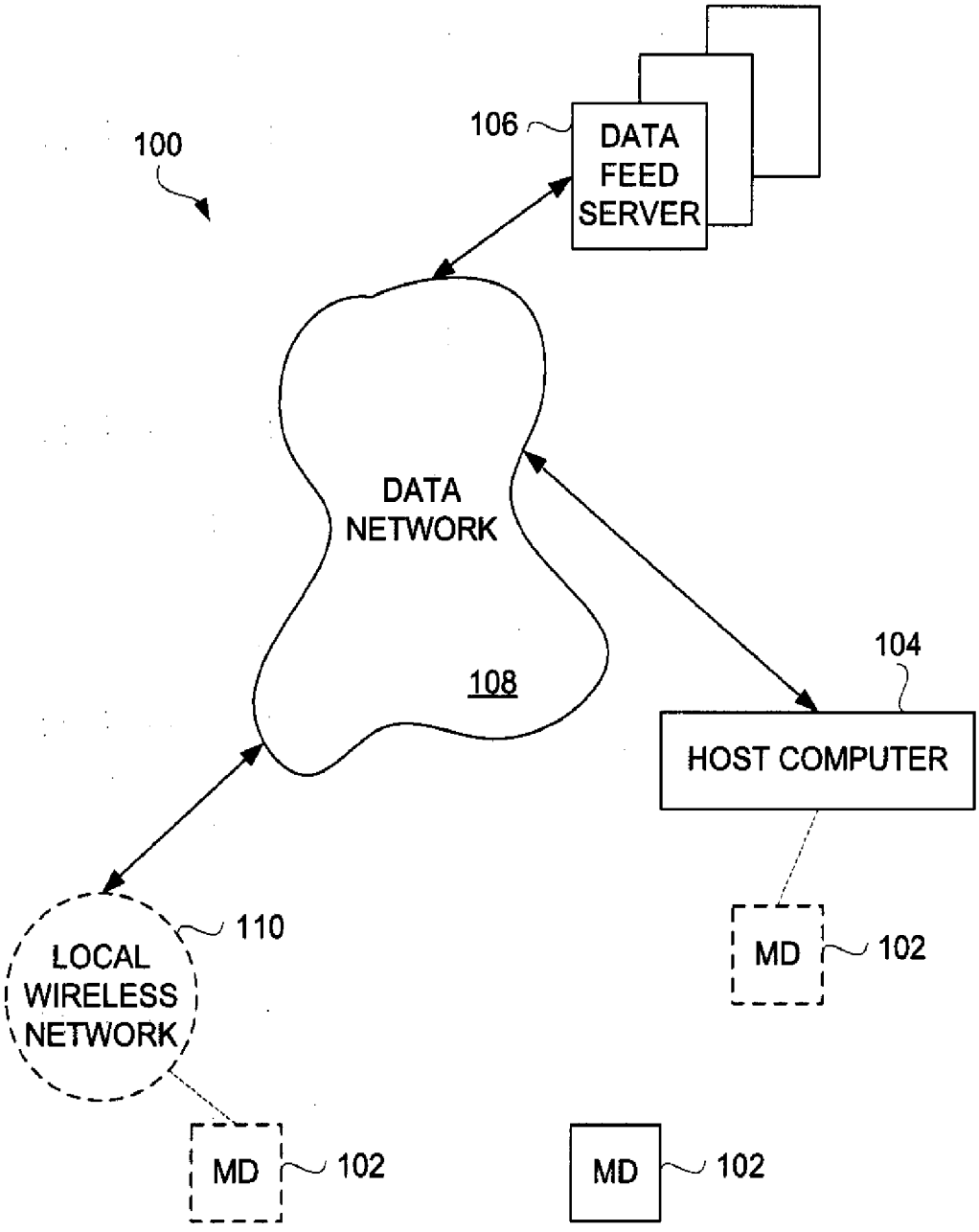
100
106
DATA FEED SERVER
DATA NETWORK
108
104
HOST COMPUTER
110
LOCAL WIRELESS NETWORK
MD
102
MD
102
MD
102

FIG. 1

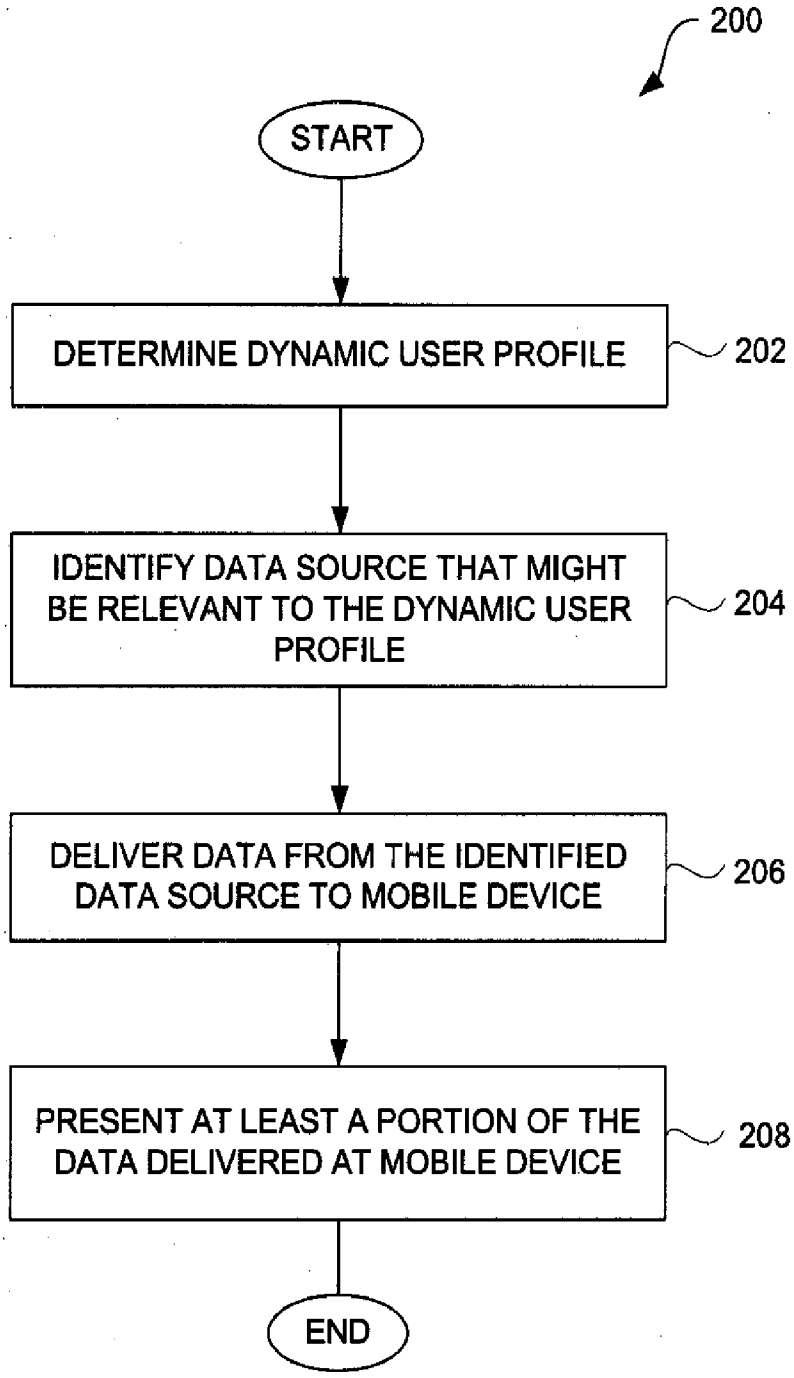
200
START
DETERMINE DYNAMIC USER PROFILE
202
IDENTIFY DATA SOURCE THAT MIGHT BE RELEVANT TO THE DYNAMIC USER PROFILE
204
DELIVER DATA FROM THE IDENTIFIED DATA SOURCE TO MOBILE DEVICE
206
PRESENT AT LEAST A PORTION OF THE DATA DELIVERED AT MOBILE DEVICE
208
END

FIG. 2

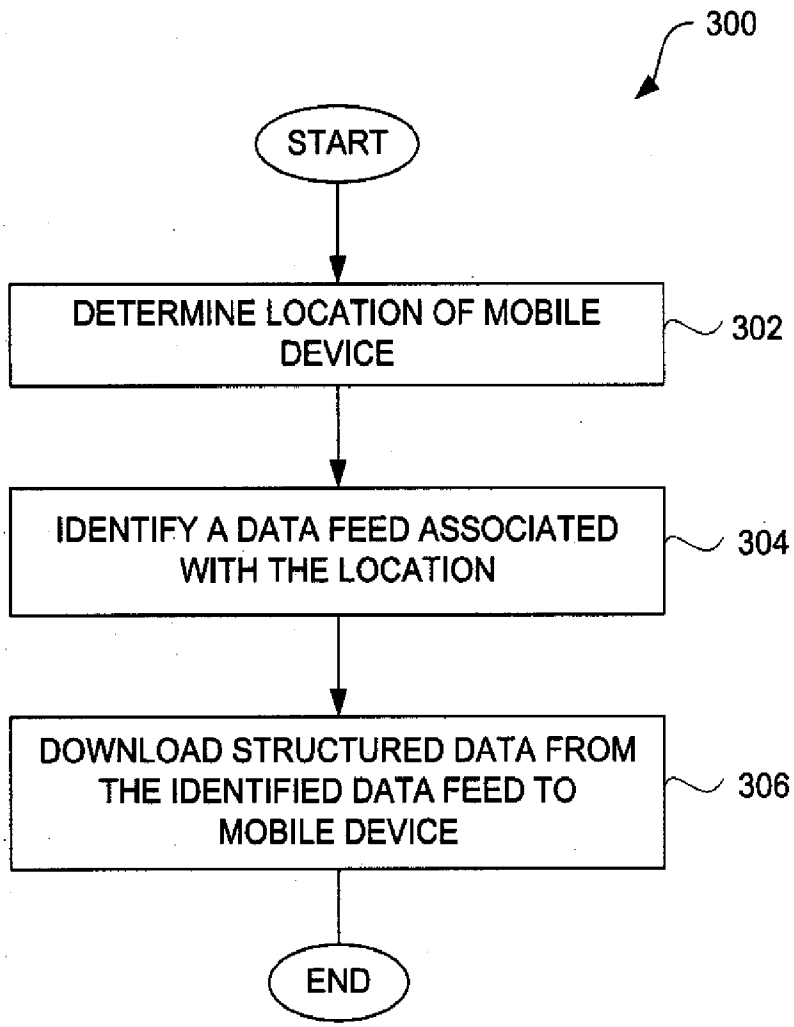
300
START
DETERMINE LOCATION OF MOBILE DEVICE
302
IDENTIFY A DATA FEED ASSOCIATED WITH THE LOCATION
304
DOWNLOAD STRUCTURED DATA FROM THE IDENTIFIED DATA FEED TO MOBILE DEVICE
306
END

FIG. 3

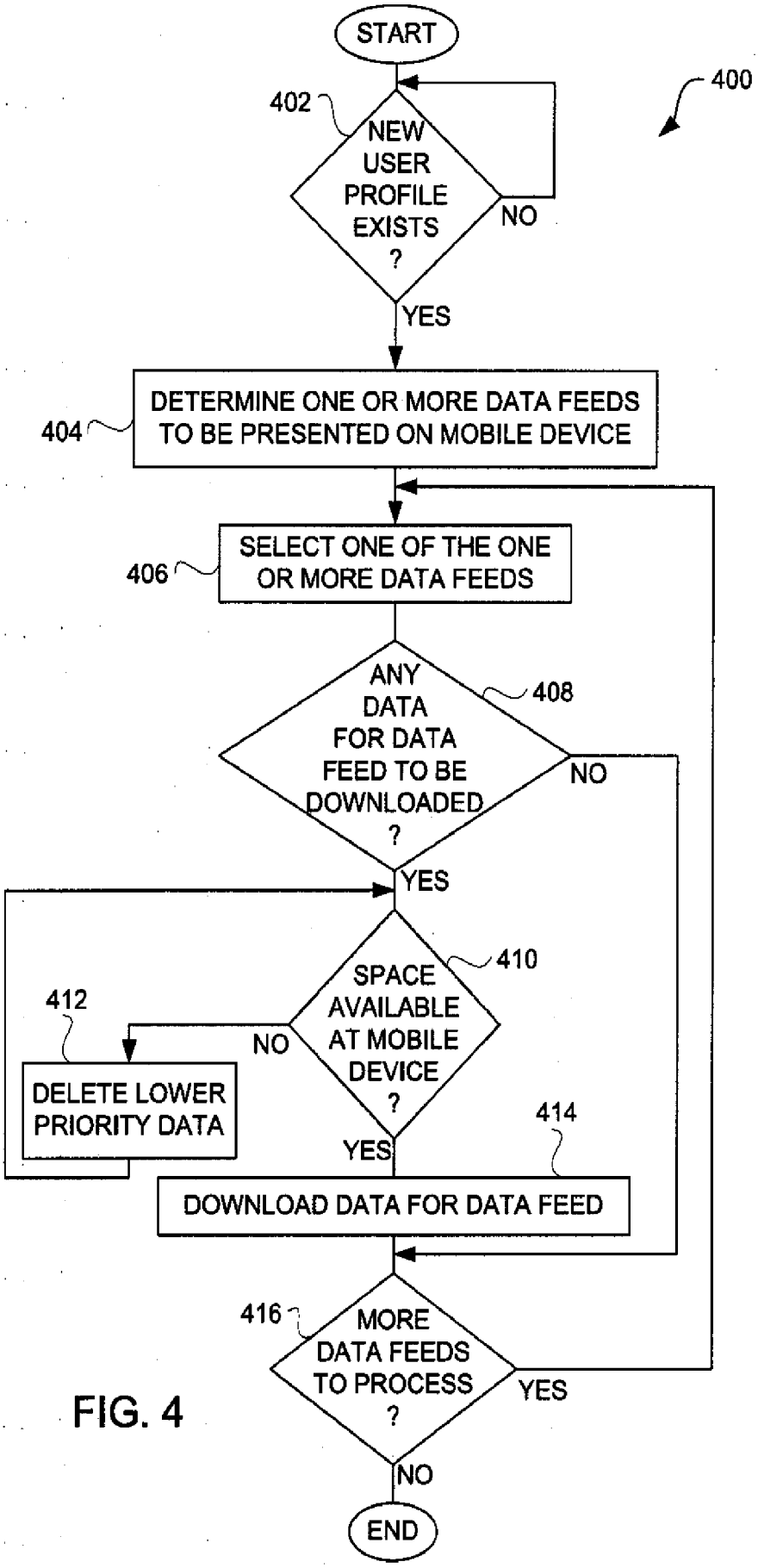
START
400
402
NEW USER PROFILE EXISTS ?
NO
YES
404
DETERMINE ONE OR MORE DATA FEEDS TO BE PRESENTED ON MOBILE DEVICE
406
SELECT ONE OF THE ONE OR MORE DATA FEEDS
ANY DATA FOR DATA FEED TO BE DOWNLOADED ?
408
NO
YES
410
SPACE AVAILABLE AT MOBILE DEVICE ?
412
NO
DELETE LOWER PRIORITY DATA
YES
414
DOWNLOAD DATA FOR DATA FEED
416
MORE DATA FEEDS TO PROCESS ?
YES
NO
END

FIG. 4

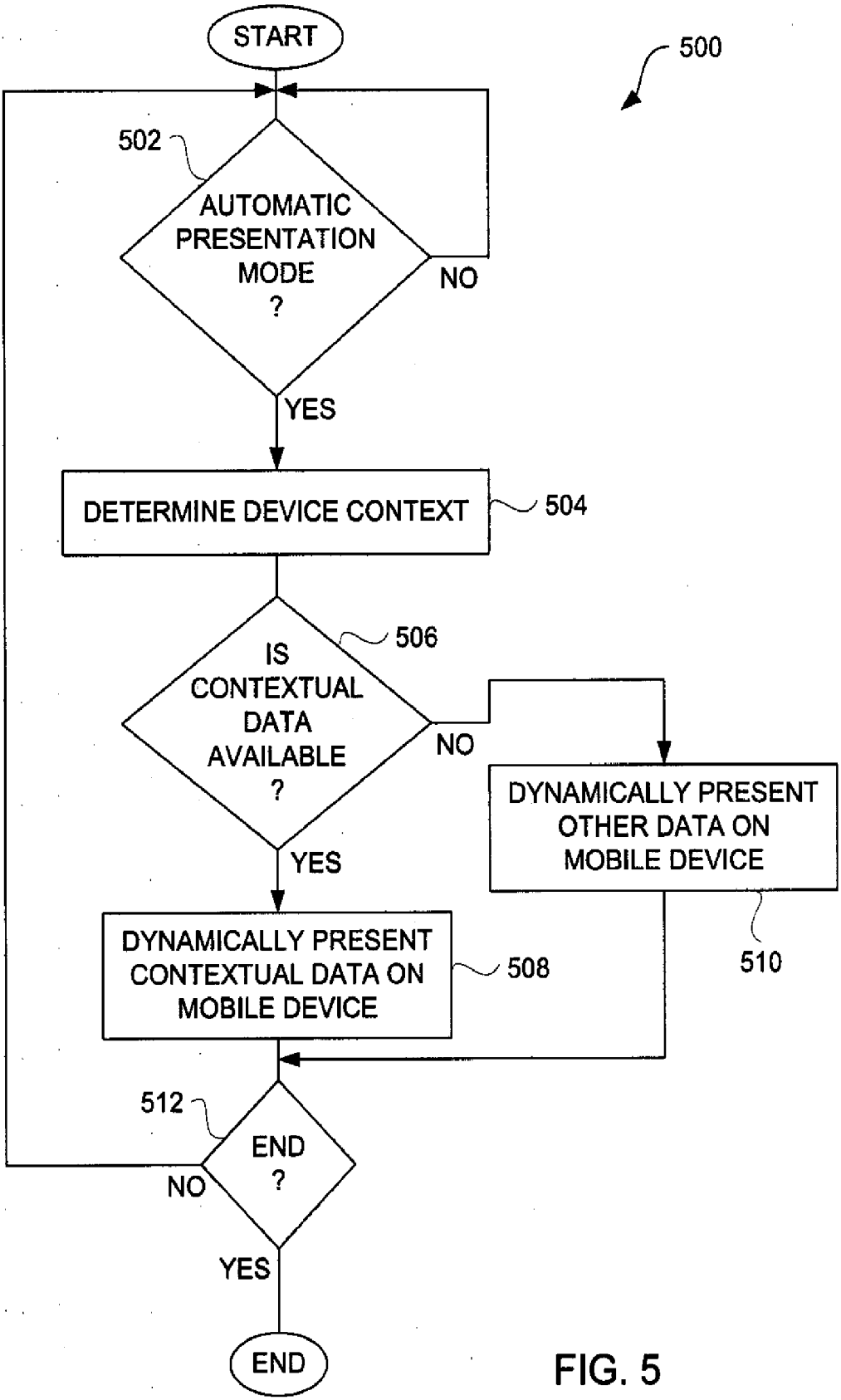
START
500
502
AUTOMATIC PRESENTATION MODE ?
NO
YES
DETERMINE DEVICE CONTEXT
504
506
IS CONTEXTUAL DATA AVAILABLE ?
NO
YES
DYNAMICALLY PRESENT OTHER DATA ON MOBILE DEVICE
510
DYNAMICALLY PRESENT CONTEXTUAL DATA ON MOBILE DEVICE
508
512
END ?
NO
YES
END

FIG. 5

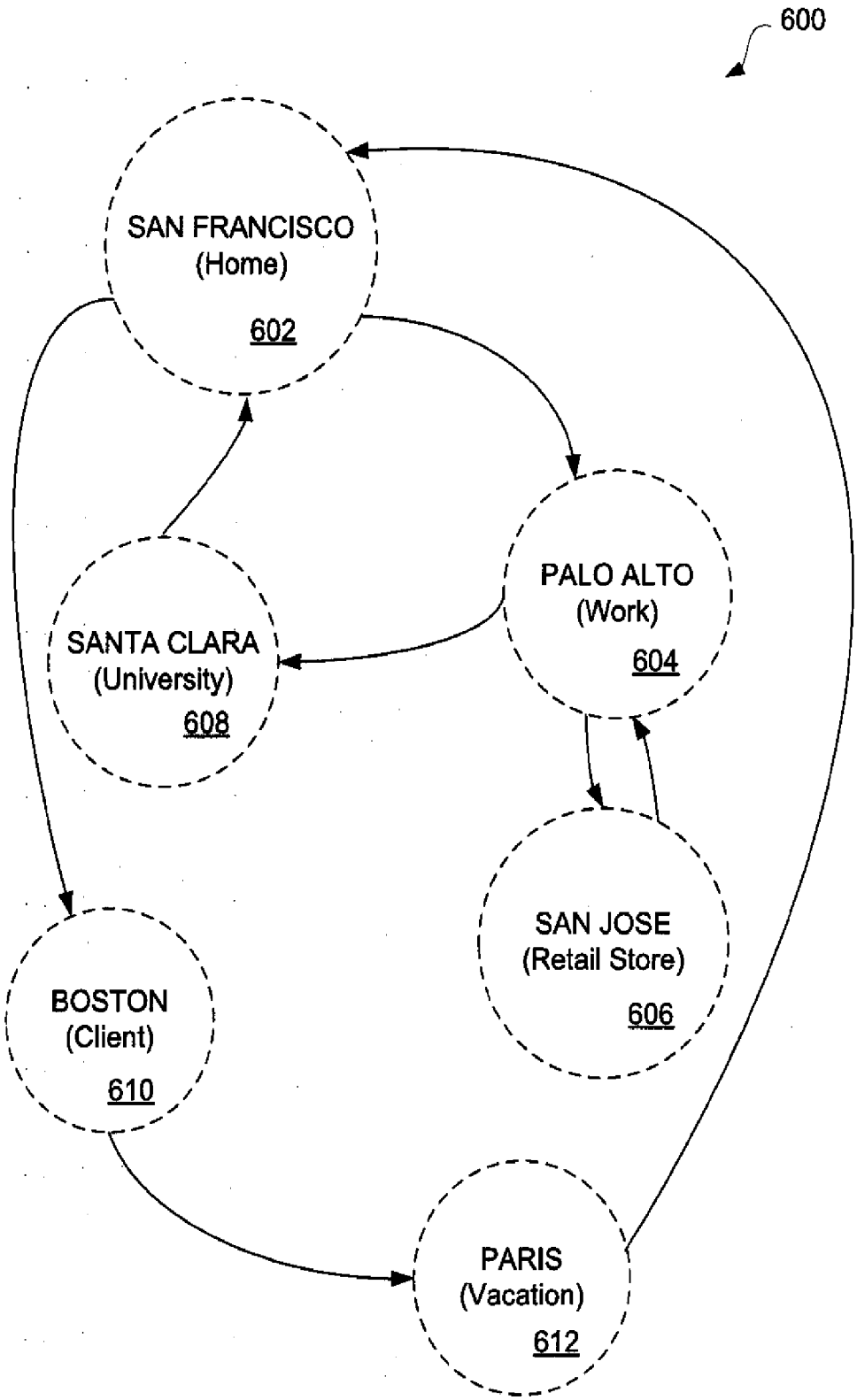
600
SAN FRANCISCO
(Home)
602
PALO ALTO
(Work)
604
SANTA CLARA
(University)
608
SAN JOSE
(Retail Store)
606
BOSTON
(Client)
610
PARIS
(Vacation)
612

FIG. 6

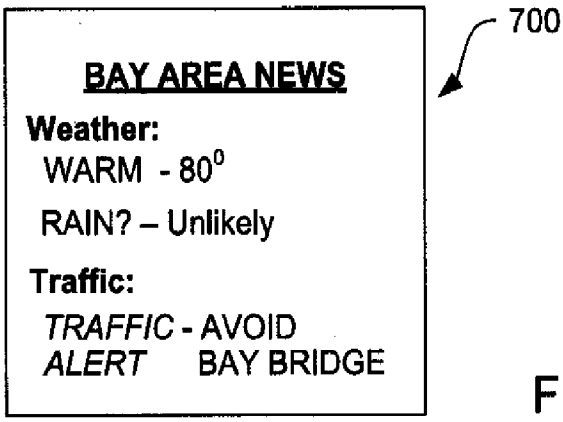

FIG. 7A

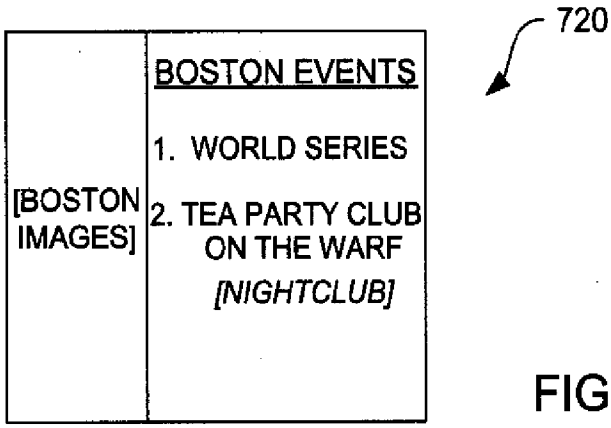

FIG. 7B

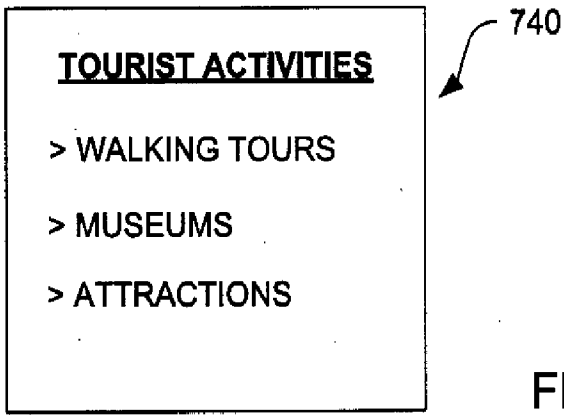

FIG. 7C

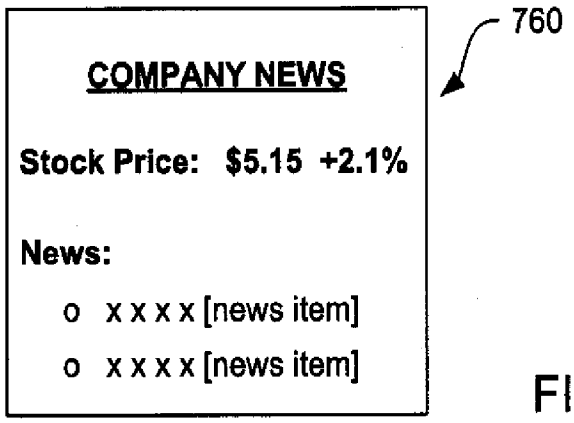
760
COMPANY NEWS
Stock Price: $5.15 +2.1%
News:
o x x x x [news item]
o x x x x [news item]

FIG. 7D

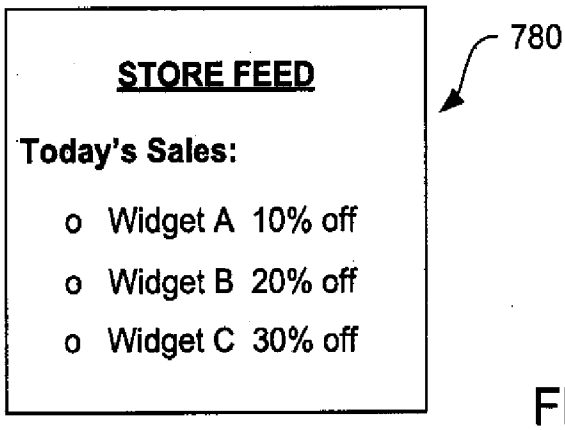
780
STORE FEED
Today's Sales:
o Widget A 10% off
o Widget B 20% off
o Widget C 30% off

FIG. 7E

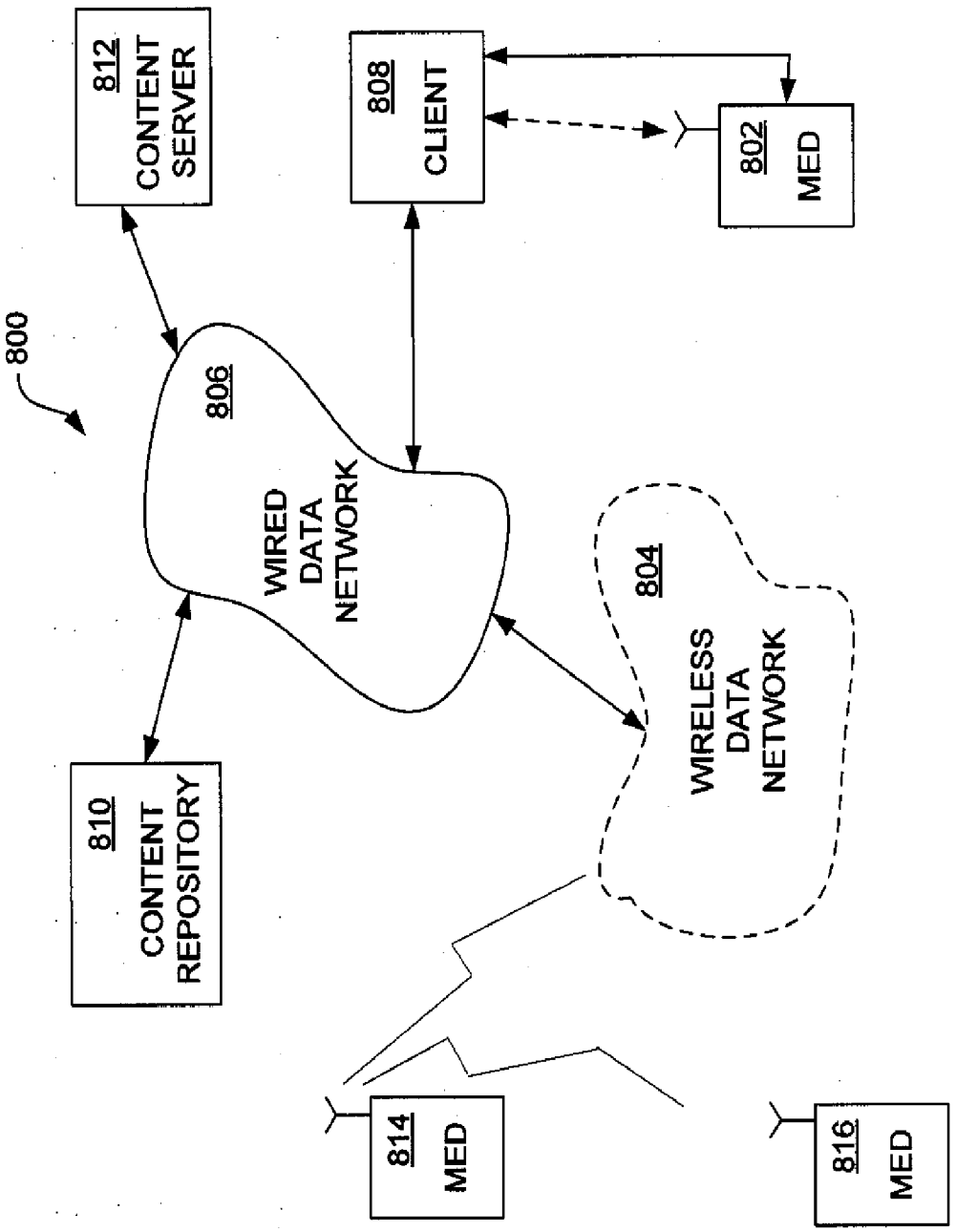
800
812
CONTENT
SERVER
808
CLIENT
802
MED
806
WIRED
DATA
NETWORK
804
WIRELESS
DATA
NETWORK
810
CONTENT
REPOSITORY
814
MED
816
MED

FIG. 8

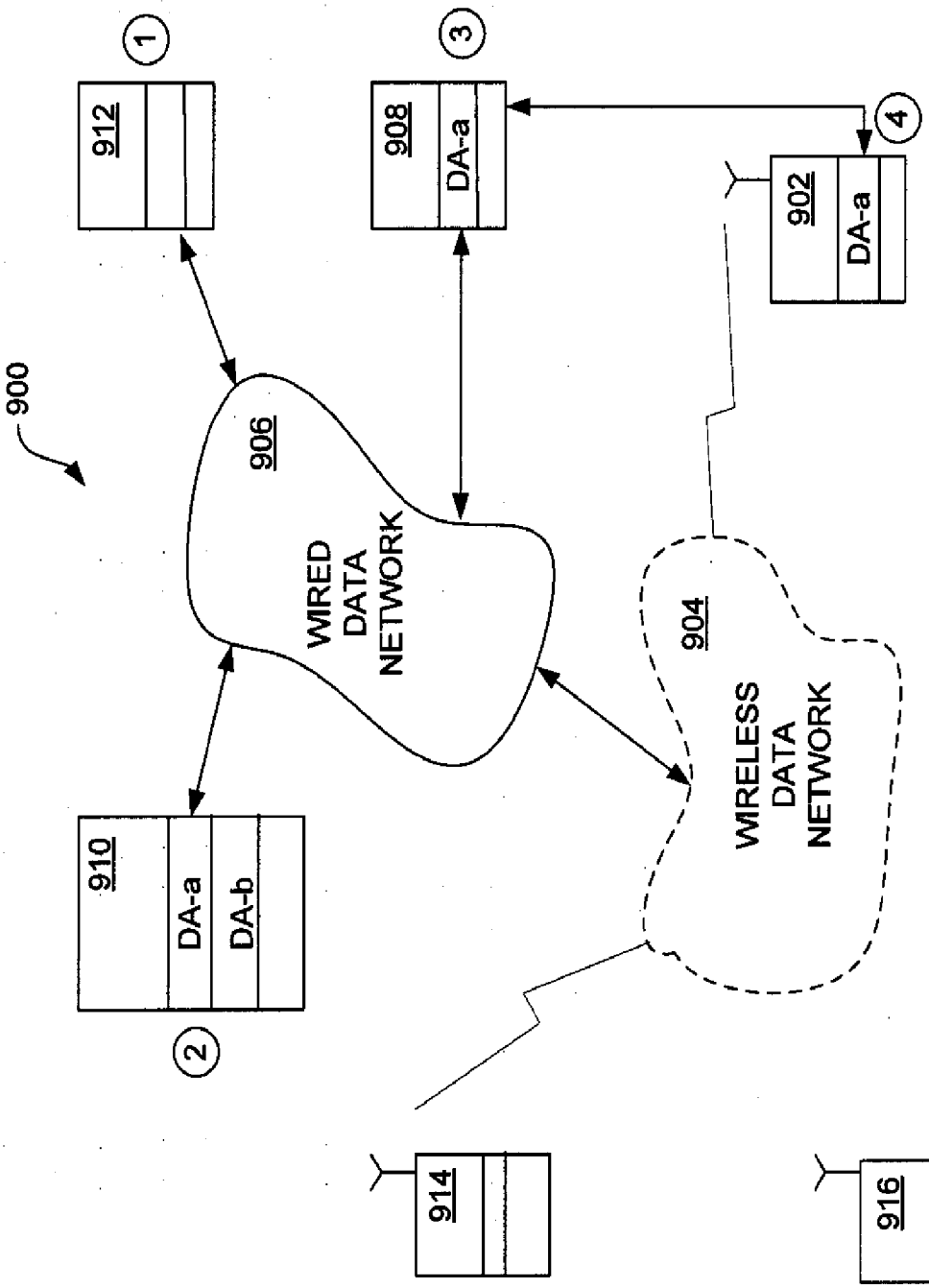
900
906
WIRED DATA NETWORK
904
WIRELESS DATA NETWORK
912
1
908
DA-a
3
902
DA-a
4
910
DA-a
DA-b
2
914
916

FIG. 9A

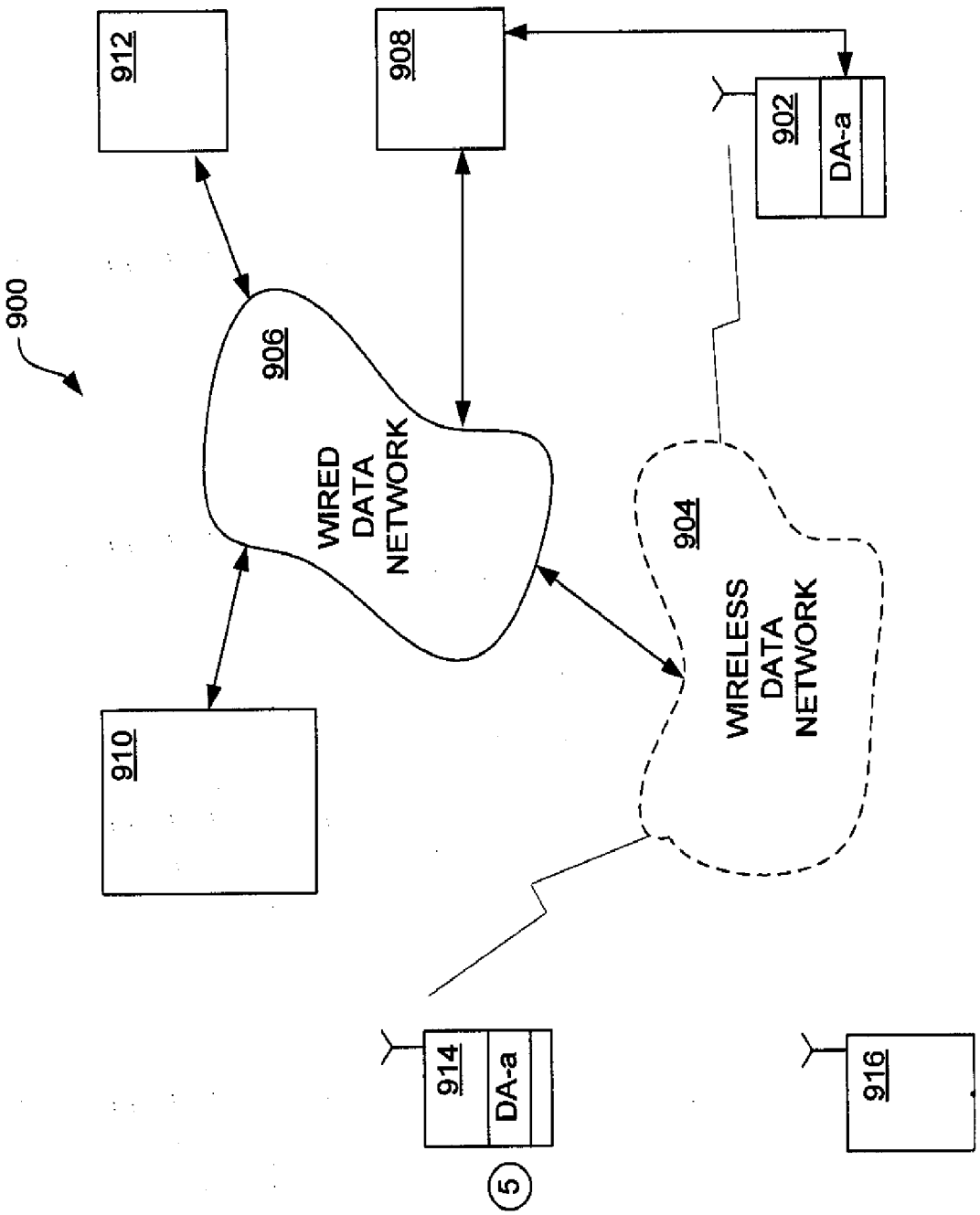
900
912
908
902
DA-a
906
WIRED DATA NETWORK
904
WIRELESS DATA NETWORK
910
914
DA-a
916
5

FIG. 9B

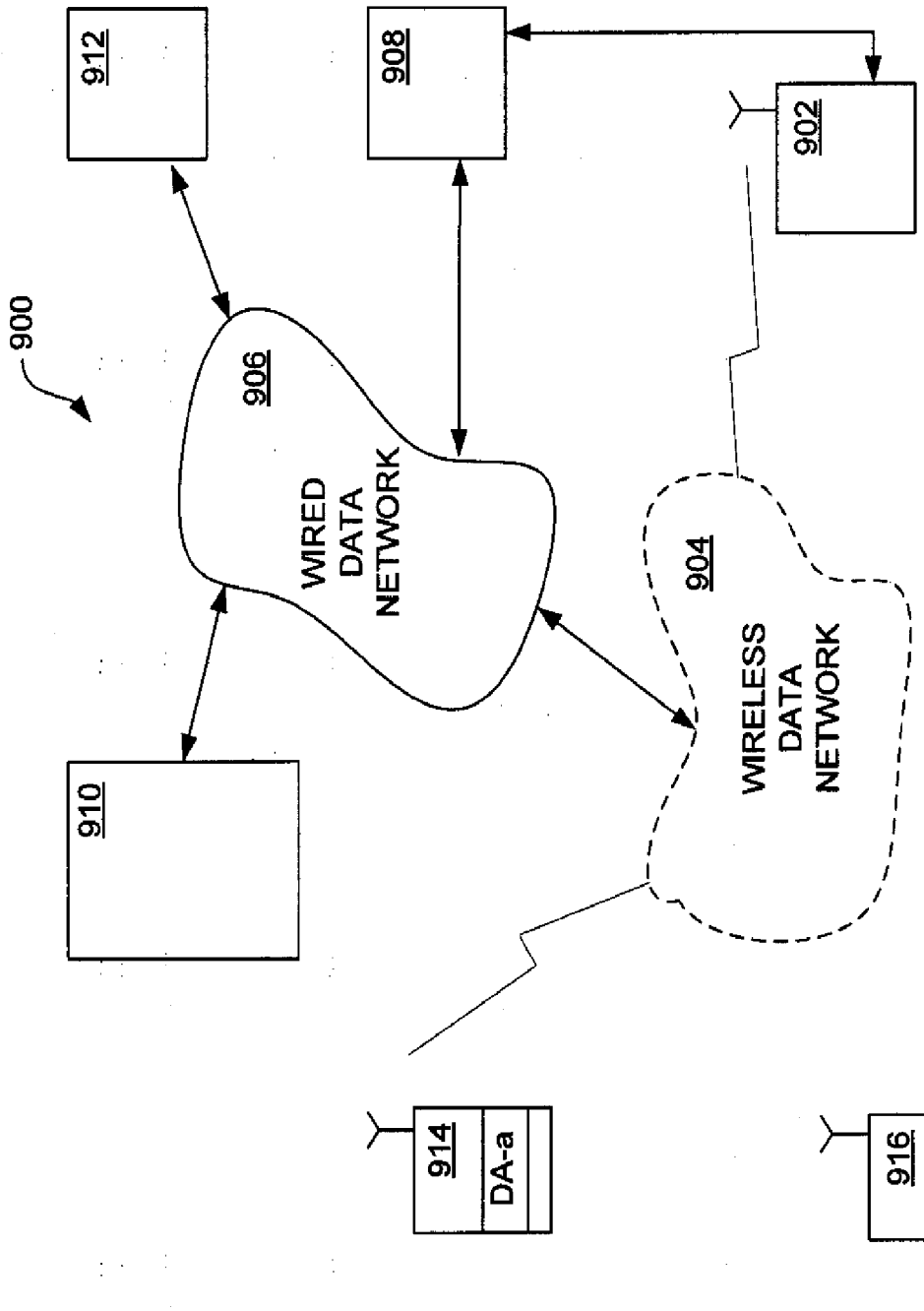
900
912
908
902
906
WIRED DATA NETWORK
904
WIRELESS DATA NETWORK
910
914
DA-a
916
DA-a
6

FIG. 9C

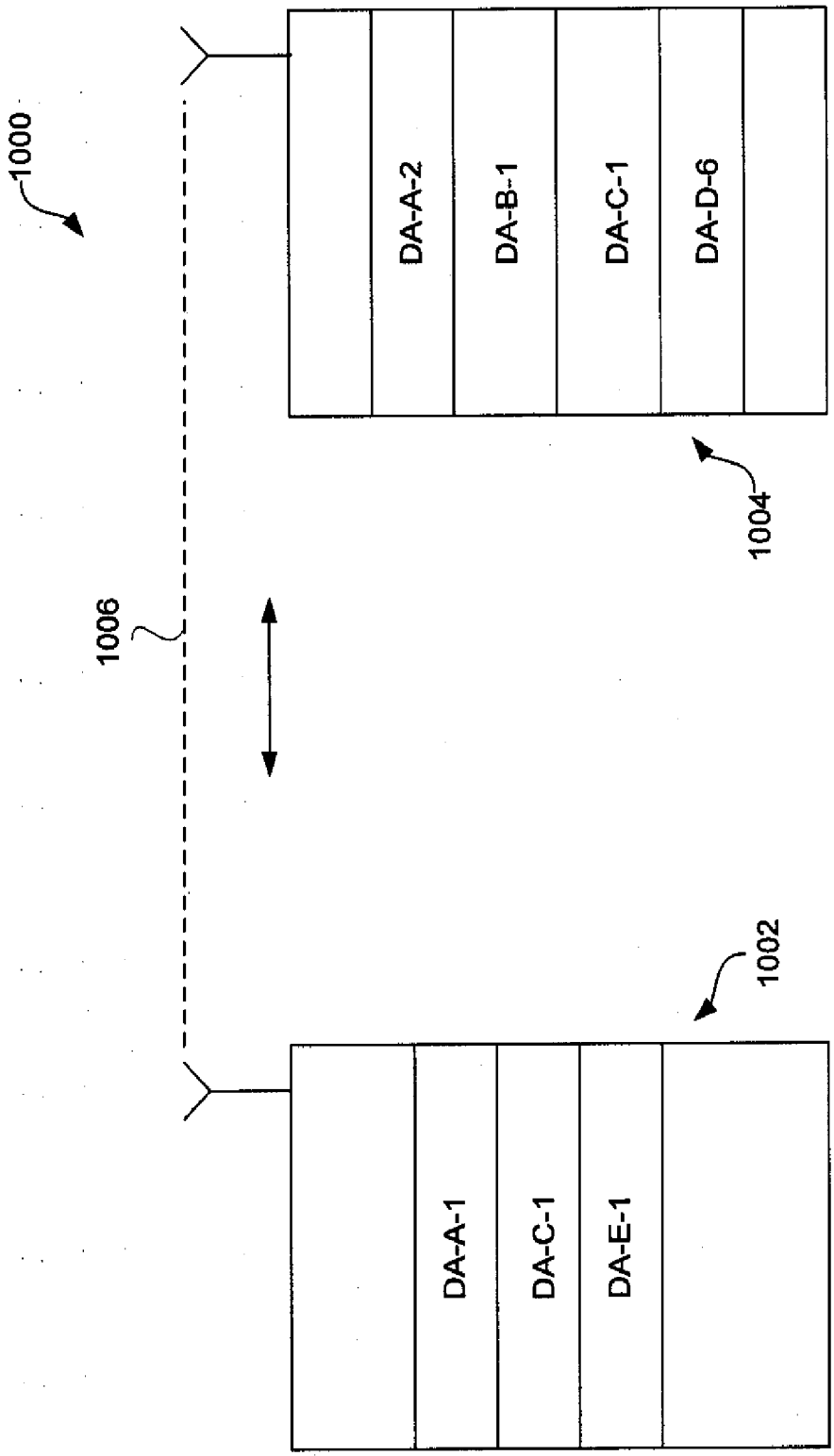

FIG. 10A

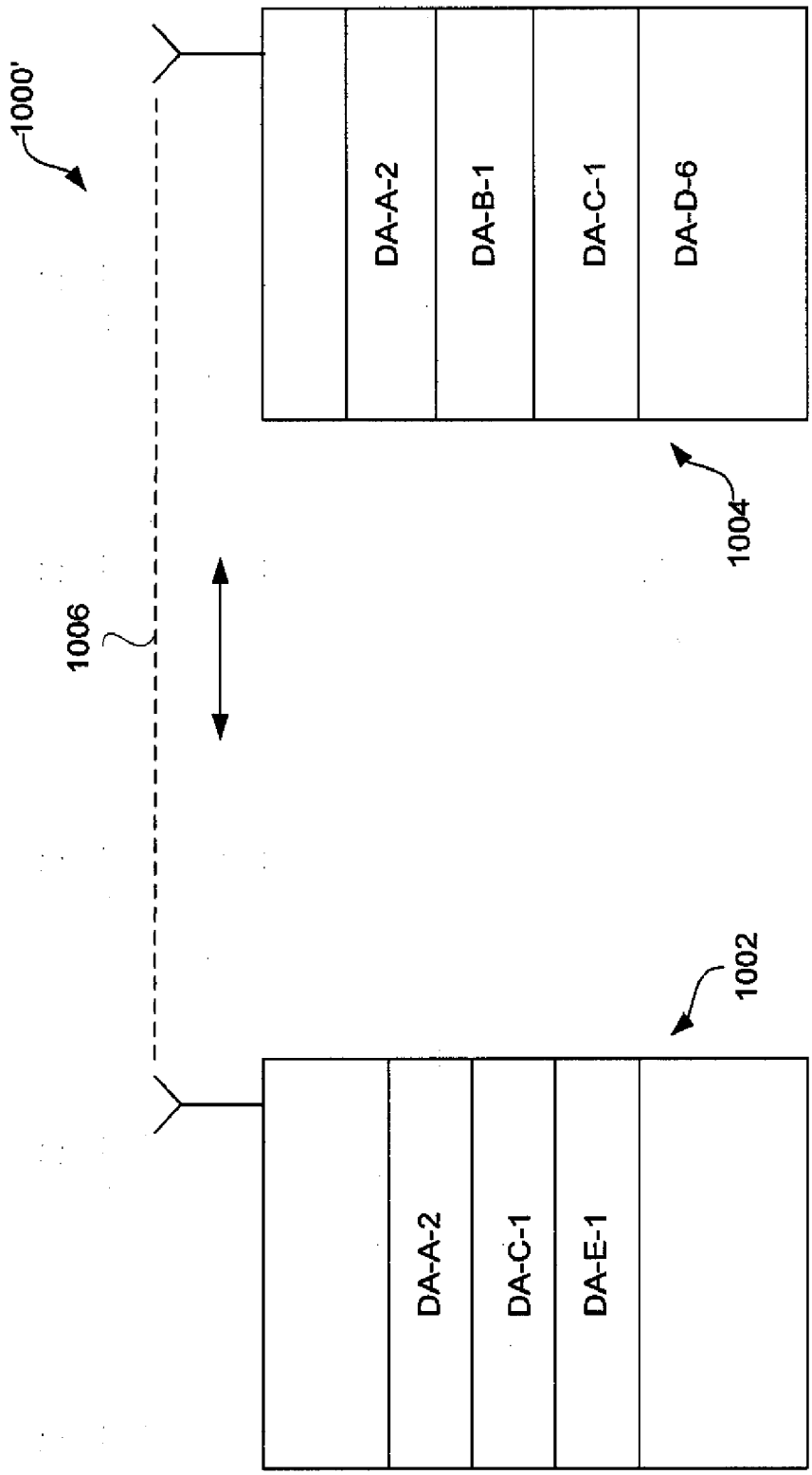

FIG. 10B

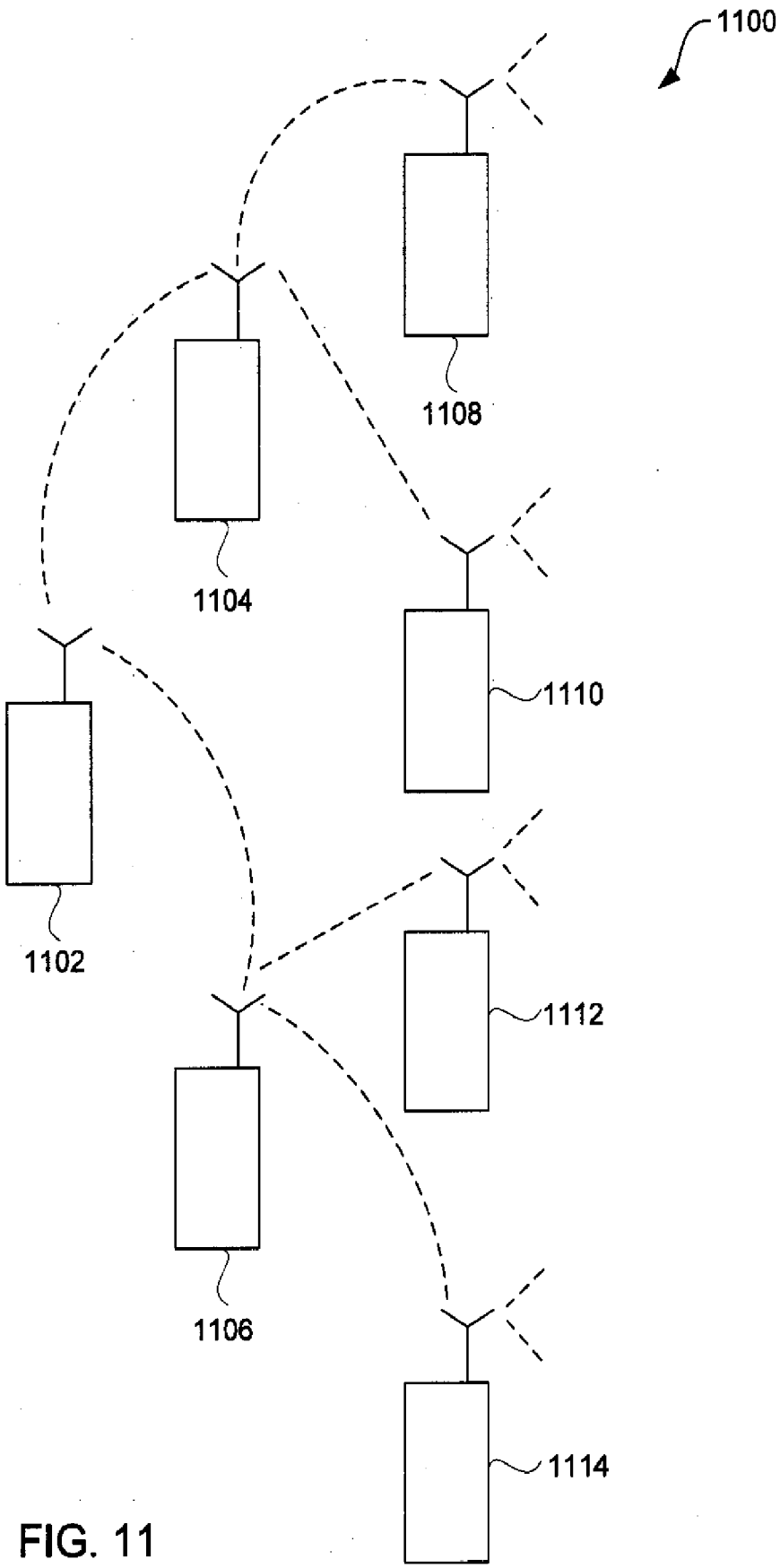

FIG. 11

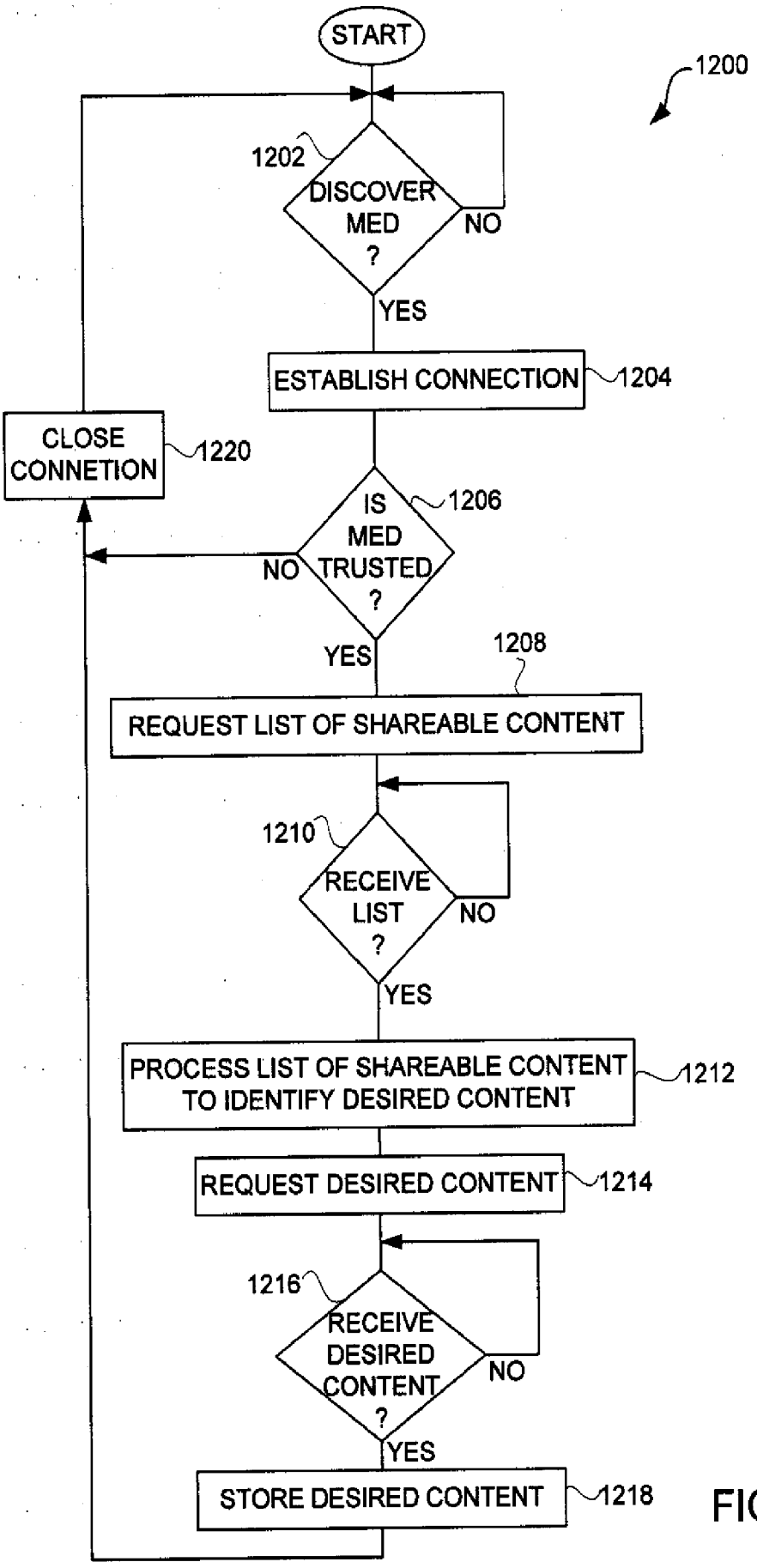
START
1200
1202
DISCOVER MED ?
NO
YES
ESTABLISH CONNECTION
1204
CLOSE CONNETION
1220
IS MED TRUSTED ?
1206
NO
YES
1208
REQUEST LIST OF SHAREABLE CONTENT
1210
RECEIVE LIST ?
NO
YES
PROCESS LIST OF SHAREABLE CONTENT TO IDENTIFY DESIRED CONTENT
1212
REQUEST DESIRED CONTENT
1214
1216
RECEIVE DESIRED CONTENT ?
NO
YES
STORE DESIRED CONTENT
1218

FIG. 12

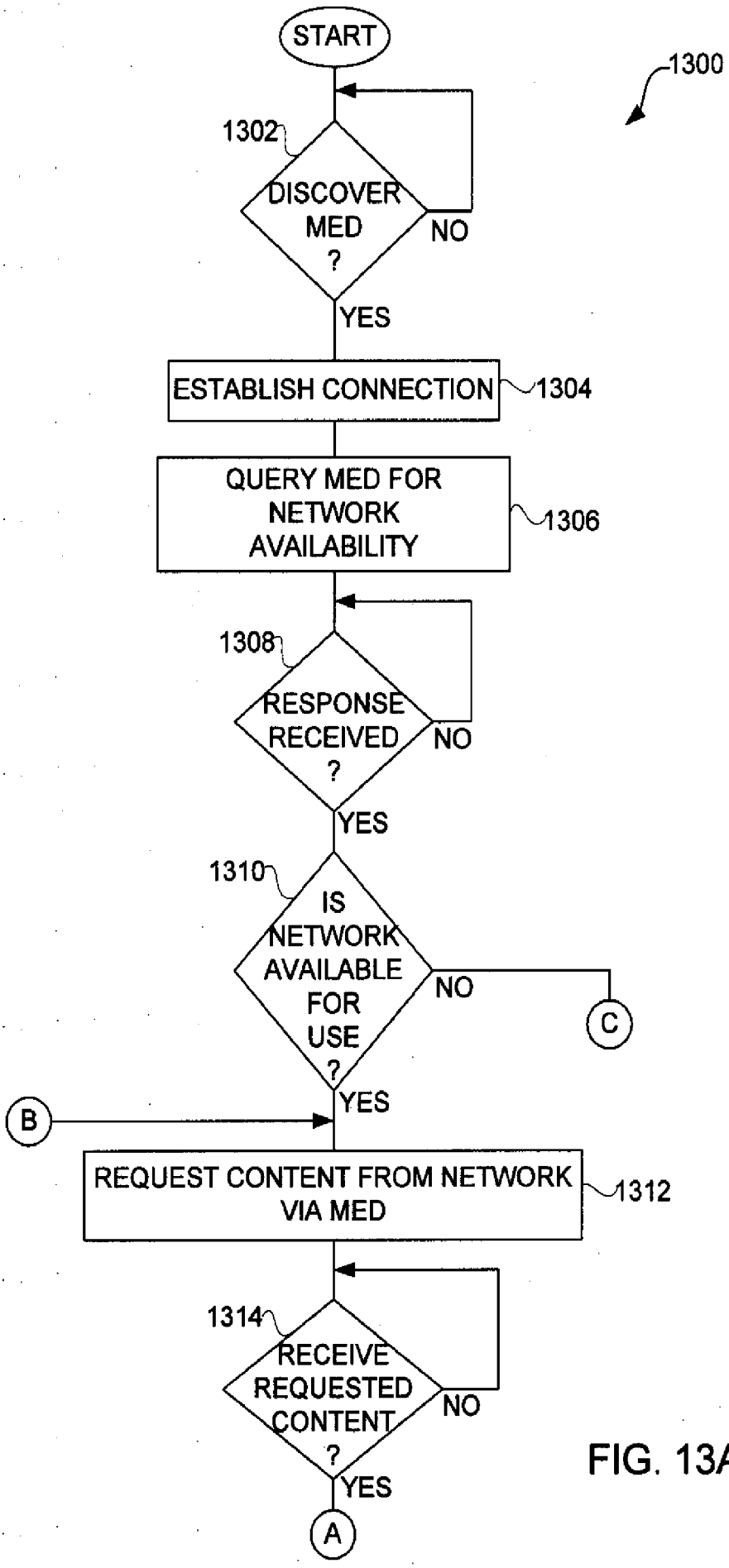
START
1300
1302
DISCOVER MED ?
NO
YES
ESTABLISH CONNECTION
1304
QUERY MED FOR NETWORK AVAILABILITY
1306
1308
RESPONSE RECEIVED ?
NO
YES
1310
IS NETWORK AVAILABLE FOR USE ?
NO
C
YES
B
REQUEST CONTENT FROM NETWORK VIA MED
1312
1314
RECEIVE REQUESTED CONTENT ?
NO
YES
A

FIG. 13A

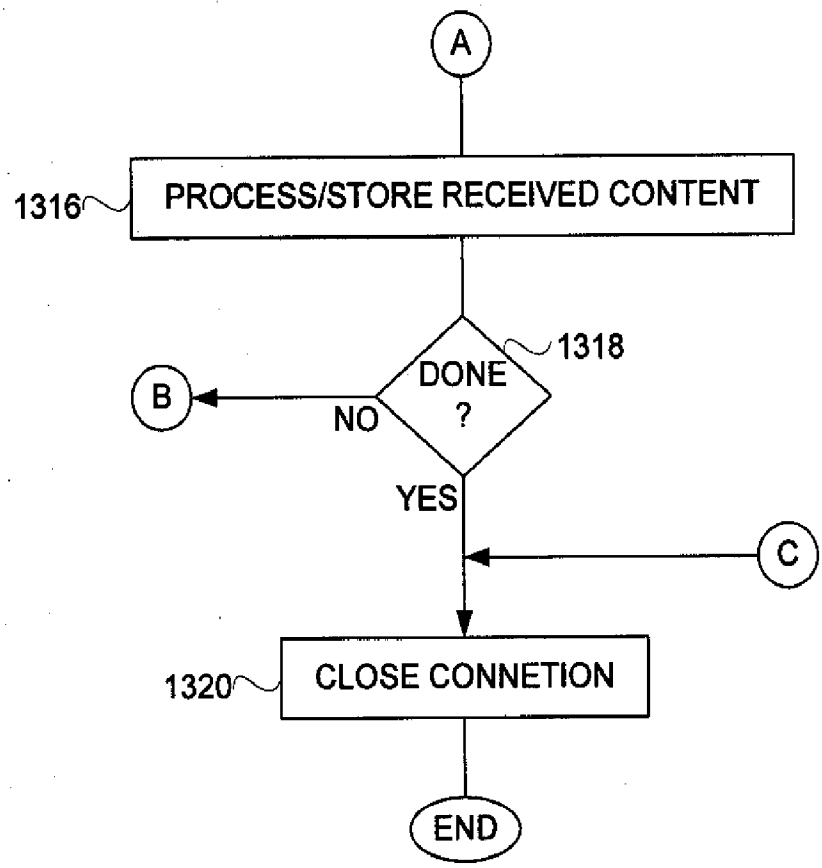
A
1316
PROCESS/STORE RECEIVED CONTENT
1318
DONE
?
B
NO
YES
C
1320
CLOSE CONNETION
END

FIG. 13B

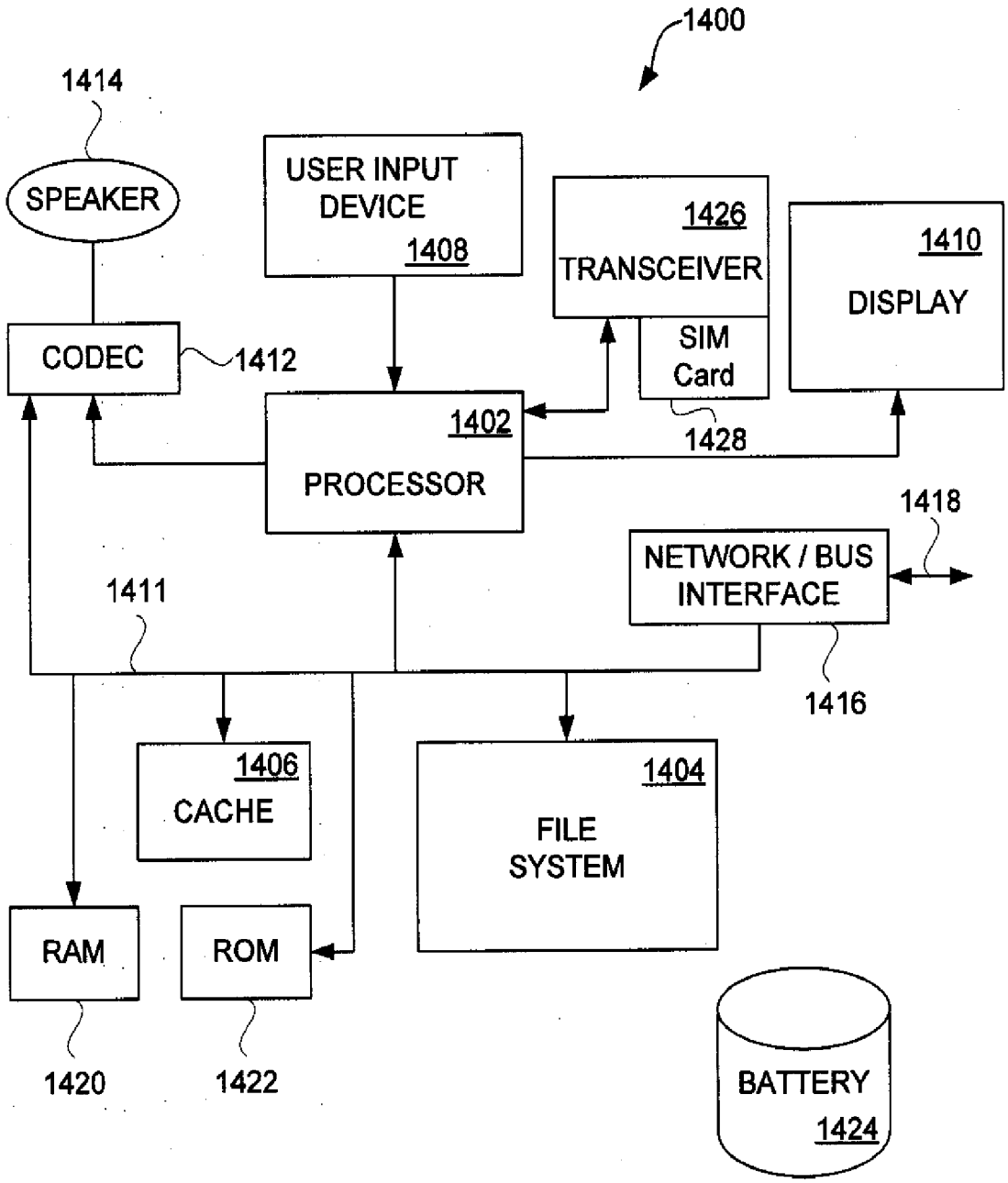
1400
1414
SPEAKER
USER INPUT DEVICE
1408
1426
TRANSCEIVER
SIM Card
1428
1410
DISPLAY
CODEC
1412
1402
PROCESSOR
1418
NETWORK / BUS INTERFACE
1411
1416
1406
CACHE
1404
FILE SYSTEM
RAM
ROM
1420
1422
BATTERY
1424

FIG. 14