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(54) **ACCESS POINT MANAGEMENT AND USAGE IN A NETWORK ENVIRONMENT**

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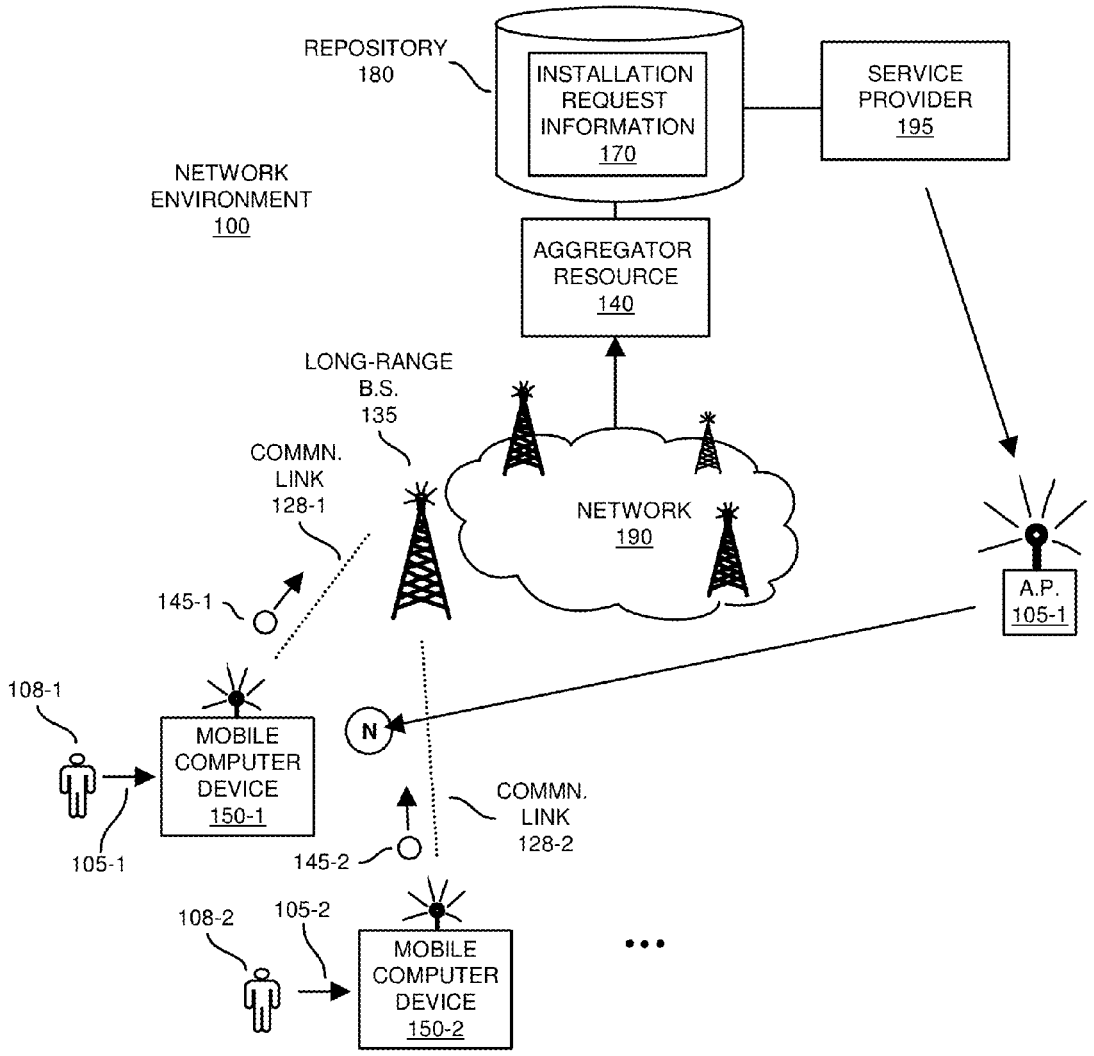
CPC ***H04W 16/20*** (2013.01); ***H04W 8/18*** (2013.01)

(57) **ABSTRACT**

A network management application receives input from a subscriber operating a computer device to add a new wireless access point to a network environment. The input specifies a geographical location in which the subscriber requests installation of the new wireless access point in the network environment. The network management application produces a message to include the geographical location as specified by the input. The message indicates that the subscriber requests installation of the new wireless access point at the geographical location. The network management application initiates transmission of the message from the computer device to an aggregator resource at a remote location. A service provider analyzes installation request information produced by the aggregator resource to determine where to install one or more new wireless access points in the network environment.



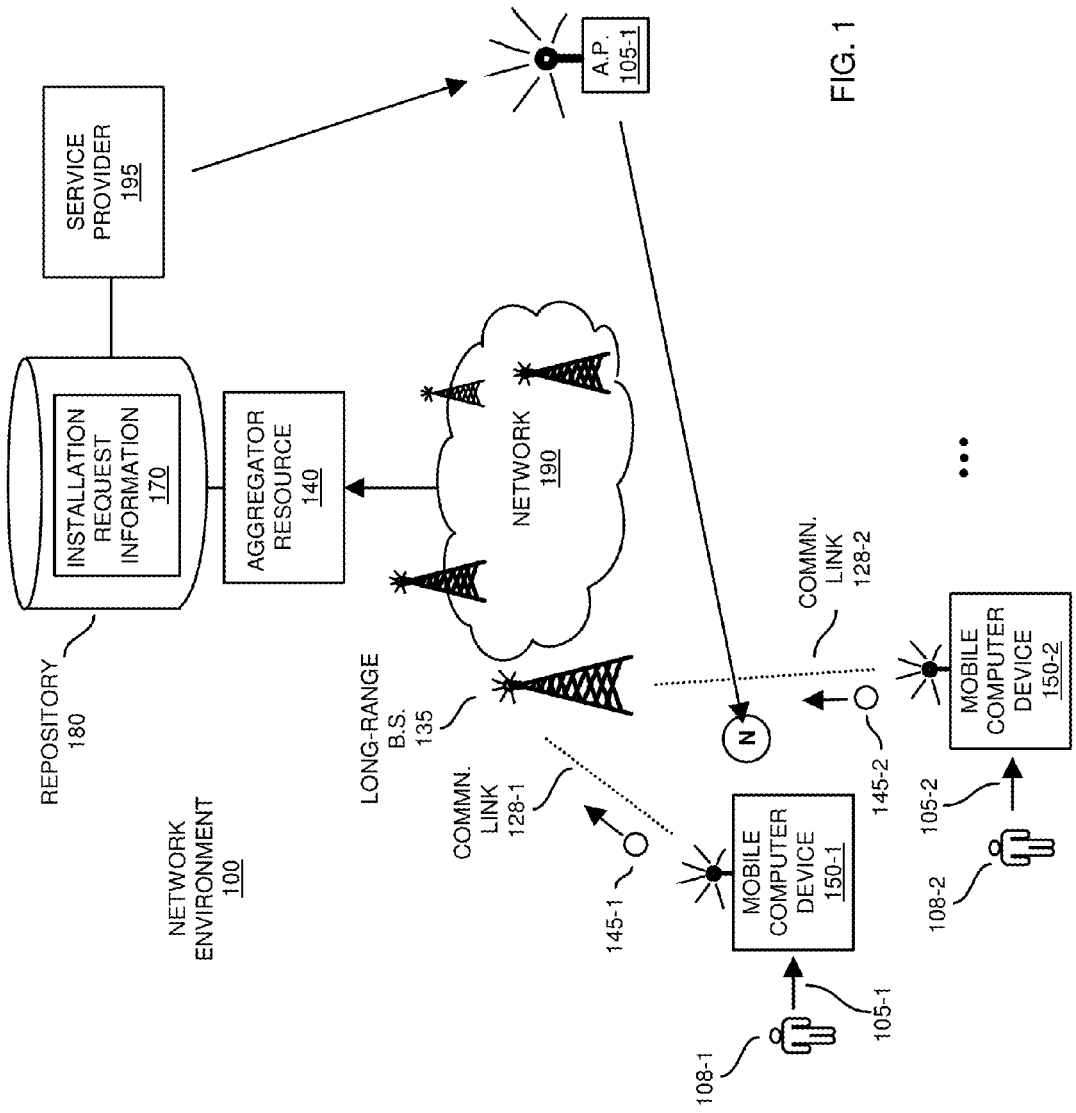

NETWORK ENVIRONMENT 100
REPOSITORY 180
INSTALLATION REQUEST INFORMATION 170
SERVICE PROVIDER 195
AGGREGATOR RESOURCE 140
NETWORK 190
A.P. 105-1
LONG-RANGE B.S. 135
COMMN. LINK 128-1
COMMN. LINK 128-2
145-1
145-2
MOBILE COMPUTER DEVICE 150-1
MOBILE COMPUTER DEVICE 150-2
105-1
105-2
108-1
108-2
N

FIG. 1

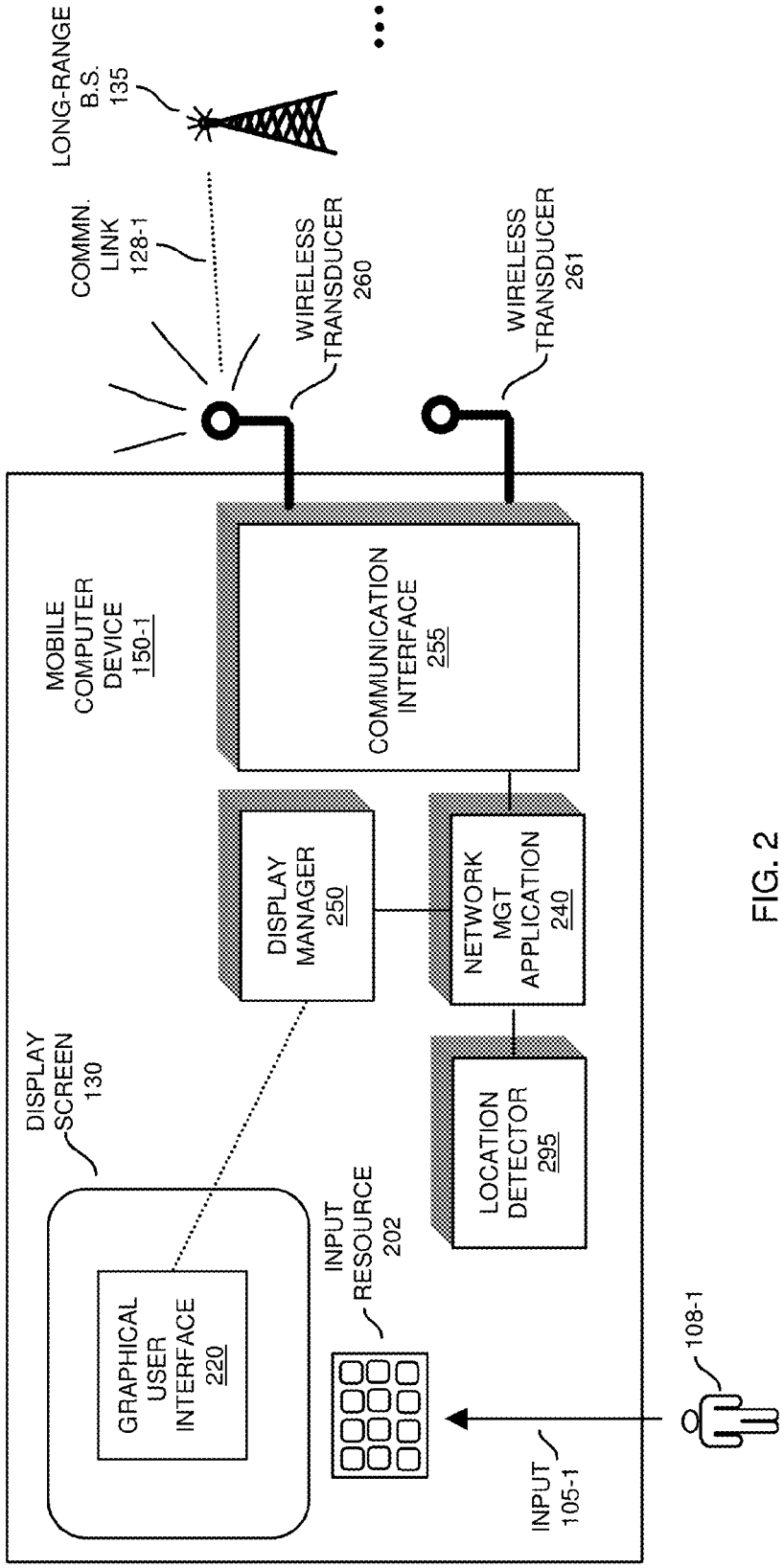

LONG-RANGE B.S. 135
COMMN. LINK 128-1
WIRELESS TRANSDUCER 260
WIRELESS TRANSDUCER 261
MOBILE COMPUTER DEVICE 150-1
COMMUNICATION INTERFACE 255
DISPLAY MANAGER 250
NETWORK MGT APPLICATION 240
LOCATION DETECTOR 295
DISPLAY SCREEN 130
GRAPHICAL USER INTERFACE 220
INPUT RESOURCE 202
INPUT 105-1
108-1

FIG. 2

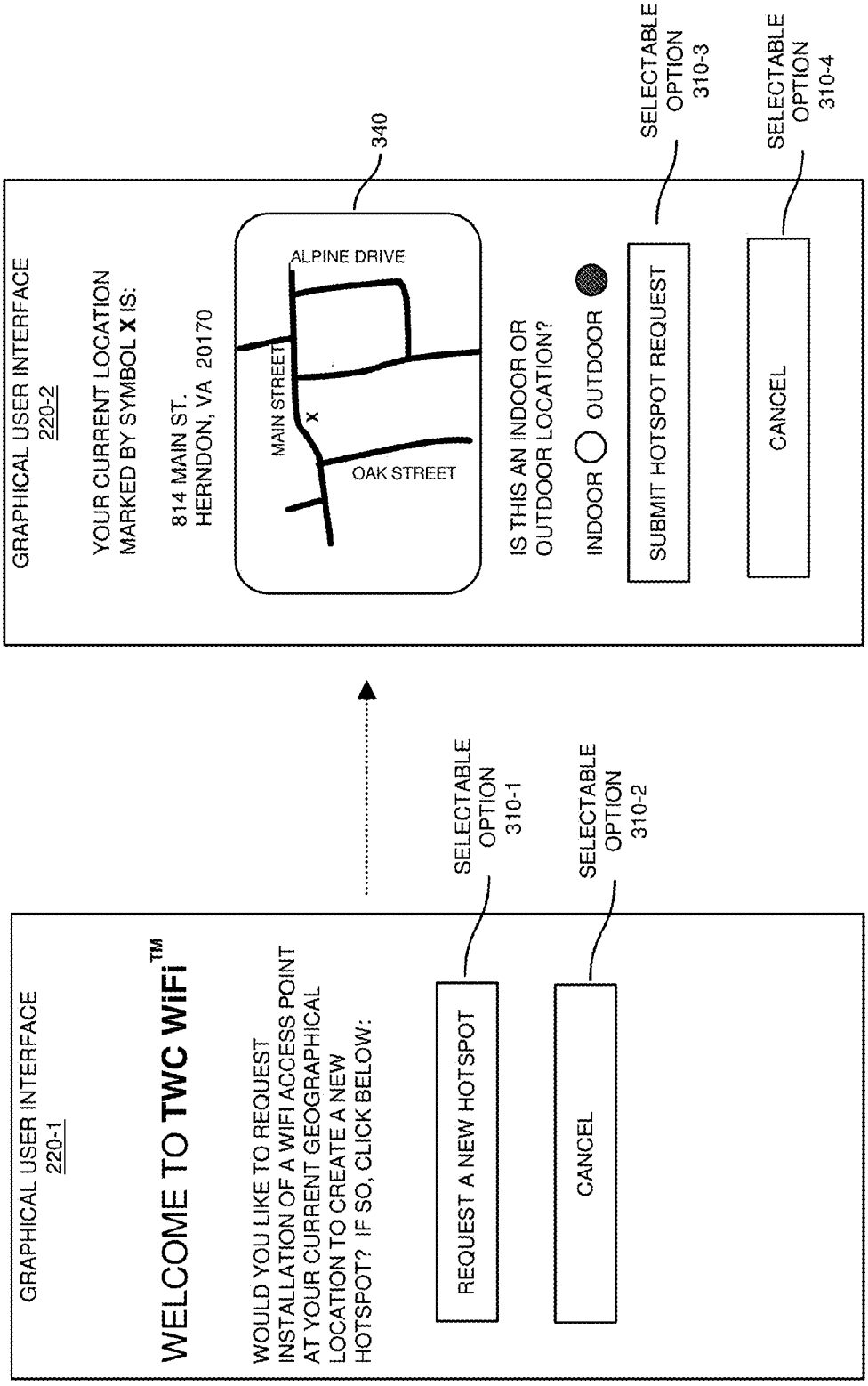

GRAPHICAL USER INTERFACE
220-1
WELCOME TO TWC WiFi™
WOULD YOU LIKE TO REQUEST INSTALLATION OF A WIFI ACCESS POINT AT YOUR CURRENT GEOGRAPHICAL LOCATION TO CREATE A NEW HOTSPOT? IF SO, CLICK BELOW:
REQUEST A NEW HOTSPOT
CANCEL
SELECTABLE OPTION 310-1
SELECTABLE OPTION 310-2
GRAPHICAL USER INTERFACE
220-2
YOUR CURRENT LOCATION MARKED BY SYMBOL X IS:
814 MAIN ST.
HERNDON, VA 20170
ALPINE DRIVE
MAIN STREET
OAK STREET
340
IS THIS AN INDOOR OR OUTDOOR LOCATION?
INDOOR
OUTDOOR
SUBMIT HOTSPOT REQUEST
CANCEL
SELECTABLE OPTION 310-3
SELECTABLE OPTION 310-4

FIG. 3

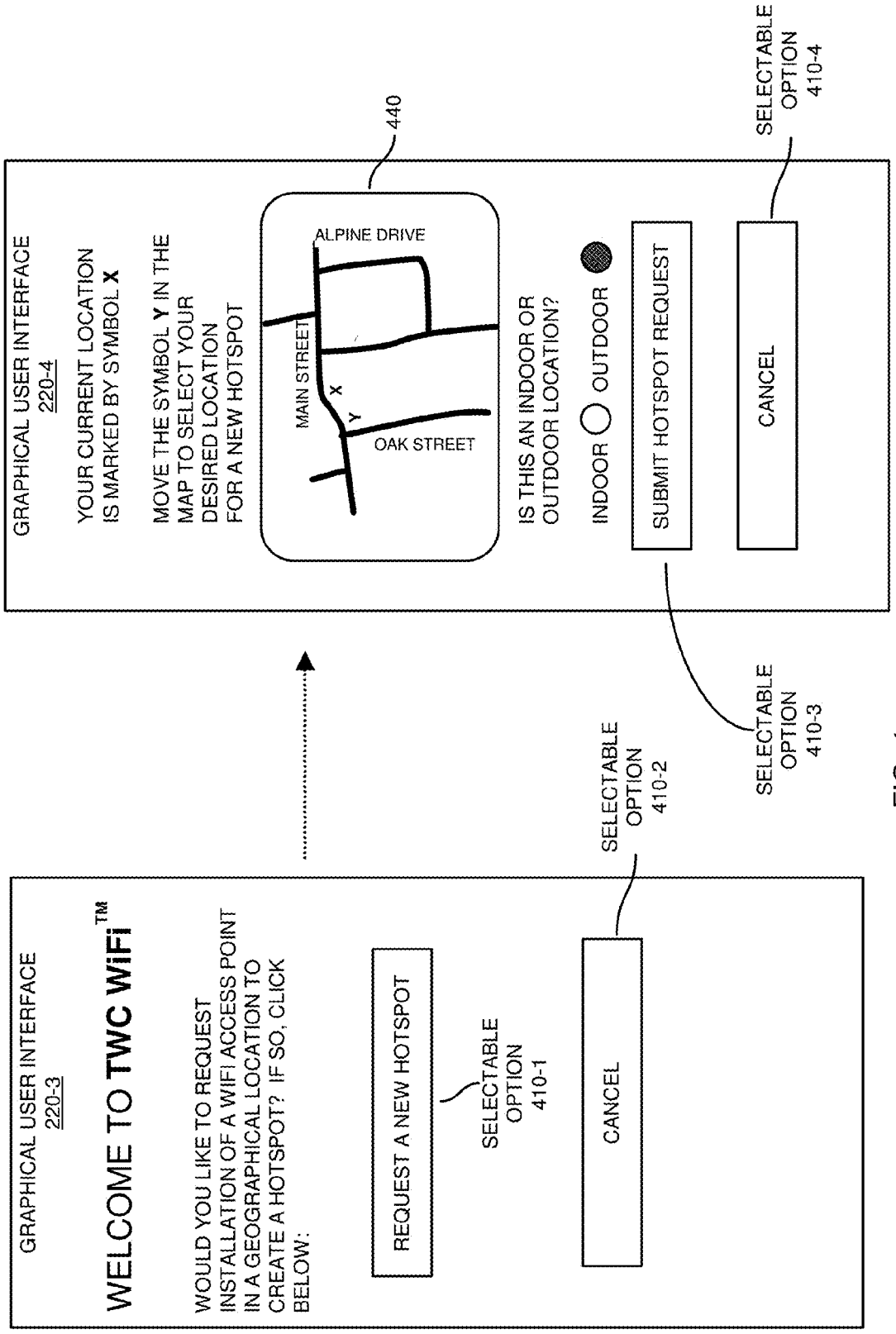

GRAPHICAL USER INTERFACE
220-3
WELCOME TO TWC WiFi™
WOULD YOU LIKE TO REQUEST INSTALLATION OF A WIFI ACCESS POINT IN A GEOGRAPHICAL LOCATION TO CREATE A HOTSPOT? IF SO, CLICK BELOW:
REQUEST A NEW HOTSPOT
SELECTABLE OPTION 410-1
CANCEL
SELECTABLE OPTION 410-2
SELECTABLE OPTION 410-3
GRAPHICAL USER INTERFACE
220-4
YOUR CURRENT LOCATION IS MARKED BY SYMBOL X
MOVE THE SYMBOL Y IN THE MAP TO SELECT YOUR DESIRED LOCATION FOR A NEW HOTSPOT
440
ALPINE DRIVE
MAIN STREET
X
Y
OAK STREET
IS THIS AN INDOOR OR OUTDOOR LOCATION?
INDOOR
OUTDOOR
SUBMIT HOTSPOT REQUEST
CANCEL
SELECTABLE OPTION 410-4

FIG. 4

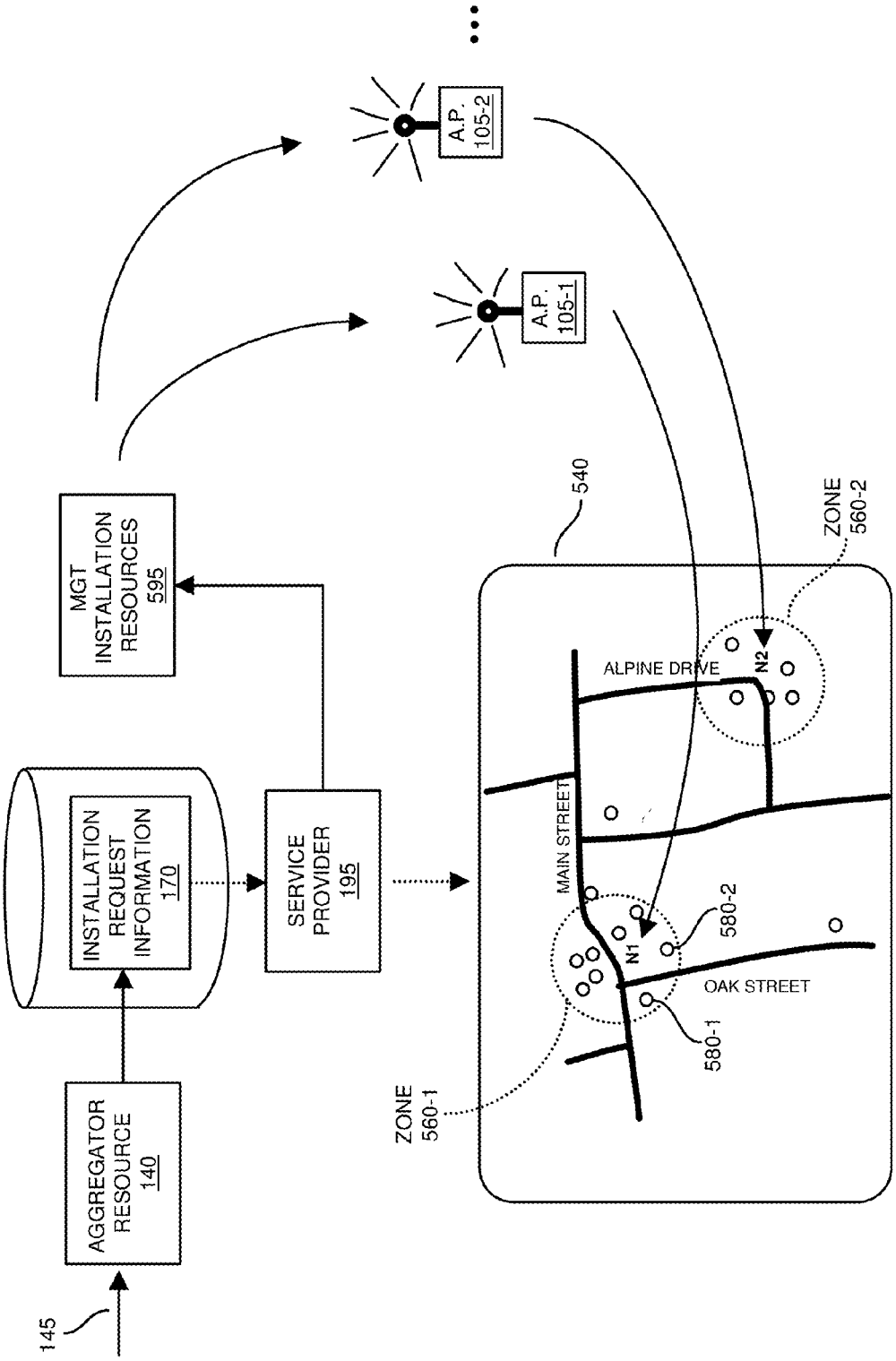

A.P. 105-2
A.P. 105-1
MGT INSTALLATION RESOURCES 595
INSTALLATION REQUEST INFORMATION 170
SERVICE PROVIDER 195
AGGREGATOR RESOURCE 140
145
540
ZONE 560-2
ZONE 560-1
ALPINE DRIVE
MAIN STREET
OAK STREET
N1
N2
580-1
580-2

FIG. 5

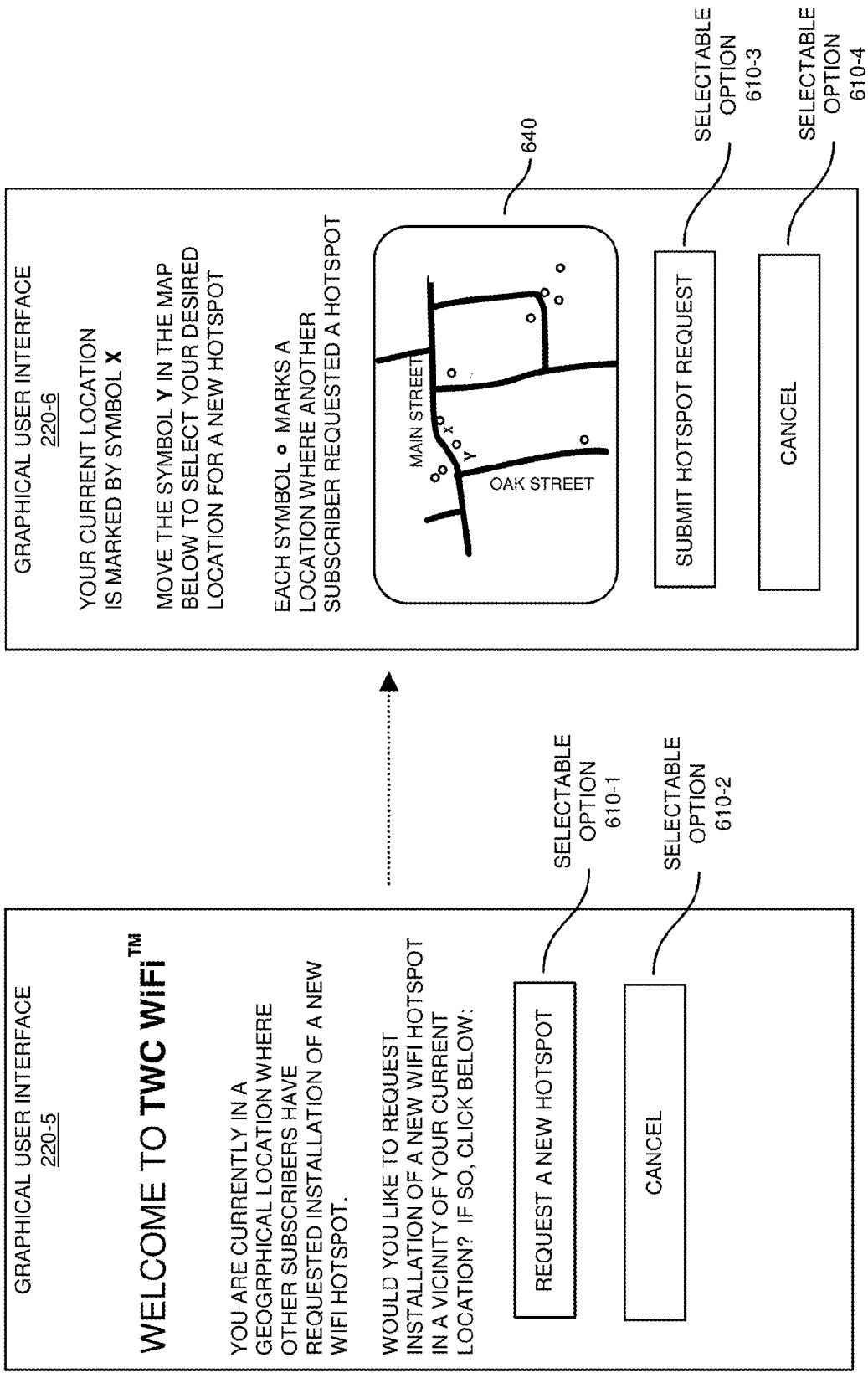

GRAPHICAL USER INTERFACE
220-5
WELCOME TO TWC WiFi™
YOU ARE CURRENTLY IN A GEOGRPHICAL LOCATION WHERE OTHER SUBSCRIBERS HAVE REQUESTED INSTALLATION OF A NEW WIFI HOTSPOT.
WOULD YOU LIKE TO REQUEST INSTALLATION OF A NEW WIFI HOTSPOT IN A VICINITY OF YOUR CURRENT LOCATION? IF SO, CLICK BELOW:
REQUEST A NEW HOTSPOT
CANCEL
SELECTABLE OPTION 610-1
SELECTABLE OPTION 610-2
GRAPHICAL USER INTERFACE
220-6
YOUR CURRENT LOCATION IS MARKED BY SYMBOL X
MOVE THE SYMBOL Y IN THE MAP BELOW TO SELECT YOUR DESIRED LOCATION FOR A NEW HOTSPOT
EACH SYMBOL ∘ MARKS A LOCATION WHERE ANOTHER SUBSCRIBER REQUESTED A HOTSPOT
MAIN STREET
OAK STREET
640
SUBMIT HOTSPOT REQUEST
CANCEL
SELECTABLE OPTION 610-3
SELECTABLE OPTION 610-4

FIG. 6

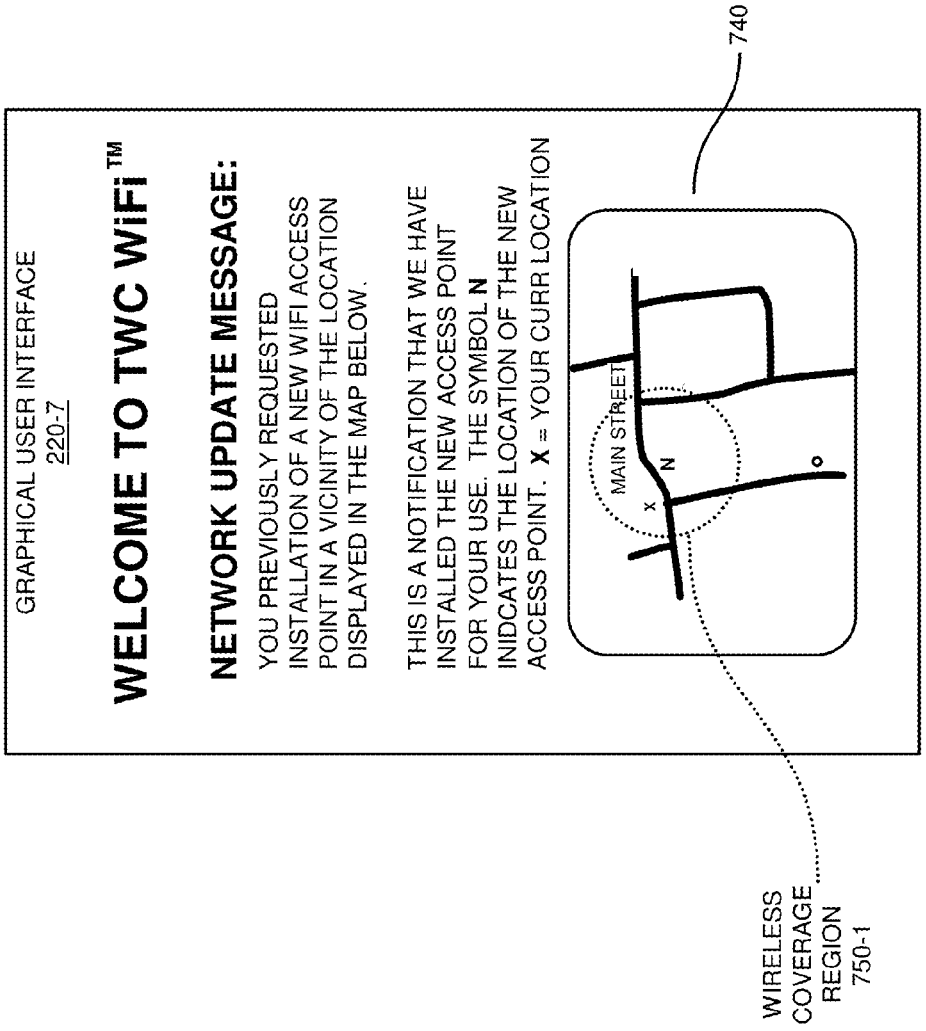

GRAPHICAL USER INTERFACE
220-7
WELCOME TO TWC WiFi™
NETWORK UPDATE MESSAGE:
YOU PREVIOUSLY REQUESTED INSTALLATION OF A NEW WIFI ACCESS POINT IN A VICINITY OF THE LOCATION DISPLAYED IN THE MAP BELOW.
THIS IS A NOTIFICATION THAT WE HAVE INSTALLED THE NEW ACCESS POINT FOR YOUR USE. THE SYMBOL N INIDCATES THE LOCATION OF THE NEW ACCESS POINT. X = YOUR CURR LOCATION
MAIN STREET
N
X
740
WIRELESS COVERAGE REGION
750-1

FIG. 7

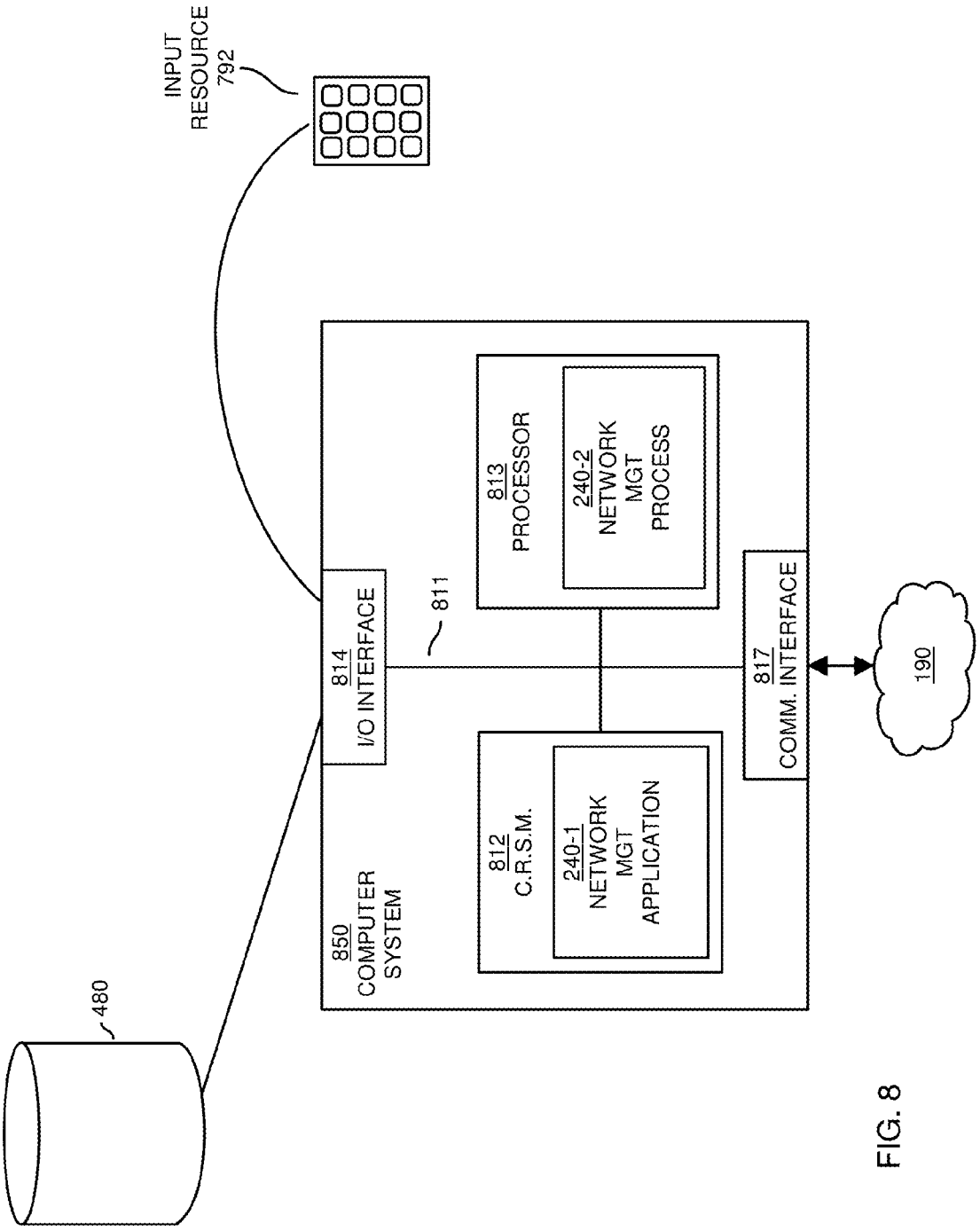

INPUT RESOURCE 792
813 PROCESSOR
240-2 NETWORK MGT PROCESS
811
814 I/O INTERFACE
817 COMM. INTERFACE
190
812 C.R.S.M.
240-1 NETWORK MGT APPLICATION
850 COMPUTER SYSTEM
480

FIG. 8

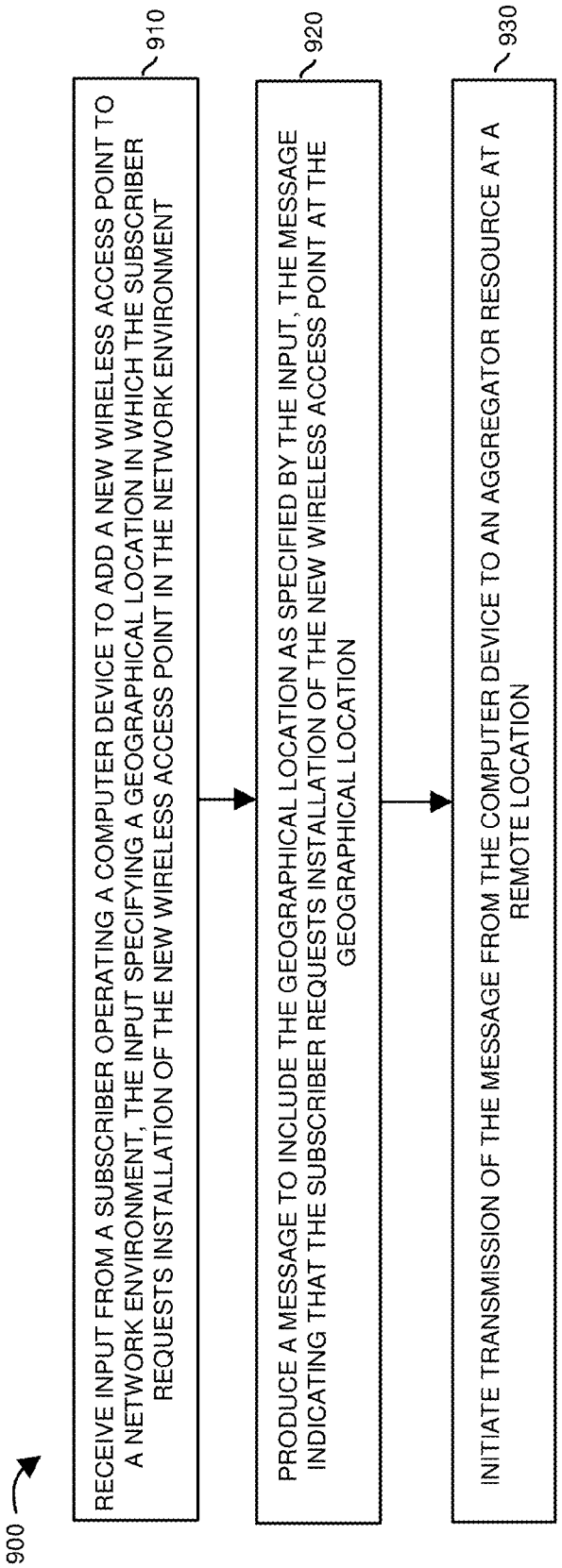

900
910
RECEIVE INPUT FROM A SUBSCRIBER OPERATING A COMPUTER DEVICE TO ADD A NEW WIRELESS ACCESS POINT TO A NETWORK ENVIRONMENT, THE INPUT SPECIFYING A GEOGRAPHICAL LOCATION IN WHICH THE SUBSCRIBER REQUESTS INSTALLATION OF THE NEW WIRELESS ACCESS POINT IN THE NETWORK ENVIRONMENT
920
PRODUCE A MESSAGE TO INCLUDE THE GEOGRAPHICAL LOCATION AS SPECIFIED BY THE INPUT, THE MESSAGE INDICATING THAT THE SUBSCRIBER REQUESTS INSTALLATION OF THE NEW WIRELESS ACCESS POINT AT THE GEOGRAPHICAL LOCATION
930
INITIATE TRANSMISSION OF THE MESSAGE FROM THE COMPUTER DEVICE TO AN AGGREGATOR RESOURCE AT A REMOTE LOCATION

FIG. 9

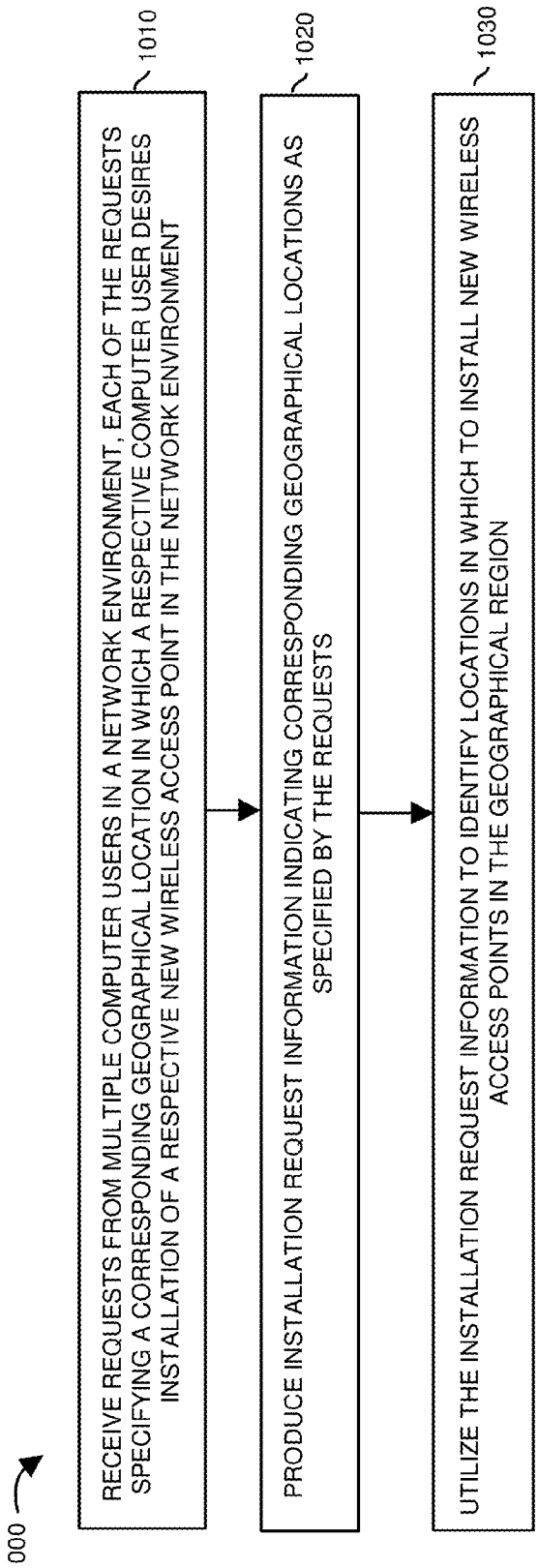

1000
1010
RECEIVE REQUESTS FROM MULTIPLE COMPUTER USERS IN A NETWORK ENVIRONMENT, EACH OF THE REQUESTS SPECIFYING A CORRESPONDING GEOGRAPHICAL LOCATION IN WHICH A RESPECTIVE COMPUTER USER DESIRES INSTALLATION OF A RESPECTIVE NEW WIRELESS ACCESS POINT IN THE NETWORK ENVIRONMENT
1020
PRODUCE INSTALLATION REQUEST INFORMATION INDICATING CORRESPONDING GEOGRAPHICAL LOCATIONS AS SPECIFIED BY THE REQUESTS
1030
UTILIZE THE INSTALLATION REQUEST INFORMATION TO IDENTIFY LOCATIONS IN WHICH TO INSTALL NEW WIRELESS ACCESS POINTS IN THE GEOGRAPHICAL REGION

FIG. 10

ACCESS POINT MANAGEMENT AND USAGE IN A NETWORK ENVIRONMENT

BACKGROUND

[0001] Conventional RF (Radio Frequency) technology has been used for many years to connect wireless devices such as phones, laptops, etc., to a landline network and/or other wireless networks. Today, RF technology supports many different types of connection services such as voice communications, high-speed data services, WiFi™ connectivity, and so on.

[0002] One type of mature RF technology is cellular network technology. Conventional cellular network technology typically includes an expansive land area that has been divided into so-called cellular regions. A single cellular base station typically resides in each cell. The single cellular base station typically provides coverage over multiple square miles of land. Often, a base station in a respective cell is connected to a landline network. Via wireless communications between the respective cell phone and base station, the wireless subscriber operating a cell phone in the cellular region is able to communicate with or have access to the landline network.

[0003] Another type of RF technology is known as WiFi™. This more recently implemented wireless technology includes large-scale installation of WiFi™ base stations. In comparison to the conventional long-range cellular network technology as previously discussed, WiFi™ technology supports short-range communications such as 200-300 meters as opposed to 1500 or more meters provided by cellular telephone base stations. In comparison to installation of cellular telephone towers, installation of WiFi™ base stations is substantially less expensive.

[0004] The wireless coverage in a vicinity of a respective WiFi™ base station is sometimes called a WiFi™ hot spot. As mentioned, wireless coverage provided by a WiFi™ base station is typically much smaller than wireless coverage provided by a corresponding long-range base station disposed on a cellular telephone tower.

[0005] When located within the WiFi™ hotspot, a mobile device operated by a corresponding user is able to establish a wireless communication link between the mobile device and the WiFi™ base station. Via communications over the wireless communication link, the mobile device has access to hardwired networks and is able to perform operations such as retrieve data from and transmit data to other resources in a network environment.

BRIEF DESCRIPTION OF EMBODIMENTS

[0006] Conventional techniques of installing short-range RF communication technology such as WiFi™ technology can suffer from deficiencies. For example, a service provider implementing the short-range RF communication technology must determine where to install one or more short-range base stations. This task may be very difficult because little, if any, data may be available indicating the best locations to install the short-range base stations.

[0007] As a specific example, the service provider may be able to identify areas where high numbers of people such as subscribers are likely to frequent. However, mere occurrence of high traffic (such as presence of a large number of people) in a particular area does not mean that users in the area will use a corresponding short-range base station to access a core network such as the Internet. Even though an area experiences high-traffic, users may not connect to the corresponding short-range base station because they are preoccupied with another activity. Thus, mere use of people density information (such as the amount of people per unit area) indicating high numbers of persons in a small area is not necessarily a best indicator of whether installation of a wireless access point would be beneficial.

[0008] Embodiments herein deviate with respect to conventional techniques. For example, one embodiment herein is directed to identifying locations in which to install one or more new wireless access points based on user feedback.

[0009] More specifically, in accordance with one embodiment, a mobile computer device operated by a respective user includes and executes an application enabling the respective user to identify locations in which to install a corresponding access point. Via input and control of the application, the network management application executing on the mobile computer device receives a request from a user operating the computer device to add a new wireless access point in a network environment. The request can indicate a specific geographical location in which the user requests installation of the new wireless access point in the network environment. In one embodiment, the application produces a message including the geographical location as specified by the user. The message indicates that the user requests installation of the new wireless access point at a specified geographical location. Subsequent to generating the message, the application on the mobile computer device then transmits the message to a remote aggregator resource.

[0010] In a similar manner, each of multiple users can identify specific locations and produce installation request messages indicating where to install one or more new access points in the network environment. In such an instance, the remote aggregator resource as described herein can be configured to receive requests from multiple computer users in a network environment.

[0011] As previously discussed, each of the requests can specify a corresponding geographical location in which a respective computer user desires installation of a respective new wireless access point in the network environment. In one non-limiting example embodiment, the remote installation management resource compiles the received requests and produces installation request information indicating corresponding geographical locations as specified by the requests. The service provider utilizes the geographical information to identify locations in which to pursue installation of new wireless access points in the geographical region.

[0012] Accordingly, in contrast to conventional RF technology, embodiments herein include receiving feedback from one or more computer users such as subscribers. The feedback indicates potential locations in which to install one or more new wireless access points. If the overall feedback from multiple users indicates that a sufficiently high number of users will benefit from installation of an access point at a particular geographical location, a corresponding service provider initiates installation of a new access point at the particular geographical location. Thus, a service provider can determine where to install one or more new access points based at least in part on input from corresponding subscribers that plan to use them sometime in the future.

[0013] These and other more specific embodiments are disclosed in more detail below.

[0014] Note that any of the resources as discussed herein can include one or more computerized devices, servers, base stations, wireless communication equipment, communication management systems, workstations, handheld or laptop computers, or the like to carry out and/or support any or all of the method operations disclosed herein. In other words, one or more computerized devices or processors can be programmed and/or configured to operate as explained herein to carry out different embodiments of the invention.

[0015] Yet other embodiments herein include software programs to perform the steps and operations summarized above and disclosed in detail below. One such embodiment comprises a computer program product including a non-transitory computer-readable storage medium (i.e., any physical computer readable hardware storage medium) on which software instructions are encoded for subsequent execution. The instructions, when executed in a computerized device (e.g., computer processing hardware) having a processor, program and/or cause the processor to perform the operations disclosed herein. Such arrangements are typically provided as software, code, instructions, and/or other data (e.g., data structures) arranged or encoded on a non-transitory computer readable storage medium such as an optical medium (e.g., CD-ROM), floppy disk, hard disk, memory stick, etc., or other a medium such as firmware or shortcode in one or more ROM, RAM, PROM, etc., or as an Application Specific Integrated Circuit (ASIC), etc. The software or firmware or other such configurations can be installed onto a computerized device to cause the computerized device to perform the techniques explained herein.

[0016] Accordingly, embodiments herein are directed to a method, system, computer program product, etc., that supports operations as discussed herein.

[0017] One or more embodiments herein include a computer readable storage medium and/or system having instructions stored thereon. The instructions, when executed by computer processor hardware, cause the computer processor hardware (such as in a mobile computer device) to: receive a request from a user operating a computer device to add a new wireless access point to a network environment, the request specifying a geographical location in which the user requests installation of the new wireless access point in the network environment; produce a message to include the geographical location, the message indicating that the user requested installation of the new wireless access point at the geographical location; and transmit the message from the computer device to a remote installation management resource.

[0018] One or more embodiments herein include a computer readable storage medium and/or system having instructions stored thereon. The instructions, when executed by computer processor hardware, cause the computer processor hardware (such as in a security system) to: receive requests from multiple computer users in a network environment, each of the requests specifying a corresponding geographical location in which a respective computer user desires installation of a respective new wireless access point in the network environment; produce installation request information indicating corresponding geographical locations as specified by the requests; and utilize the geographical information to identify locations in which to install new wireless access points in the geographical region.

[0019] The ordering of the operations above has been added for clarity sake. Note that any of the processing steps as discussed herein can be performed in any suitable order.

[0020] Other embodiments of the present disclosure include software programs and/or respective hardware to perform any of the method embodiment steps and operations summarized above and disclosed in detail below.

[0021] It is to be understood that the system, method, apparatus, instructions on computer readable storage media, etc., as discussed herein also can be embodied strictly as a software program, firmware, as a hybrid of software, hardware and/or firmware, or as hardware alone such as within a processor, or within an operating system or a within a software application.

[0022] As discussed herein, techniques herein are well suited for facilitating installation of corresponding wireless access points in a network environment. However, it should be noted that embodiments herein are not limited to use in such applications and that the techniques discussed herein are well suited for other applications as well.

[0023] Additionally, note that although each of the different features, techniques, configurations, etc., herein may be discussed in different places of this disclosure, it is intended, where suitable, that each of the concepts can optionally be executed independently of each other or in combination with each other. Accordingly, the one or more present inventions as described herein can be embodied and viewed in many different ways.

[0024] Also, note that this preliminary discussion of embodiments herein purposefully does not specify every embodiment and/or incrementally novel aspect of the present disclosure or claimed invention(s). Instead, this brief description only presents general embodiments and corresponding points of novelty over conventional techniques. For additional details and/or possible perspectives (permutations) of the invention(s), the reader is directed to the Detailed Description section and corresponding figures of the present disclosure as further discussed below.

BRIEF DESCRIPTION OF THE DRAWINGS

[0025] FIG. **1** is an example diagram illustrating a network environment and the system facilitating installation of a new wireless access point based on feedback from multiple users according to embodiments herein.

[0026] FIG. **2** is an example block diagram illustrating functionality associated with a mobile computer device according to embodiments herein.

[0027] FIG. **3** is an example diagram illustrating use of a graphical user interface by a user to request installation of a new wireless access point at a current geographical location according to embodiments herein.

[0028] FIG. **4** is an example diagram illustrating use of a graphical user interface by a user to request installation of a new wireless access point at a user specified location according to embodiments herein.

[0029] FIG. **5** is an example diagram illustrating generation of installation request information based on user feedback and installation of one or more new access points based on the feedback according to embodiments herein.

[0030] FIG. **6** is an example diagram illustrating use of a graphical user interface facilitating installation of new wireless access points according to embodiments herein.

[0031] FIG. **7** is an example diagram illustrating notification that a newly installed access point is now available for use by a respective user according to embodiments herein.

[0032] FIG. **8** is a diagram illustrating an example computer architecture in which to execute any of the functionality according to embodiments herein.

[0033] FIGS. **9** and **10** are example diagrams illustrating methods facilitating management and installation of one or more new access points in a network environment according to embodiments herein.

[0034] The foregoing and other objects, features, and advantages of the invention will be apparent from the following more particular description of preferred embodiments herein, as illustrated in the accompanying drawings in which like reference characters refer to the same parts throughout the different views. The drawings are not necessarily to scale, with emphasis instead being placed upon illustrating the embodiments, principles, concepts, etc.

DETAILED DESCRIPTION AND FURTHER SUMMARY OF EMBODIMENTS

[0035] Now, more specifically, FIG. **1** is an example diagram illustrating a network environment according to embodiments herein.

[0036] As shown, network environment **100** includes multiple computer devices **150** (e.g., computer device **150-1**, computer device **150-2**, etc.). In one embodiment, a respective user operates each of the multiple computer devices **150**. For example, user **108-1** operates mobile computer device **150-1**; user **108**-to operates mobile computer device **150-2**; and so on. Network environment **100** can include any number of mobile computer devices.

[0037] Each of the mobile computer devices **150** can be any suitable type of device. For example, mobile computer device **150-1** can be a cell phone, mobile communication device, phone device, digital assistant, a laptop computer, a personal computer, a notebook computer, a netbook computer, a handheld computer, a workstation, etc.

[0038] In this example embodiment, via input **105-1**, user **108-1** controls respective applications executing on mobile computer device **150-1**; via input **105-2**, user **108-2** controls respective applications executing on mobile computer device **150-2**; and so on.

[0039] In accordance with one embodiment, the users **108** operate respective mobile computer devices **150** to request installation of a respective wireless access point in network environment **100**. For example, in one non-limiting example embodiment, the mobile computer device **150-1** receives input **105-1** such as a command from user **108-1** (a first subscriber) to generate an installation request message **145-1** indicating that the user would like a new WiFi™ access point installed in the network environment **100**.

[0040] The input **105-1** received from the user **108** can specify a geographical location in which the user **108-1** requests installation of a new wireless access point in the network environment. The specified geographical location may be a location in which there currently is not a wireless WiFi™ access point available for use by the corresponding user **108-1**.

[0041] In response to receiving input **105-1**, the mobile computer device **150-1** produces the installation request message **145-1** to include the geographical location as specified by the user **108-1** (or geographical location specified by another resource).

[0042] Subsequent to creating the installation request message **145-1**, the mobile computer device **150-1** then initiates transmission of the installation request message **145-1** from the mobile computer device **150-1** to aggregator resource **140** at a remote location over network **190**. Accordingly, the aggregator resource **140** is made aware that the user **108-1** of mobile computer device **150-1** would like a new wireless access point installed at the location specified in the installation request message.

[0043] In one embodiment, via generation and forwarding of the installation request message **145-1**, the user **108-1** requests installation of a new short-range base station such as a WiFi™ access point at a specified location.

[0044] Note that any of one or more suitable types of communication links can be used to communicate installation request messages **145** from mobile computer devices **150** to aggregator resource **140**.

[0045] For example, in one embodiment, when generating and forwarding installation request messages **145**, because a respective short-range base station such as a WiFi™ access point may not be available for use in a particular geographical region, the mobile computer devices **150** may communicate installation request messages using a cellular phone protocol.

[0046] As a more specific example, as shown in FIG. **1**, assume that the mobile computer device **150-1** transmits the installation request message **145-1** over communication link **128-1** to long-range base station **135** such as a cell phone tower (or other suitable base station in network **190**). Long-range base station **135** then forwards the corresponding installation request message through network **190** to aggregator resource **140**.

[0047] Note that in a similar manner that user **108-1** operates mobile computer device **150-1** to generate installation request message **145-1** as discussed above, user **108-2** can operate mobile computer device **150-2** to generate installation request message **145-2**.

[0048] More specifically, via input **105-2**, the user **108-2** is able to request installation of a corresponding wireless access point at a particular geographical location in network environment **100**. In a manner as previously discussed, the mobile computer device **150-2** can be configured to communicate a corresponding installation request message **145-2** over communication link **128-2** to long-range base station **135** such as a cell phone tower (or other suitable base station in network **190**). Long-range base station **135** forwards the installation request message **145-2** to aggregator resource **140**.

[0049] Thus, the aggregator resource **140** receives the installation requests from multiple computer users **108** in network environment **100**. Each of the requests specifies a corresponding geographical location in which a respective computer user desires installation of a respective new wireless access point in the network environment **100**.

[0050] As further shown in FIG. **1**, the aggregator resource **140** processes the received installation request messages **145** from multiple subscribers to produce installation request information **170**. The installation request information **170** can include information such as corresponding geographical locations to install new wireless access points, identities of the subscribers requesting the new access points, etc. The aggregator resource **140** initiates storage of the installation request information **170** in repository **180**.

[0051] Service provider **195** has access to installation request information **170**. In one embodiment, the service provider **195** analyzes the installation request information **170** to identify locations in which to potentially install one or more new wireless access points. In other words, the service

provider **195** can initiate installation of one or more new wireless access points based at least in part on the installation request information **170**.

[0052] In this example embodiment, assume that a sufficiently large number of subscribers (users **108** that subscribe to services provided by the service provider **195**) request installation of a corresponding new wireless access point at a specified location or region in network environment **100**. In response to receiving the installation requests, to accommodate users **108**, the service provider **195** initiates installation of the new access point **105-1** at the location marked by symbol N (representing a new wireless access point).

[0053] Accordingly, in accordance with input from multiple subscribers (users **108**), the service provider **195** can be configured to install one or more new wireless access points in network environment **100**. In contrast to conventional techniques in which a service provider guesses as to best locations to install new wireless access points, embodiments herein include installing wireless access points based at least in part on requests from users. The requests can specify locations in which to install new access points. Because installation locations are specified by users, the newly installed wireless access points are more likely to be placed in useful locations for subsequent use by corresponding subscribers.

[0054] FIG. **2** is an example block diagram illustrating functionality associated with a mobile computer device according to embodiments herein. Note that mobile computer device **150-1** can include hardware and software resources to carry out operations as discussed herein.

[0055] In one embodiment, as shown, the mobile computer device **150-1** can include wireless transducer **260**. In this non-limiting example, wireless transducer **260** supports communications over communication link **128-1** to long-range base station **135** in accordance with cellular phone protocols supporting wireless mobile telecommunications technologies such as 2G, 3, 4G, etc.

[0056] As further shown, the mobile computer device **150-1** can include wireless transducer **261** supporting short-range wireless communications such as those based on a WiFi™ protocol (e.g., such as any WiFi™ standard or protocol as specified by IEEE 802.11).

[0057] In one embodiment, to communicate in accordance with WiFi™, mobile computer device **150-1** generates a discovery message from wireless transducer **261** to identify a presence of any WiFi™ base stations located in the vicinity of the mobile computer device **150-1**. As described herein, if no WiFi™ base stations are available, the user **108-1** of the mobile computer device **150-1** can alternatively use wireless transducer **260** to communicate in network environment **100**.

[0058] Note that in addition to including wireless transducer **260** and wireless transducer **261**, the mobile computer device **150-1** can include a hardwired link (i.e., physical cable) facilitating communications between communication interface **255** and a corresponding base station.

[0059] Accordingly, mobile computer device **150-1** can communicate installation request messages **145** over any suitable communication link (e.g., a wireless link, hardwired link, etc.) to aggregator resource **140**.

[0060] As previously discussed, network management application **240** enables corresponding user **108-1** to request installation of new wireless access points. Note that network management application **240** is shown as being executed locally on mobile computer device **150-1**. However, in alternative embodiments, note that the network management application **240** can be located in any suitable one or more local or remote computer devices.

[0061] As a specific example of use, assume that the user **108-1** or other suitable resource provides appropriate input (e.g., commands, clicks, button presses, etc.) to input resource **202** (a keyboard, touch-screen interface, microphone, computer mouse, mouse pad, etc.). The input controls network management application **240**.

[0062] Launching of network management application **240** can include execution of respective computer code associated with the network management application **240**. Network management application **240** facilitates generation and transmission of installation request messages **145** in a manner as previously discussed. Via display manager **250**, network management application **240** displays graphical user interface **220** on display screen **130** for viewing by user **108-1**.

[0063] Via the graphical user interface **220**, the user **108-1** is able to generate installation request messages as previously discussed. As its name suggests, location detector **295** can be used to detect a current location of the mobile computer device **150-1** in network environment **100**. As discussed later in this specification, current location information generated by location detector **295** can be used by the network management application **240** to specify a location where user **108-1** would like installation of corresponding new wireless access point.

[0064] As briefly mentioned, mobile computer device **150-1** includes communication interface **255**. Via communication interface **255**, the network management application **240** is able to establish a respective wired or wireless communication link with a remote resource and initiate forwarding of installation request messages over network **190** to aggregator resource **140**. As previously discussed, mobile computer device **150-1** can support both long-range and short-range wireless communications via wireless transducer **260** and/or wireless transducer **261**.

[0065] By further way of non-limiting example, note again that if a WiFi™ access point is not currently available for use by a mobile computer device **150-1** to communicate the corresponding installation request message to aggregator resource **140** using wireless transducer **261**, the network management application **240** can initiate forwarding of a corresponding installation request message over an RF (Radio Frequency) signal from wireless transducer **260** over communication link **128-1** to long-range base station **135**.

[0066] Communication interface **255** facilitates conversion of digital information (such as network address information associated with aggregator resource **140**, location information in which to install a corresponding wireless access point, subscriber information, etc.) associated with a respective installation request message generated by network management application **240** into the corresponding RF signal transmitted over communication link **128-1** to aggregator resource **140**. Long-range base station **135** further transmits the installation request messages **145** over network **190** such as the Internet to aggregator resource **140** (such as a server resource).

[0067] If it is not possible for mobile computer device **150-1** to communicate over a wireless link to aggregator resource **140** using wireless transducer **260**, wireless transducer **261**, etc., because the mobile computer device **150-1** is outside wireless coverage, note that the mobile computer device **150-1** can be configured to temporarily store installation request messages **145**. In such an instance, when the

mobile computer device **150-1** detects that a corresponding wireless communication link or hardwired communication link is available to communicate a previously generated installation request messages, the mobile computer device **150-1** transmits the temporarily stored installation request messages to aggregator resource **140**.

[0068] FIG. **3** is an example diagram illustrating use of a graphical user interface by a user to request installation of a new wireless access point at a current location according to embodiments herein.

[0069] More specifically, in response to executing network management application **240**, display manager **250** initiates display of graphical user interface **220-1** on display screen **130** for viewing by a respective user **108-1**. Graphical user interface **220-1** includes display of a notification that the user **108-1** is able to request installation of a new WiFi™ access point at a corresponding geographical location such as the current location of the mobile computer device **150-1**. The notification and graphical user interface **220-1** indicates that a respective user is able to select the selectable option **310-1** to request installation of a new WiFi™ hotspot.

[0070] The mobile computer device **150-1** can be configured to execute network management application **240** and display graphical user interface **220** for any suitable reason.

[0071] In one embodiment, the network management application **240** initiates display of graphical user interface **220-1** and corresponding notification to the subscriber (user **108-1**) operating the mobile computer device **150-1** in response to detecting establishment of wireless communication link **128-1** (such as a non-WiFi™ wireless communication link) by the computer device to communicate in the network environment **100**.

[0072] The notification in graphical user interface **220-1** (such as WOULD YOU LIKE TO REQUEST INSTALLATION OF A WIFI™ ACCESS POINT AT YOUR CURRENT GEOGRAPHICAL LOCATION . . .) prompts the subscriber user **108-1** to selectively input the request via selection of selectable option **310-1**. Note that the user **108-1** can select selectable option **310-2** (CANCEL) to skip the process of requesting a new wireless access point.

[0073] Assume that the user **108-1** selects selectable option **310-1** in graphical user interface **220-1** to request installation of a new WiFi access point. Based on the selection, network management application **240** receives input from graphical user interface **220-1** that the user **108-1** would like to request the installation of a new wireless access point at a corresponding geographical location such as a user's current location. In response to the selection of selectable option **310-1**, the network management application **240** initiates display of graphical user interface **220-2** on display screen **130**.

[0074] As previously discussed, the location detector **295** can be configured to detect a current location of the mobile computer device **150-1**. The location detector **295** communicates the location information to network management application **240**. The network management application **240** generates graphical user interface **220-2** to indicate the current location of the mobile computer device **150-1** in the network environment **100**. If desired, the network management application **240** can be configured to display map **340** to indicate locations of currently available WiFi™ hotspots and corresponding access points.

[0075] Assume in this example that the network management application **240** identifies the current location of the mobile computer device **150-1** to be 814 Main St., Herndon, Va. 20170. The network management application **240** retrieves a street map associated with this address. The street map can be obtained from any suitable resource.

[0076] By way of non-limiting example, to provide notification of a current location associated with mobile computer device and/or user **108-1**, the network management application **240** executing on mobile computer device **150-1** initiates display of map **340** (such as a street map) on graphical user interface **220-2**. Network management application **240** initiates display of a symbol X on the displayed map **340** of graphical user interface **220-2**. The symbol X indicates the current location of the computer device **150-1** in the geographical region of network environment **100**. Accordingly, via graphical user interface **220-2**, the user **108-1** is able to identify their current location by viewing map **340** of graphical user interface **220-2**.

[0077] As further shown, the graphical user interface **220-2** can be configured to notify the respective user **108-1** that the user may request installation of a new wireless access point at an indoor location or an outdoor location. In this example embodiment, as shown, assume that the user selects installation option at an outdoor location. User selection of the outdoor location is included in the corresponding installation request message **145-1** to notify aggregator resource **140** and service provider **195** of the type of requested wireless access point.

[0078] Note that as an alternative to selecting the outdoor option, the user **108-1** can select the indoor option to indicate to install a new wireless access point at an indoor location at the location specified. In this latter instance, the installation request message **145-1** would include information indicating that the user **108-1** would like to install the new wireless access point at an indoor location.

[0079] Subsequent to selection of whether the new access point is to be an indoor location or an outdoor location, the user **108-1** selects selectable option **310-3** to complete a process of generating a respective installation request message.

[0080] Assume that user **108-1** selects selectable option **310-3**. In response to receiving a selection of selectable option **310-3**, the network management application **240** completes generation and forwarding of a corresponding installation request message **145-1** to aggregator resource **170**.

[0081] In one embodiment, the network management application **240** retrieves identity information associated with user **108-1** and/or mobile computer device **150-1** to include in the installation request message **145-1**. For example, in one embodiment, the network management application **240** obtains a network address assigned to the mobile computer device **150-1**. Management application **240** includes the network address of the mobile computer device **150-1** in the installation request message **145-1** to indicate an identity of the mobile computer device **150-1** or subscriber requesting the installation of the new wireless access point.

[0082] Note that as an alternative or in addition to including network address information in a corresponding installation request message **145-1**, any suitable information associated with the user **108-1** can be included in the installation request message **145-1**. For example, the user **108-1** can be assigned a unique subscriber identity value as provided by corresponding service provider **195**. In such an instance, if desired, the network management application **240** can be configured to include the corresponding unique subscriber identity value in the installation request message **145-1**.

[0083] Accordingly, downstream resources (such as the aggregator resource **140**, service provider **195**, etc., to which the installation request message is sent and subsequently analyzed) are able to identify which of multiple subscribers or mobile computer devices generated the corresponding installation request message **145-1**.

[0084] Also, as previously discussed, the network management application **240** can be configured to include the current geographical location of the mobile computer device **150-1** in the installation request message **145-1**.

[0085] Note that as an alternative to selecting selectable option **310-3**, the corresponding user **108-1** can abort generation of a corresponding installation request message **145-1**. For example, the user **108-1** can select selectable option **310-4** to abort creating and/or sending a corresponding installation request message **145-1** to aggregator resource **140**.

[0086] In addition to facilitating installation of one or more new wireless access points in network environment **100**, the network management application **240** can be configured to receive feedback from a respective user indicating whether or not the user thought the network management application **240** was a useful to in order to request installation of new wireless access points. The network management application **240** can be configured to forward the feedback to an appropriate resource that collects feedback from multiple users **108**. Accordingly, via the collected feedback from multiple users **108**, the service provider **195** is able to determine whether corresponding users **108** like the network management application **240**.

[0087] FIG. **4** is an example diagram illustrating use of a graphical user interface by a user to request installation of a new wireless access point at a user specified location according to embodiments herein. In general, graphical user interfaces **220-3** in **220-4** enable a respective user **108-12** more particularly indicate the location in which to install a corresponding new wireless access point.

[0088] More specifically, in a similar manner as previously discussed above, network management application **240** initiates display of graphical user interface **220-3** enabling a corresponding user to request installation of a corresponding wireless access point at a specified location. To request installation a corresponding wireless access point in network environment **100**, the user selects selectable option **410-1**. Alternatively, if the user **108-1** does not wish to request installation of a new wireless access point, the user **108-1** selects selectable option **410-2**.

[0089] Assume in this example that the user selects selectable option **410-1**. In response to receiving selection of selectable option **410-1**, the network management application **240** initiates display of graphical user interface **220-4** on display screen **130** for viewing by respective user **108-1**. Via graphical user interface **220-4**, the user is able to input specific information indicating the location in which to install a corresponding new wireless access point.

[0090] For example, as previously discussed, the location detector **295** can be configured to detect a current location of the mobile computer device **150-1** in network environment **100**. Location detector **295** forwards corresponding location information indicating the current location to network management application **240**. The network management application **240** initiates display of the symbol X on the map **440** to indicate the current location of the mobile computer device **150-1** in network environment **100**.

[0091] The user **100-1** is able to select a corresponding location on the map **440** in which to install a corresponding new wireless access point. The graphical user interface **220-4** includes a notification indicating to the user **108-1** that the user **108-1** can move the symbol Y on the map **440** to select a desired location to install a new wireless access point (such as a WiFi™ access point).

[0092] Movements of symbol Y in graphical user interface **220-4** can be achieved in any suitable manner. For example, the user **108-1** can drag and drop symbol Y to any suitable location on map **440**. Thus, the location of symbol Y can be a different location than the current location X of the mobile computer device **150-1**.

[0093] Accordingly, from the subscriber, the network management application **240** receives selection of the geographical location (as specified by location marked by symbol Y) in which to install a corresponding new wireless access point via input to the displayed map **440**. As mentioned, the network management application **240** initiates display of the symbol Y on displayed map **440** to indicate the geographical location selected by the subscriber for the installation of the new wireless access point.

[0094] To complete generation of installation request message **145-1**, user **108-1** selects selectable option **410-3** displayed on graphical user interface **220-4**. The generated installation request message **145-1** can include any information discussed herein.

[0095] As an alternative to selecting selectable option **410-3** to submit a corresponding wireless access point installation request message **145-1** to aggregator resource **140**, the corresponding user **108-1** can abort generation of a corresponding installation request message **145-1**. For example, the user **108-1** can select selectable option **410-4** to abort creating and/or sending a corresponding installation request message **145-1**.

[0096] FIG. **5** is an example diagram illustrating generation of geographical information based on user feedback and installation of one or more new access points based on the feedback according to embodiments herein.

[0097] More specifically, the aggregator resource **140** receives installation request messages **145** (e.g., installation request message **145-1**, installation request message **145-2**, etc.) from multiple computer users in network environment **100**. Each of the requests can be configured to specify a corresponding geographical location in which a respective computer user desires installation of a respective new wireless access point in the network environment **100**.

[0098] Each of the installation request messages **145** received from users **108** can include a unique identifier value such as a network address of a corresponding computer device generating the respective request, a unique identifier value such as a name of the subscriber, etc.

[0099] As its name suggests, the aggregator resource **140** aggregates and subsequently processes the installation request messages **145** from the different users **108** to produce installation request information **170**. The service provider **195** utilizes the installation request information **170** to identify suitable locations in which to install one or more new wireless access points in the geographical region.

[0100] In one embodiment, to facilitate installation of new wireless access points, the service provider **195** utilizes installation request information **170** to produce a map **540** illustrating a geographical region (in a vicinity of Main Street, Oak Street, as well as other streets) in the network environ-

ment **100**. In this example embodiment, the map **540** includes symbols (e.g., circles) indicating locations in the geographical region in which corresponding users requested installation of corresponding new wireless access point.

[0101] Assume in this example embodiment that aggregator resource **140** receives a first installation request message **145-1** from user **108-1** operating mobile computer device **150-1**. The installation request message **145-1** indicates that the user **108-1** would like installation of the new wireless access point at location **580-1** on map **540**. Assume further in this example embodiment that the aggregator resource **140** receives the second installation request message **145-2** from user **108-2** operating mobile computer device **150-2**. Installation request message **145-2** indicates that the user **108-2** would like installation of a new wireless access point at location **580-2** on map **540**.

[0102] In this way, as specified by corresponding received installation request messages **145**, the circles appearing on map **540** indicate locations where different users have requested installation of corresponding wireless access point and generally the same area.

[0103] In one embodiment, the map **540** is a heatmap.

[0104] Different colors, symbols, lines, etc., can be used in the map **540** to indicate different densities of installation requests per unit area. A first color can be used to indicate areas in map **540** in which relatively few users request the corresponding installation of a wireless access point; a second color can be used to indicate areas map **540** which the greater number of users requests installation of corresponding new wireless access point; and so on. Thus, certain colors can be used to indicate specific regions or zones in which a greater number of users requests installation of a corresponding new wireless access point.

[0105] The service provider **195** analyzes the map **540** to identify zones and determine which locations to install corresponding new wireless access points.

[0106] The service provider **195** can use any suitable criteria to determine where to install new wireless access points. For example, in one embodiment, the service provider **195** makes a determination where to install corresponding new wireless access points depending on how many subscribers per unit area request installation of corresponding wireless access point. More specifically, if the number of subscribers requesting a corresponding new wireless access point in a given unit of area (such as 40,000 square feet) or zone is above a threshold value, the service provider **195** can initiate installation of a corresponding wireless access point in the given area.

[0107] Note that use of the installation request information **170** to identify locations in which to install one or more new wireless access points in a geographical region can include identifying a specific region such as zone **560-1** in the network environment **100** in which a number of computer users **108** above a threshold value (such as 7 users) requests installation of a wireless access point in a specific region. Because **8** users (i.e., a value greater than the threshold value of 7) requests installation of a new wireless access point in a corresponding region near the corner of Oak Street and Main Street, the service provider **195** initiates installation of a new wireless access point at location marked by symbol N1 in zone **560-1** to provide wireless coverage in a vicinity of the specific region.

[0108] Similar to zone **560-1**, zone **560-2** in map **540** indicates also an area in which many users have requested installation of corresponding new wireless access point.

[0109] Thus, use of installation request information **170** to identify locations in which to install new wireless access points in the geographical region can include: analyzing the installation request information **170** to identify zones **560** (such as zone hundred **60-1**, zone **560-2**, etc.) within the geographical region that include requests for installation of a new wireless access point above a threshold value; and providing notification of the zones **560** on map **540** for further analysis by the service provider **195**.

[0110] Note that each of the subscribers in network environment **100** can be assigned to one of multiple different subscription levels. For example, a first group of users (subscribers) in network environment **100** can be assigned a first subscription level; a second group of users (subscribers) in network environment **100** can be assigned a second subscription level; a third group of users (subscribers) in network environment **100** can be assigned a third subscription level; and so on.

[0111] Each subscription level can provide a different level of access (e.g., amount of data, duration of time to retrieve content, bandwidth, etc.) to network **190**.

[0112] Embodiments herein can further include reviewing subscription levels associated with the multiple computer users generating installation request messages **145** to determine whether to grant an installation request.

[0113] For example, the service provider **195** can be configured to initiate installation of new wireless access points at the locations in network environment **100** based at least in part on the subscription levels assigned to the different computer users. Users in the first group (first subscription level) can be assigned a first weight value; users in the second group (second subscription level) can be assigned a second weight value; users in the third group (third subscription level) can be assigned a third weight value; and so on.

[0114] If the total weight associated with multiple installation requests per unit area is greater than a predefined threshold value, the service provider **195** can initiate installation of corresponding wireless access point. More specifically, in one embodiment, the first weight assigned to users in the first group can be the value 1, the second weight assigned to users in the second group can be the value 0.5, the third weight assigned to users in the third group can be the value 0.2.

[0115] Assume that the service provider **195** requires greater than a threshold value of 4 to install a corresponding wireless access point in a zone. In such an instance, if five or more users assigned to the first subscription level request installation of corresponding access point in a zone, the service provider **195** initiates installation of the access point; if nine or more users assigned to the second subscription level request installation of corresponding access point in a zone, the service provider **195** initiates installation of the access point; if twenty one or more users assigned to the third subscription level request installation of corresponding access point in a zone, the service provider **195** initiates installation of the access point; if two user assigned the first subscription level and 5 users assigned to the second subscription level request installation of a corresponding access point zone, the service provider **195** initiates installation of the access point; and so on.

[0116] Assume further in this example that the service provider **195** makes a decision to install a new wireless access

point at location marked by N1 and N2. Subsequent to analysis of map **540** and corresponding installation request information **170**, the service provider **195** deploys management installation resources **595** (e.g., technicians, service trucks, etc.) to install access point **105-1** at location marked by N1 in zone **560-1**; service provider **195** deploys management installation resources **595** to install access point **105-2** at location marked by N2 in zone **560-2**; and so on.

[0117] FIG. **6** is an example diagram illustrating use of a graphical user interface enabling a respective user to display locations where other users request installation of wireless access points and specify a new location to install a respective access point according to embodiments herein.

[0118] As previously discussed, in response to detecting presence of the mobile computer device **150-1** in a particular geographical region of network environment **100**, the network management application **240** can be configured to initiate display of a visual prompt on the display screen **130**. The visual prompt (such as the text WOULD YOU LIKE TO REQUEST INSTALLATION OF A NEW WIFI™ HOTSPOT IN A VICINITY . . .) provides notification that the subscriber operating the computer device can request installation of the new wireless access point.

[0119] In accordance with further embodiments, the network management application **240** can be configured to initiate display of a visual indication on a map to indicate locations in a geographical region where other subscribers or users of computer devices requested installation of one or more new wireless access points.

[0120] For example, the network management application **240** can be configured to monitor the current location of the mobile computer device **150-1** as it moves throughout network environment **100**. In response to detecting: i) presence of the mobile computer device **150-1** in a vicinity of a geographical region in which other subscribers (users of mobile computer device **150**) have requested installation of a respective new wireless access point, and ii) that a number of the other subscribers requesting the installation of the respective new wireless access point at the geographical location is above a threshold value, the network management application **240** initiates display of graphical user interface **220-5** to the subscriber (user **108-1**) operating the mobile computer device **150-1**.

[0121] As shown, network management application **240** can be configured to include selectable option **610-1** in graphical user interface **220-5** for the subscriber to request installation of a new wireless access point in the network environment **100**. If the user **108-1** would like to generate a corresponding installation request message **145-1**, the user **108-1** selects selectable option **610-1**. Alternatively, the user **108-1** can select selectable option **610-2** to avoid generation of a corresponding installation request message **145**.

[0122] Assume that the user **108-1** selects selectable option **610-1** in the user interface **220-5** to generate a corresponding installation request message. In such an instance, the network management application **240** initiates display of graphical user interface **220-6** on display screen **130** for viewing by a respective user **108-1**.

[0123] As shown, the network management application **240** initiates display of map **640** and corresponding text message in graphical user interface **220-6**. The corresponding text message indicates that the current location of the mobile computer device **150-1** is marked by symbol X in the map **640**.

[0124] Further, the text in graphical user interface **220-6** indicates that each circle in map **640** represents a corresponding location where another subscriber requested installation of a corresponding wireless access point.

[0125] Accordingly, via the map **640** displayed in graphical user interface **220-6**, the user **108-1** is able to view locations where other users have requested installation of a WiFi™ access point to create a corresponding WiFi™ hotspot.

[0126] By further way of non-limiting example, the network management application **240** can be configured to communicate with aggregator resource **140** (or some other suitable resource) to retrieve all or a portion of installation request information **170** to determine when the mobile computer device **150-1** is located in an area where other mobile computer devices have requested installation of new wireless access points.

[0127] As previously discussed, the installation requests information **170** indicates the locations where other users have requested installation of corresponding new wireless access points. In response to generating request for installation request information **170** (such as locations in a vicinity of the current location of the mobile computer device **150-1** where others have requested installation of a new wireless access point), the aggregator resource **140** forwards access request information to network management application **240** executing on mobile computer device **150-1**.

[0128] In accordance with installation request information **170**, the network management application **240** initiates display of circles on map **640** to indicate where other subscribers have requested installation of a corresponding wireless access point. Accordingly, the user **108-1** is able to identify and assess the locations in which others have requested installation of a corresponding new wireless access point.

[0129] In one embodiment, the network management application **240** analyzes the retrieved installation request information **170** to detect when the corresponding mobile computer device **150-1** is in a location in which other subscribers have requested installation of a corresponding new wireless access point. In response to detecting that the user **108-1** and mobile computer device **150-1** is currently located in an area in which multiple other users previously requested installation of a new wireless access point in the area, the network management application initiates display of graphical user interface **220-5** to notify the user **108-1** that they are currently in a geographically station where other subscribers have requested installation of a new WiFi™ hotspot.

[0130] Thus, embodiments herein can include soliciting the user **108-1** of mobile computer device **150-1** for feedback. This additional feedback can be used by the service provider **195** to help determine whether to go forward with installation of a corresponding new wireless access point in a vicinity at the corner of Main Street and Oak Street. In other words, the installation request information **170** produced by aggregate resource **140** may indicate that a specific location in network environment **100** appears to be a reasonably good candidate in which to install a corresponding new wireless access point. Soliciting additional feedback from subscribers that frequent that specific location can help to determine whether or not the service provider **195** should move forward with installation of a corresponding new wireless access point at the specific location.

[0131] FIG. **7** is an example diagram illustrating notification that a newly installed access point is available for use by a respective user according to embodiments herein.

[0132] In one embodiment, subsequent to installation of a new wireless access point based on user requests, the network management application **240** can be configured to generate and display graphical user interface **220-7** on display screen **130**. As shown, the graphical user interface **220-7** provides notification to the subscriber (user **108-1**) of the mobile computer device **150-1** that a new wireless access point has been installed at a particular location in network environment **100**.

[0133] The notification in graphical user interface **220-7** can indicate presence of the newly installed wireless access point at the location as marked by the symbol N in map **740**. In addition to displaying the location of a corresponding new wireless access point installed in the network environment **100**, the network management application **240** can be configured to initiate display of corresponding information indicating an anticipated wireless coverage provided by the corresponding new access point. In this example embodiment, the network management application **240** initiates display of wireless coverage region **750-1** on display to map **240** to indicate geographical boundaries in which the corresponding user can reasonably expect to be able to communicate with the new wireless access point at the location is marked by symbol N.

[0134] In accordance with yet further example embodiments, note that the network management application **240** can be configured to receive updated location information indicating a current location of mobile computer device **150-1** as it moves through corresponding network environment **100**. The location information of current location of mobile computer device **150-1** can be received from location detector **295** or any other suitable resource. The network management application **240** compares the current location of the corresponding mobile computer device **150-1** to stored information indicating locations in which the corresponding user **108-1** requested installation of a corresponding new wireless access point.

[0135] In this example embodiment assume that the user **108-1** requested installation of the new wireless access point at or in a vicinity of the location marked by symbol N. In response to detecting that the current location of the mobile computer device **150-1** resides within the wireless coverage region **750-1** or that the mobile computer device **150-1** is in a vicinity of the location marked by symbol N, the network management application **240** initiates display of corresponding graphical user interface **220-7** on display screen **130** for viewing by a respective user **108-1**. The notification in graphical user interface **220-7** indicates that the user **108-1** previously requested installation of a WiFi™ access point in a vicinity of the location marked by symbol N displayed in map **740**.

[0136] Accordingly, embodiments herein can include providing the notification of a newly available wireless access point to the subscriber in response to detecting presence of the subscriber in a vicinity of the geographical location in which the subscriber previously requested installation of the new wireless access point.

[0137] In accordance with yet further embodiments, the network management application **240** can be configured to notify the user **108-1** that the new wireless access point is available in the particular area even though the user **108-1** did not previously request installation of the wireless access point. Thus, a given subscriber can be notified of the availability of a new wireless access point installation, which resulted from other subscribers requesting installation of the WiFi™ access point.

[0138] FIG. **8** is an example block diagram of a computer device for implementing any of the operations as discussed herein according to embodiments herein.

[0139] In one embodiment, network management application **240**, aggregator resource **140**, etc., are implemented by a computer such as computer system **850** to carry out one or more operations as discussed herein.

[0140] As shown, computer system **850** of the present example includes an interconnect **811**, a processor **813** (such as one or more processor devices, computer processor hardware, etc.), computer readable storage medium **812** (such as hardware storage to store data), I/O interface **814**, and communications interface **817**.

[0141] Interconnect **811** provides connectivity amongst processor **813**, computer readable storage media **812**, I/O interface **814**, and communication interface **817**.

[0142] I/O interface **814** provides connectivity to a repository **480** and, if present, other devices such as a playback device, display screen, input resource **792**, a computer mouse, etc.

[0143] Computer readable storage medium **812** (such as a non-transitory hardware medium) can be any hardware storage resource or device such as memory, optical storage, hard drive, rotating disk, etc. In one embodiment, the computer readable storage medium **812** stores instructions executed by processor **813**.

[0144] Communications interface **817** enables the computer system **850** and processor **813** to communicate over a resource such as network **190** to retrieve information from remote sources and communicate with other computers. I/O interface **814** enables processor **813** to retrieve stored information from repository **880**.

[0145] As shown, computer readable storage media **812** is encoded with network management application **240-1** (e.g., software, firmware, etc.) executed by processor **813**. Network management application **240-1** can be configured to include instructions to implement any of the operations as discussed herein.

[0146] During operation of one embodiment, processor **813** (e.g., computer processor hardware) accesses computer readable storage media **812** via the use of interconnect **811** in order to launch, run, execute, interpret or otherwise perform the instructions in network management application **240-1** stored on computer readable storage medium **812**.

[0147] Execution of the network management application **240-1** produces processing functionality such as network management process **240-2** in processor **813**. In other words, the network management process **240-2** associated with processor **813** represents one or more aspects of executing network management application **240-1** within or upon the processor **813** in the computer system **850**.

[0148] Those skilled in the art will understand that the computer system **850** can include other processes and/or software and hardware components, such as an operating system that controls allocation and use of hardware resources to execute management application **240-1**.

[0149] In accordance with different embodiments, note that computer system may be any of various types of devices, including, but not limited to, a wireless access point, a mobile computer, a personal computer system, a wireless device, base station, phone device, desktop computer, laptop, note-

book, netbook computer, mainframe computer system, handheld computer, workstation, network computer, application server, storage device, a consumer electronics device such as a camera, camcorder, set top box, mobile device, video game console, handheld video game device, a peripheral device such as a switch, modem, router, or in general any type of computing or electronic device. The computer system **850** may reside at any location or can be included in any suitable resource in network environment **100** to implement functionality as discussed herein.

[0150] Functionality supported by the different resources will now be discussed via flowcharts in FIGS. **9** and **10**. Note that the steps in the flowcharts below can be executed in any suitable order.

[0151] FIG. **9** is a flowchart **900** illustrating an example method according to embodiments. Note that there will be some overlap with respect to concepts as discussed above.

[0152] In processing block **910**, the mobile computer device **150-1** receives input **105-1** from a subscriber (e.g., user **108-1**) indicating to add a new wireless access point to network environment **100**. The input **105-1** specifies a geographical location in which the subscriber requests installation of the new wireless access point in the network environment **100**.

[0153] In processing block **920**, the mobile computer device **150-1** produces a message (e.g., installation request message **145-1**) to include the geographical location as specified by the input **105-1**. The message indicates that the subscriber requests installation of the new wireless access point at the specified geographical location.

[0154] In processing block **930**, the mobile computer device **150-1** initiates transmission of the message from the mobile computer device **150-1** to aggregator resource **140** at a remote location.

[0155] FIG. **10** is a flowchart **1000** illustrating an example method according to embodiments. Note that there will be some overlap with respect to concepts as discussed above.

[0156] In processing block **1010**, the aggregator resource **140** receives requests (such as installation request messages **145**) from multiple computer users in network environment **100**. Each of the requests specifies a corresponding geographical location in which a respective computer user desires installation of a respective new wireless access point in the network environment **100**.

[0157] In processing block **1020**, the aggregator resource **140** produces installation request information **170** indicating corresponding geographical locations as specified by the requests.

[0158] In processing block **1030**, the service provider **195** utilizes the installation request information **170** to identify locations in which to install new wireless access points in the geographical region.

[0159] Note again that techniques herein are well suited for use in installation of access points in wireless environments. However, it should be noted that embodiments herein are not limited to use in such applications and that the techniques discussed herein are well suited for other applications as well.

[0160] Based on the description set forth herein, numerous specific details have been set forth to provide a thorough understanding of claimed subject matter. However, it will be understood by those skilled in the art that claimed subject matter may be practiced without these specific details. In other instances, methods, apparatuses, systems, etc., that would be known by one of ordinary skill have not been described in detail so as not to obscure claimed subject matter. Some portions of the detailed description have been presented in terms of algorithms or symbolic representations of operations on data bits or binary digital signals stored within a computing system memory, such as a computer memory. These algorithmic descriptions or representations are examples of techniques used by those of ordinary skill in the data processing arts to convey the substance of their work to others skilled in the art. An algorithm as described herein, and generally, is considered to be a self-consistent sequence of operations or similar processing leading to a desired result. In this context, operations or processing involve physical manipulation of physical quantities. Typically, although not necessarily, such quantities may take the form of electrical or magnetic signals capable of being stored, transferred, combined, compared or otherwise manipulated. It has been convenient at times, principally for reasons of common usage, to refer to such signals as bits, data, values, elements, symbols, characters, terms, numbers, numerals or the like. It should be understood, however, that all of these and similar terms are to be associated with appropriate physical quantities and are merely convenient labels. Unless specifically stated otherwise, as apparent from the following discussion, it is appreciated that throughout this specification discussions utilizing terms such as "processing," "computing," "calculating," "determining" or the like refer to actions or processes of a computing platform, such as a computer or a similar electronic computing device, that manipulates or transforms data represented as physical electronic or magnetic quantities within memories, registers, or other information storage devices, transmission devices, or display devices of the computing platform.

[0161] While this invention has been particularly shown and described with references to preferred embodiments thereof, it will be understood by those skilled in the art that various changes in form and details may be made therein without departing from the spirit and scope of the present application as defined by the appended claims. Such variations are intended to be covered by the scope of this present application. As such, the foregoing description of embodiments of the present application is not intended to be limiting. Rather, any limitations to the invention are presented in the following claims.

We claim:

1. A method comprising:

receiving input from a subscriber operating a computer device to add a new wireless access point to a network environment, the input specifying a geographical location in which the subscriber requests installation of the new wireless access point in the network environment; producing a message to include the geographical location as specified by the input, the message indicating that the subscriber requests installation of the new wireless access point at the geographical location; and

initiating transmission of the message from the computer device to an aggregator resource at a remote location.

2. The method as in claim **1** further comprising:

receiving the input from a graphical user interface displayed on a display screen of the computer device, the graphical user interface including a selectable option to request the installation of the new wireless access point at the geographical location.

3. The method as in claim 1 further comprising:

detecting a current location of the computer device;

initiating display of a map of a geographical region on a display screen of the computer device, the map of the geographical region including the current location of the computer device; and

initiating display of a first symbol on the displayed map, the first symbol indicating the current location of the computer device in the geographical region.

4. The method as in claim 3 further comprising:

from the subscriber, receiving selection of the geographical location via input to the displayed map; and

initiating display of a second symbol on the map, the second symbol indicating the geographical location selected by the subscriber for the installation of the new wireless access point.

5. The method as in claim 3 further comprising:

initiating display of a visual indication on the map, the visual indication indicating locations in the geographical region where other subscribers requested installation of one or more new wireless access points.

6. The method as in claim 1, wherein the geographical location included in the message is a current location of the computer device.

7. The method as in claim 2 further comprising:

initiating display of a notification to the subscriber operating the computer device in response to detecting activation of a non-WiFi™ wireless communication link by the computer device to communicate in the network environment, the notification prompting the subscriber to input the request.

8. The method as in claim 1 further comprising:

obtaining a unique identifier value; and

including the unique identifier value in the message to indicate an identity of the subscriber requesting the installation of the new wireless access point.

9. The method as in claim 2 further comprising:

in response to detecting presence of the computer device in a particular geographical region, initiating display of a visual prompt on the display screen, the visual prompt providing notification that the subscriber operating the computer device can request installation of the new wireless access point.

10. The method as in claim 2 further comprising:

monitoring a current location of the computer device;

in response to detecting: i) presence of the computer device in a vicinity of a geographical region in which other subscribers of computer devices have requested installation of a respective new wireless access point, and ii) that a number of the other subscribers requesting the installation of the respective new wireless access point at the geographical location is above a threshold value, initiating display of a graphical user interface to the subscriber operating the computer device, the graphical user interface including a selectable option for the subscriber to request installation of the new wireless access point in the network environment.

11. The method as in claim 1 further comprising:

subsequent to installation of the new wireless access point, providing a notification to the subscriber, the notification indicating presence of and location of the newly installed wireless access point.

12. The method as in claim 11 further comprising:

providing the notification to the subscriber in response to detecting presence of the subscriber in a vicinity of the geographical location in which the subscriber previously requested installation of the new wireless access point.

13. A method comprising:

receiving requests from multiple computer users in a network environment, each of the requests specifying a corresponding geographical location in which a respective computer user desires installation of a respective new wireless access point in the network environment;

producing installation request information indicating corresponding geographical locations as specified by the requests; and

utilizing the installation request information to identify locations in which to install new wireless access points in the geographical region.

14. The method as in claim 13 further comprising:

producing a map of a geographical region in the network environment, the map including symbols to indicate the corresponding geographical locations as specified by the requests.

15. The method as in claim 13, wherein utilizing the installation request information to identify locations in which to install new wireless access points in the geographical region includes:

identifying a specific region in the network environment in which a number of computer users above a threshold value requests installation of a wireless access point in the specific region, the specific region located within the geographical region; and

initiating installation of a new wireless access point in a vicinity of the specific region.

16. The method as in claim 15, wherein receiving requests from multiple computer users in the network environment includes:

receiving a first request, the first request received from a first computer user in the network environment requesting installation of a wireless access point at a first location within the specific region; and

receiving a second request, the second request received from a second computer user in the network environment requesting installation of a wireless access point at a second location within the specific region.

17. The method as in claim 13, wherein utilizing the installation request information to identify locations in which to install new wireless access points in the geographical region includes:

analyzing the installation request information to identify zones within the geographical region that include requests for installation of a new wireless access point per unit area above a threshold value; and

providing notification of the zones present in the geographical region.

18. The method as in claim 13 further comprising:

initiating transmission of the installation request information to a particular computer user in the geographical region to notify the particular computer user of corresponding geographical locations in which other respective computer user requested installation of new wireless access points in the network environment.

19. The method as in claim 18 further comprising:

initiating transmission of the installation request information to the particular computer user in response to detec-

tion that the particular computer user is currently located in an area in which multiple other users previously requested installation of a new wireless access point in the area.

20. The method as in claim **13** further comprising:

for each respective request of the received requests:

receiving a unique identifier value assigned to a corresponding computer device generating the respective request; and

receiving location information indicating a location in which a user of the corresponding computer device desires installation of a new wireless access point.

21. The method as in claim **13** further comprising:

reviewing subscription levels associated with the multiple computer users; and

initiating installation of new wireless access points at the locations in the geographical region based at least in part on the subscription levels.

22. A computer system comprising:

computer processor hardware; and

a hardware storage resource coupled to the computer processor hardware, the hardware storage resource storing instructions that, when executed by the computer processor hardware, causes the computer processor hardware to perform operations of:

receiving input from a subscriber operating a computer device to add a new wireless access point to a network environment, the input specifying a geographical location in which the subscriber requests installation of the new wireless access point in the network environment;

producing a message to include the geographical location as specified by the input, the message indicating that the subscriber requests installation of the new wireless access point at the geographical location; and

initiating transmission of the message from the computer device to an aggregator resource at a remote location.

23. The computer system as in claim **22**, wherein the computer processor hardware further performs operations of:

receiving the input from a graphical user interface displayed on a display screen of the computer device, the graphical user interface including a selectable option to request the installation of the new wireless access point at the geographical location.

24. The computer system as in claim **22**, wherein the computer processor hardware further performs operations of:

detecting a current location of the computer device;

initiating display of a map of a geographical region on a display screen of the computer device, the map of the geographical region including the current location of the computer device; and

initiating display of a first symbol on the displayed map, the first symbol indicating the current location of the computer device in the geographical region.

25. The computer system as in claim **24**, wherein the computer processor hardware further performs operations of:

from the subscriber, receiving selection of the geographical location via input to the displayed map; and

initiating display of a second symbol on the map, the second symbol indicating the geographical location selected by the subscriber for the installation of the new wireless access point.

26. The computer system as in claim **24**, wherein the computer processor hardware further performs operations of:

initiating display of a visual indication on the map, the visual indication indicating locations in the geographical region where other subscribers requested installation of one or more new wireless access points.

27. The computer system as in claim **23**, wherein the computer processor hardware further performs operations of:

initiating display of a notification to the subscriber operating the computer device in response to detecting activation of a non-WiFi™ wireless communication link by the computer device to communicate in the network environment, the notification prompting the subscriber to input the request.

28. The computer system as in claim **22**, wherein the computer processor hardware further performs operations of:

obtaining a unique identifier value; and

including the unique identifier value in the message to indicate an identity of the subscriber requesting the installation of the new wireless access point.

29. The computer system as in claim **23**, wherein the computer processor hardware further performs operations of:

in response to detecting presence of the computer device in a particular geographical region, initiating display of a visual prompt on the display screen, the visual prompt providing notification that the subscriber operating the computer device can request installation of the new wireless access point.

30. The computer system as in claim **22**, wherein the computer processor hardware further performs operations of:

subsequent to installation of the new wireless access point, providing a notification to the subscriber, the notification indicating presence of and location of the newly installed wireless access point.

31. The computer system as in claim **30**, wherein the computer processor hardware further performs operations of:

providing the notification to the subscriber in response to detecting presence of the subscriber in a vicinity of the geographical location in which the subscriber previously requested installation of the new wireless access point.

32. Computer-readable hardware storage having instructions stored thereon, the instructions, when carried out by computer processor hardware, causes the computer processor hardware to perform operations of:

receiving input from a subscriber operating a computer device to add a new wireless access point to a network environment, the input specifying a geographical location in which the subscriber requests installation of the new wireless access point in the network environment;

producing a message to include the geographical location as specified by the input, the message indicating that the subscriber requests installation of the new wireless access point at the geographical location; and

initiating transmission of the message from the computer device to an aggregator resource at a remote location.

33. The method as in claim **1**, wherein the received input from the subscriber indicates whether the specified geographical location is an indoor location or outdoor location.

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