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Antarkar et al.

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(54) **CELLULAR DATA TESTING SYSTEM**

(71) Applicant: **Verizon Patent and Licensing Inc.**, Arlington, VA (US)

(72) Inventors: **Vinayak Antarkar**, Lexington, VA (US); **Venkat G. Kolli**, Shirley, MA (US); **Gong Zhang**, Waltham, MA (US); **Jian Huang**, Sudbury, MA (US)

(73) Assignee: **VERIZON PATENT AND LICENSING INC.**, Basking Ridge, NJ (US)

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H04W 24/08 (2009.01)
H04W 4/02 (2009.01)

(52) **U.S. Cl.**
CPC ***H04W 24/08*** (2013.01); ***H04W 4/02*** (2013.01)

(58) **Field of Classification Search**
CPC H04W 16/18; H04W 16/22; H04W 24/00; H04W 28/08; H04W 28/16; H04W 36/22; H04W 16/06; H04W 28/04; H04W 28/18; H04W 28/24; H04W 72/085
USPC 455/423–425, 452.2, 453
See application file for complete search history.

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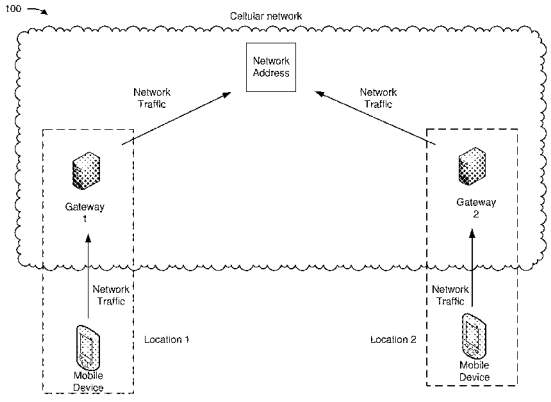
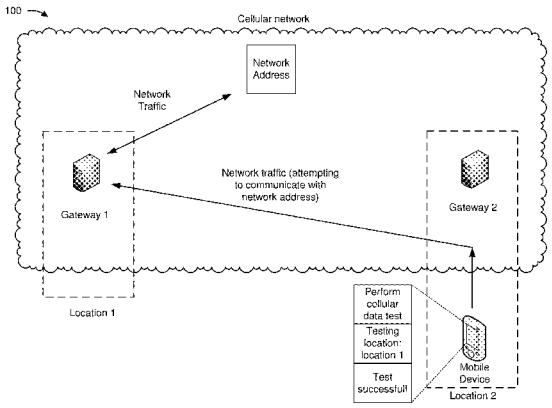
Primary Examiner — Kamran Afshar
Assistant Examiner — Nicole Louis-Fils

(57) **ABSTRACT**

A device may receive preferences related to performing cellular data testing in a cellular network. The preferences may identify one or more target network addresses. The device may receive location information identifying a testing location. The device may configure a component of the device to set a location of the device based on the location information. The device may perform a cellular data test by transmitting network traffic to the one or more target network addresses via a gateway associated with the testing location. The device may determine a result of the cellular data testing based on transmitting the network traffic. The device may selectively provide a notification based on the result.

20 Claims, 15 Drawing Sheets





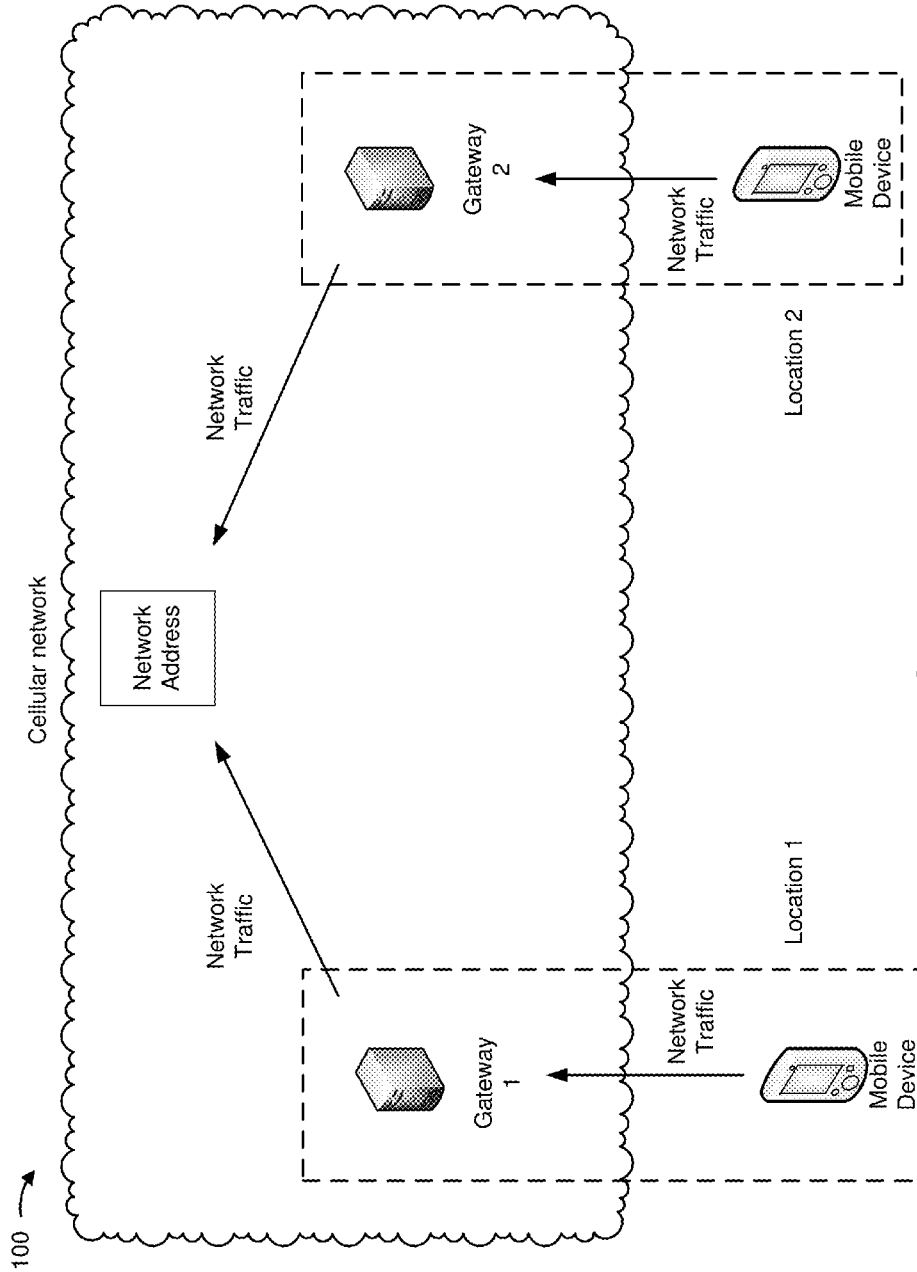

100
Cellular network
Network Address
Network Traffic
Network Traffic
Gateway 1
Gateway 2
Network Traffic
Network Traffic
Location 1
Location 2
Mobile Device
Mobile Device

FIG. 1A

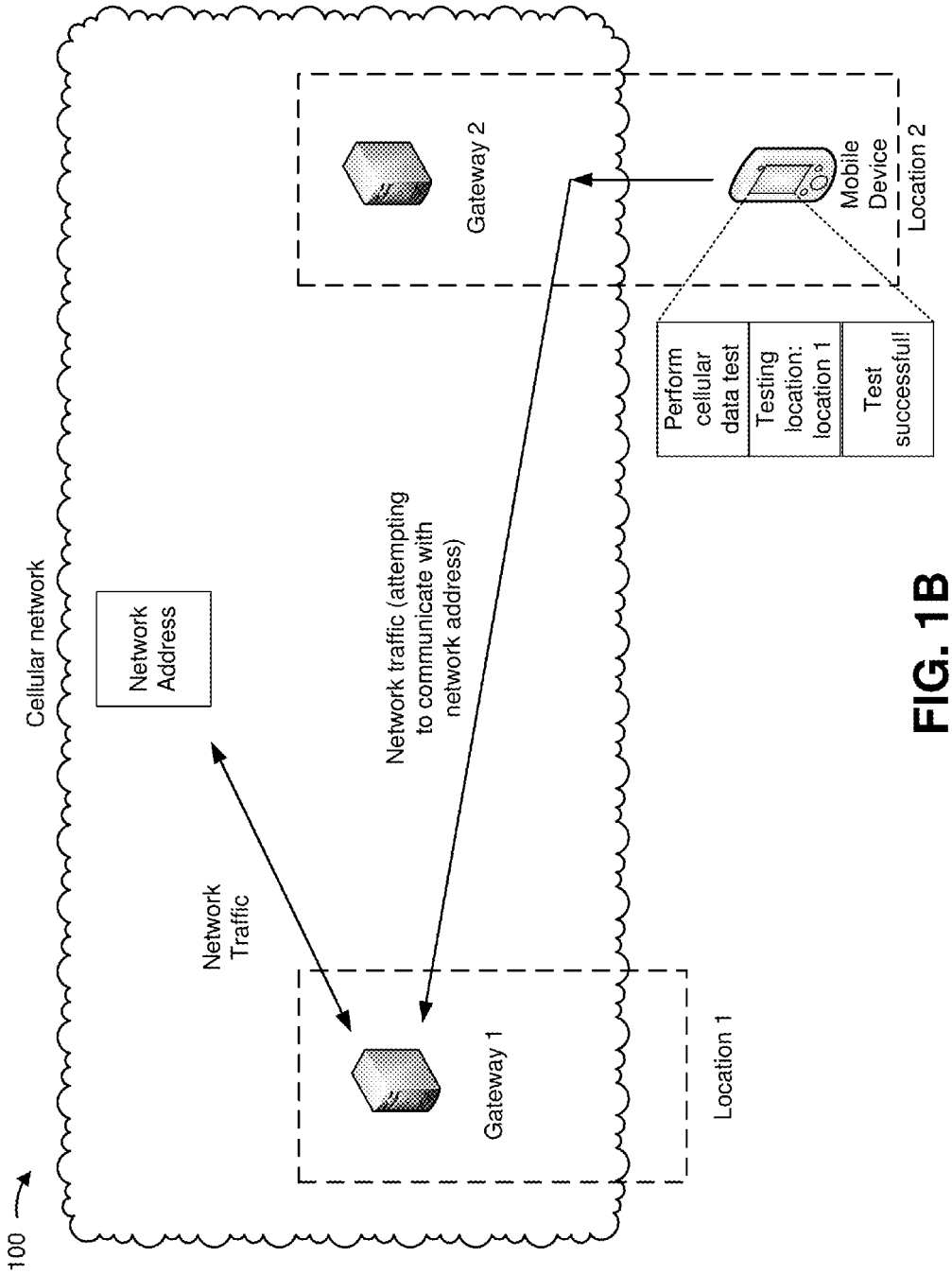

100
Cellular network
Network Address
Network Traffic
Network traffic (attempting to communicate with network address)
Gateway 1
Location 1
Gateway 2
Mobile Device
Location 2
Perform cellular data test
Testing location: location 1
Test successful!

FIG. 1B

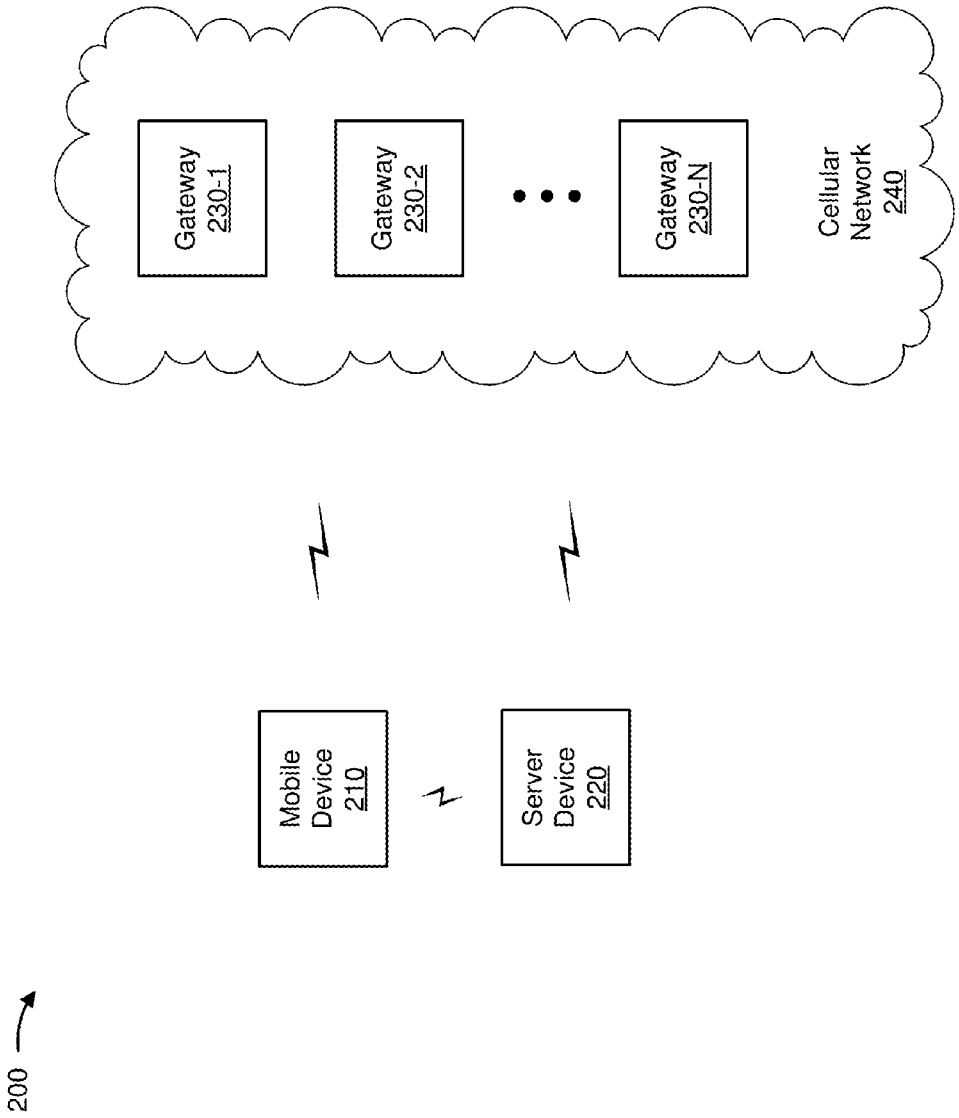

Gateway 230-1
Gateway 230-2
Gateway 230-N
Cellular Network 240
Mobile Device 210
Server Device 220
200

FIG. 2

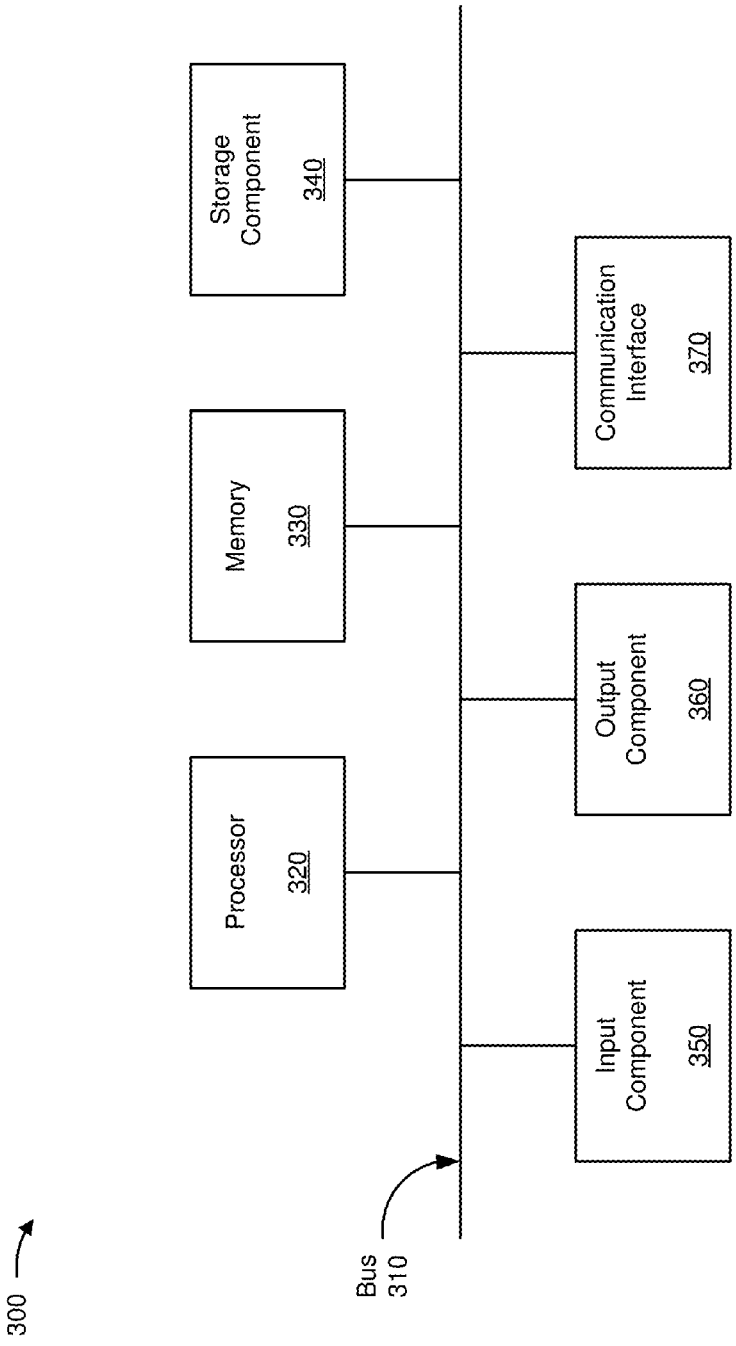

300
Bus
310
Processor
320
Memory
330
Storage
Component
340
Input
Component
350
Output
Component
360
Communication
Interface
370

FIG. 3

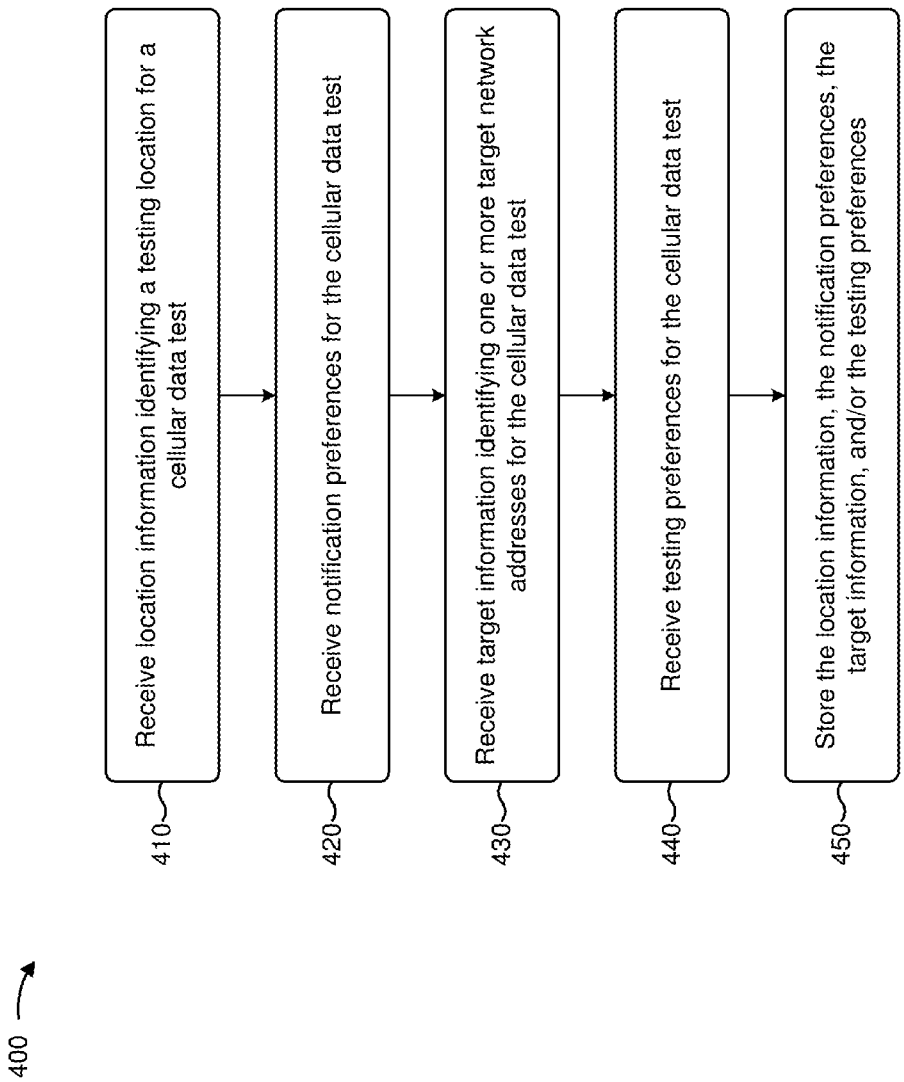

400
Receive location information identifying a testing location for a cellular data test
410
Receive notification preferences for the cellular data test
420
Receive target information identifying one or more target network addresses for the cellular data test
430
Receive testing preferences for the cellular data test
440
Store the location information, the notification preferences, the target information, and/or the testing preferences
450

FIG. 4

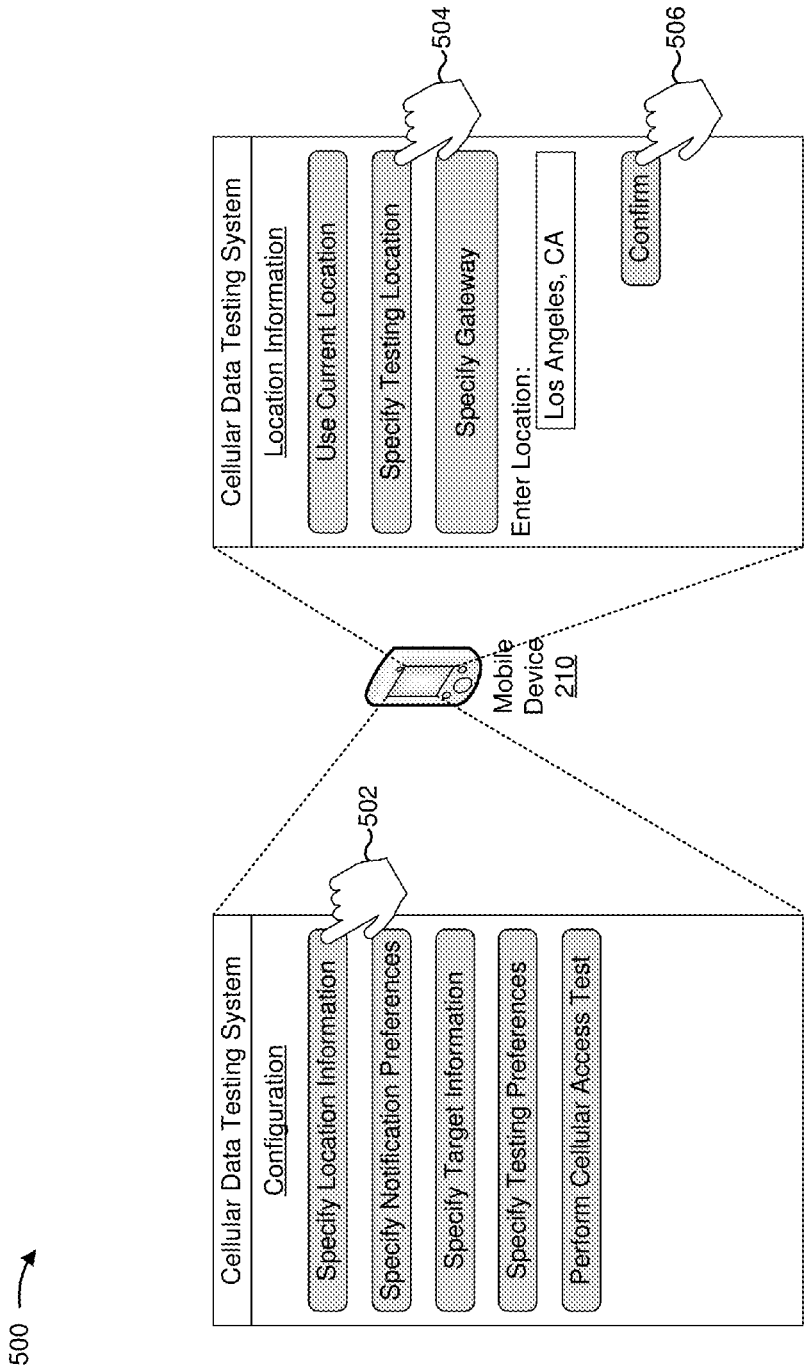

500
Cellular Data Testing System
Configuration
Specify Location Information
Specify Notification Preferences
Specify Target Information
Specify Testing Preferences
Perform Cellular Access Test
502
Mobile Device 210
Cellular Data Testing System
Location Information
Use Current Location
Specify Testing Location
Specify Gateway
Enter Location:
Los Angeles, CA
Confirm
504
506

FIG. 5A

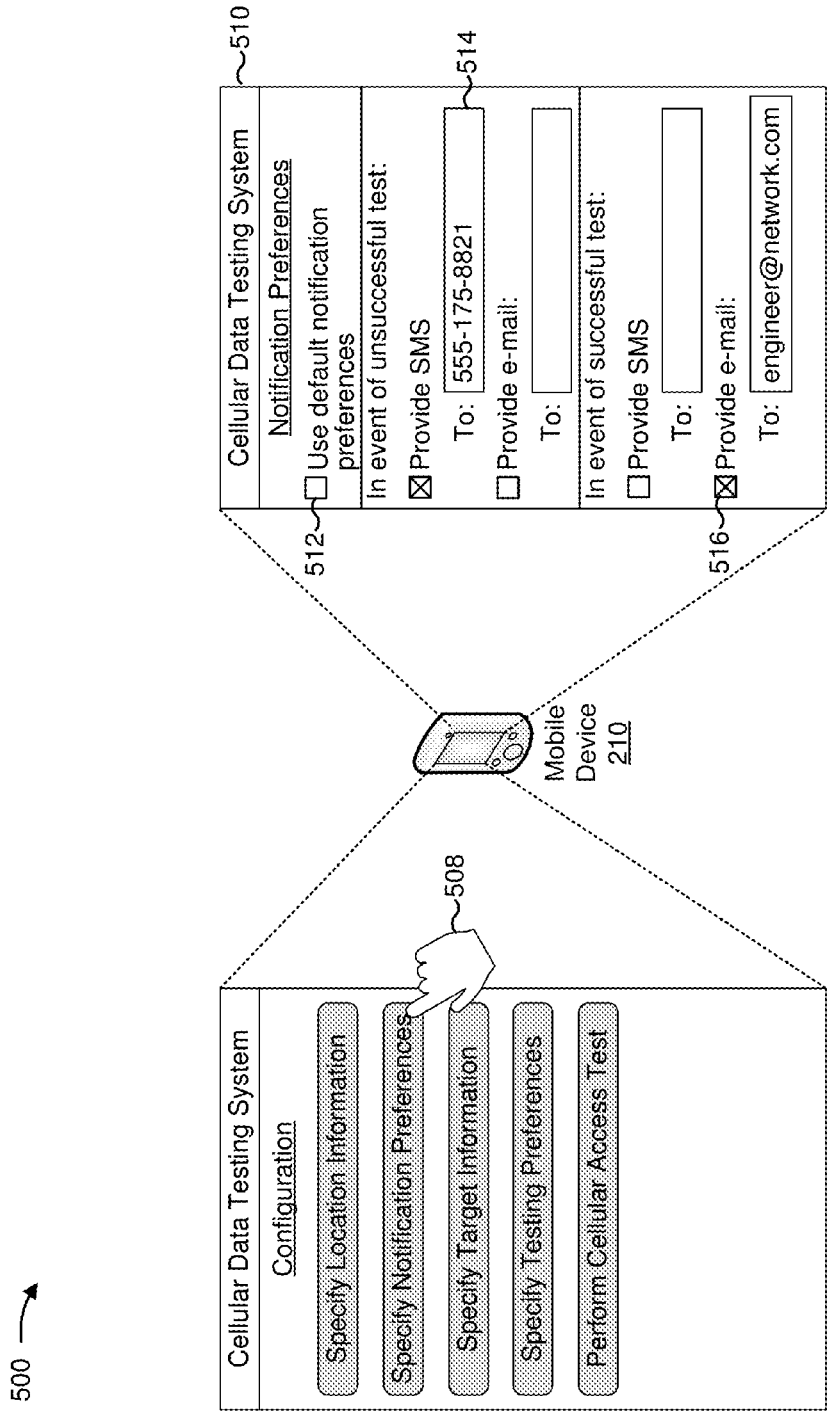

500
Cellular Data Testing System
Configuration
Specify Location Information
Specify Notification Preferences
Specify Target Information
Specify Testing Preferences
Perform Cellular Access Test
508
Mobile Device 210
Cellular Data Testing System
Notification Preferences
Use default notification preferences
512
In event of unsuccessful test:
Provide SMS
To: 555-175-8821
514
Provide e-mail:
To:
In event of successful test:
Provide SMS
To:
Provide e-mail:
To: engineer@network.com
516
510

FIG. 5B

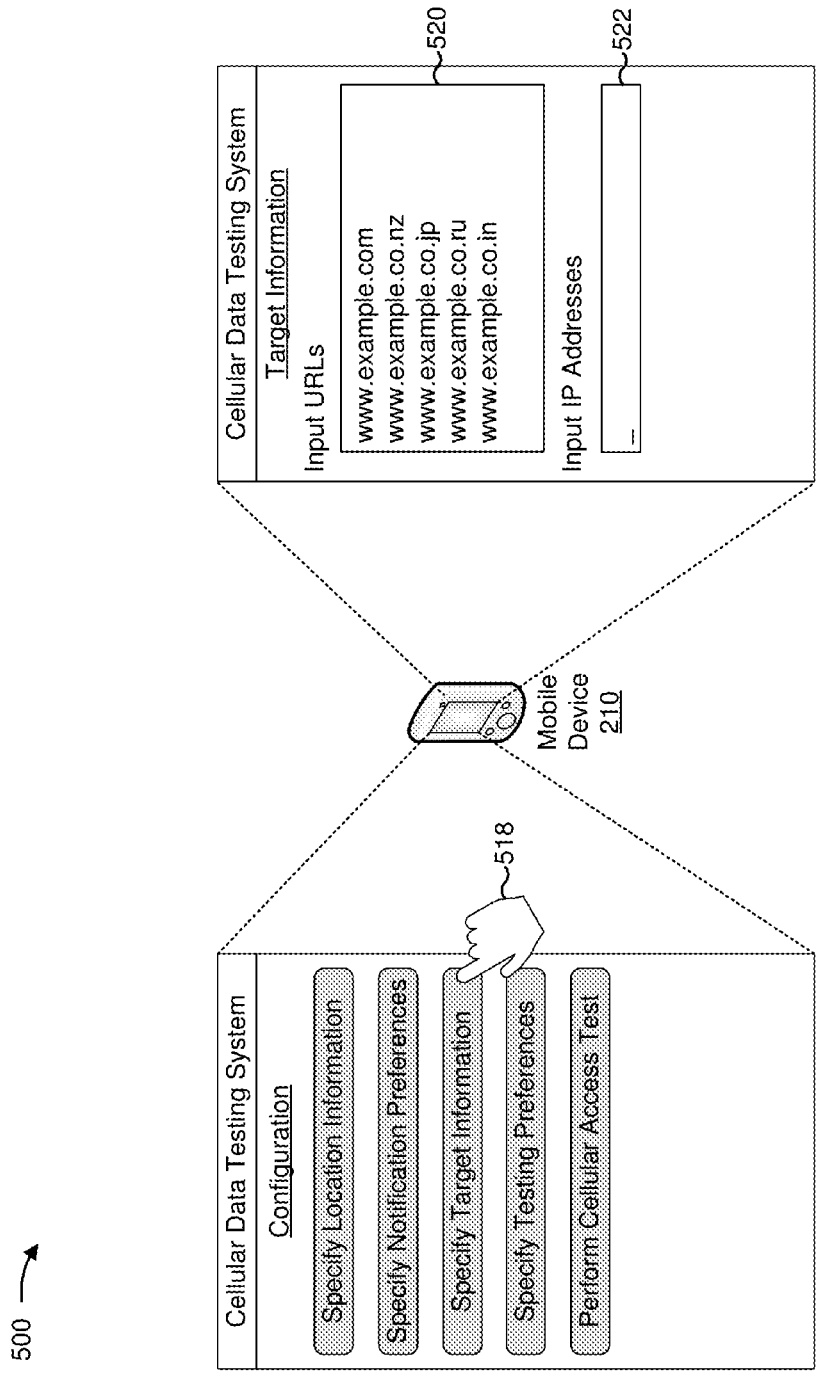

500
Cellular Data Testing System
Configuration
Specify Location Information
Specify Notification Preferences
Specify Target Information
Specify Testing Preferences
Perform Cellular Access Test
518
Mobile Device 210
Cellular Data Testing System
Target Information
Input URLs
www.example.com
www.example.co.nz
www.example.co.jp
www.example.co.ru
www.example.co.in
520
Input IP Addresses
522

FIG. 5C

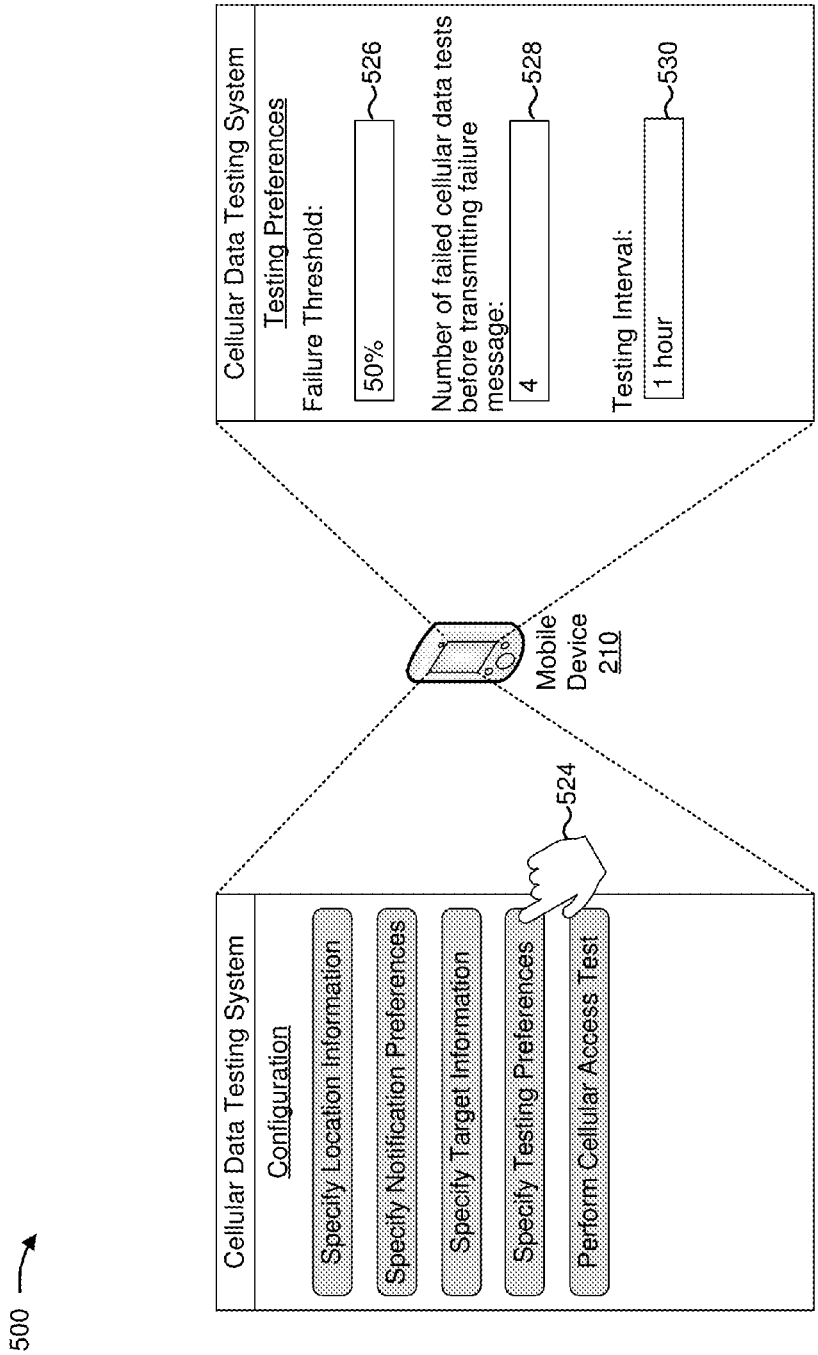

500
Cellular Data Testing System
Configuration
Specify Location Information
Specify Notification Preferences
Specify Target Information
Specify Testing Preferences
Perform Cellular Access Test
524
Mobile Device 210
Cellular Data Testing System
Testing Preferences
Failure Threshold:
50%
526
Number of failed cellular data tests before transmitting failure message:
4
528
Testing Interval:
1 hour
530

FIG. 5D

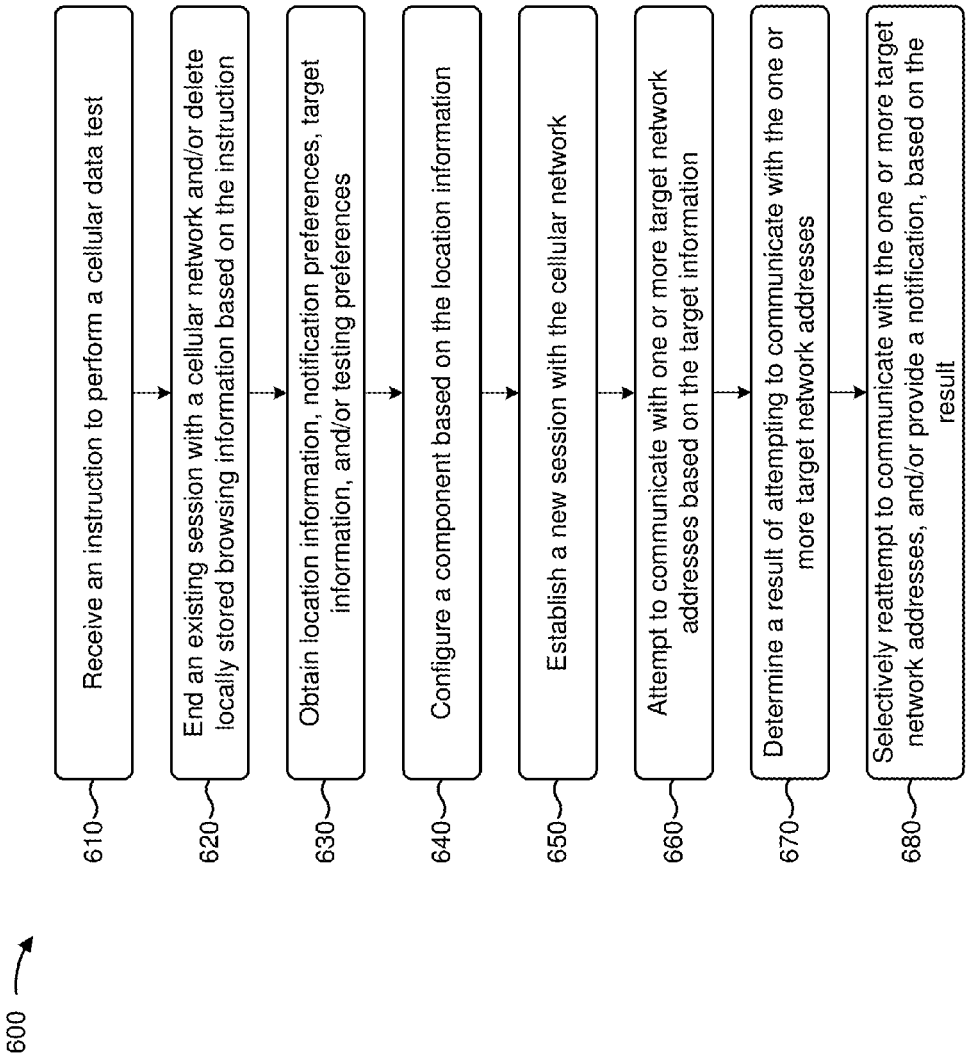

600
610
Receive an instruction to perform a cellular data test
620
End an existing session with a cellular network and/or delete locally stored browsing information based on the instruction
630
Obtain location information, notification preferences, target information, and/or testing preferences
640
Configure a component based on the location information
650
Establish a new session with the cellular network
660
Attempt to communicate with one or more target network addresses based on the target information
670
Determine a result of attempting to communicate with the one or more target network addresses
680
Selectively reattempt to communicate with the one or more target network addresses, and/or provide a notification, based on the result

FIG. 6

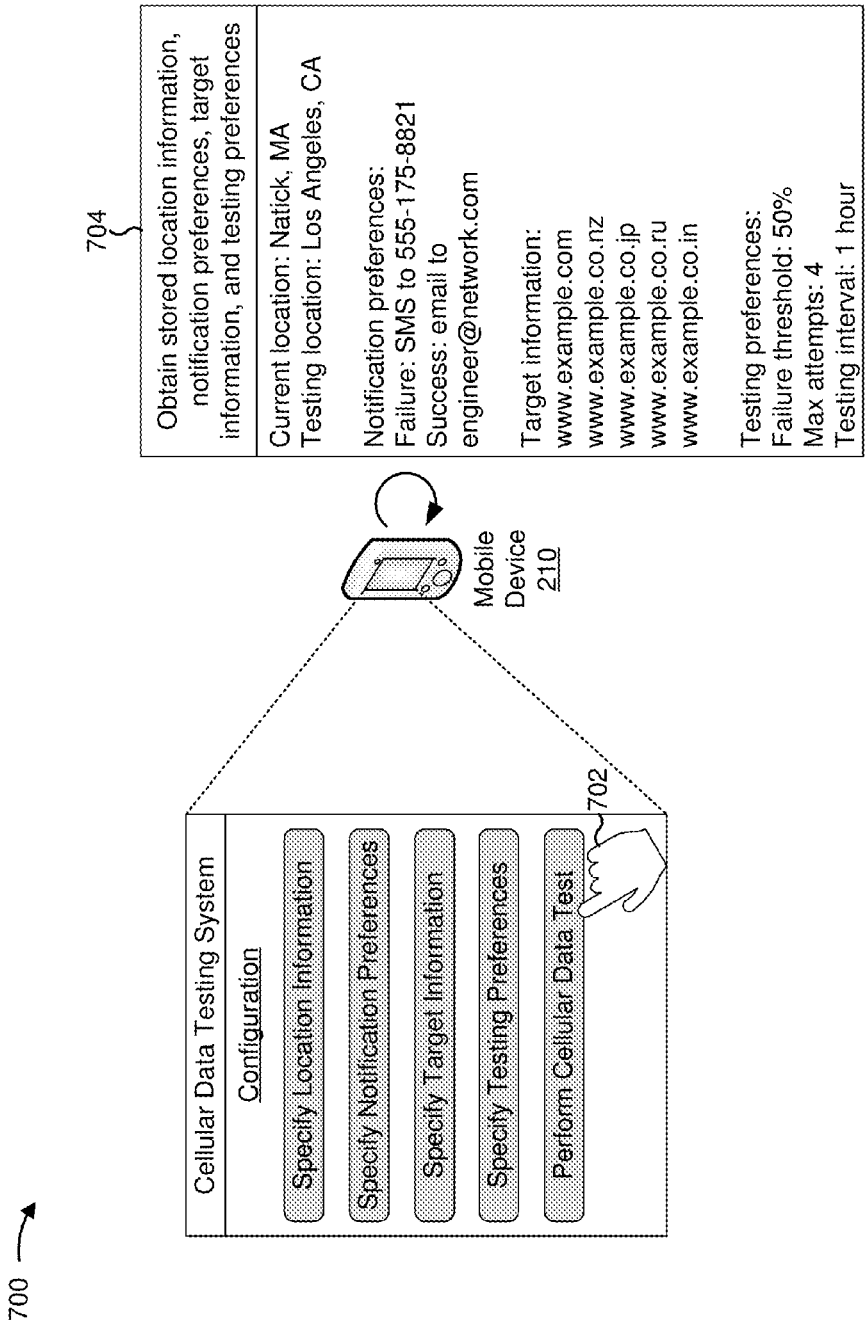

700
Cellular Data Testing System
Configuration
Specify Location Information
Specify Notification Preferences
Specify Target Information
Specify Testing Preferences
Perform Cellular Data Test
702
Mobile Device 210
704
Obtain stored location information, notification preferences, target information, and testing preferences
Current location: Natick, MA
Testing location: Los Angeles, CA
Notification preferences:
Failure: SMS to 555-175-8821
Success: email to engineer@network.com
Target information:
www.example.com
www.example.co.nz
www.example.co.jp
www.example.co.ru
www.example.co.in
Testing preferences:
Failure threshold: 50%
Max attempts: 4
Testing interval: 1 hour

FIG. 7A

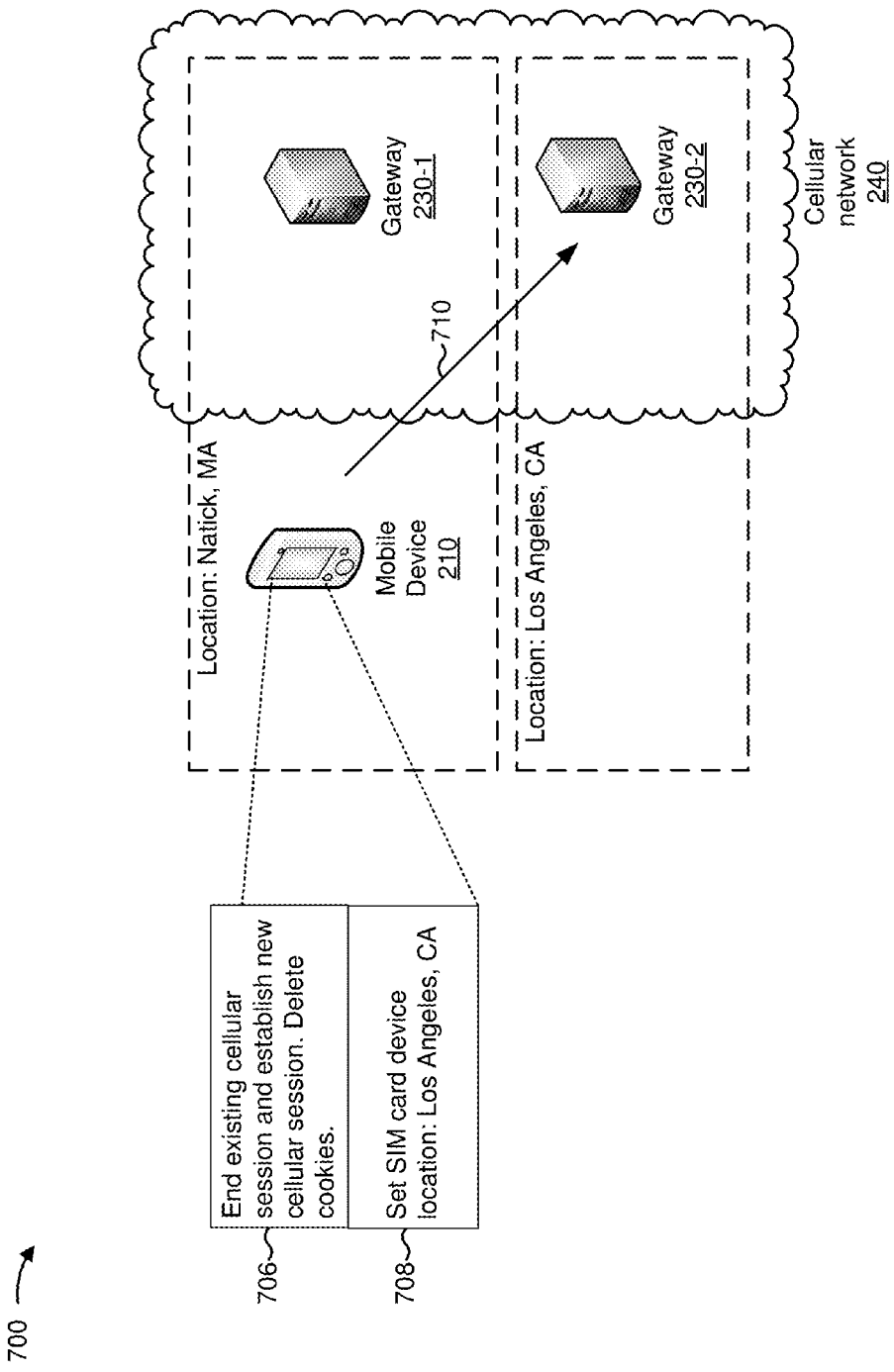

700
Location: Natick, MA
Location: Los Angeles, CA
Cellular network 240
Gateway 230-1
Gateway 230-2
Mobile Device 210
710
End existing cellular session and establish new cellular session. Delete cookies.
706
Set SIM card device location: Los Angeles, CA
708

FIG. 7B

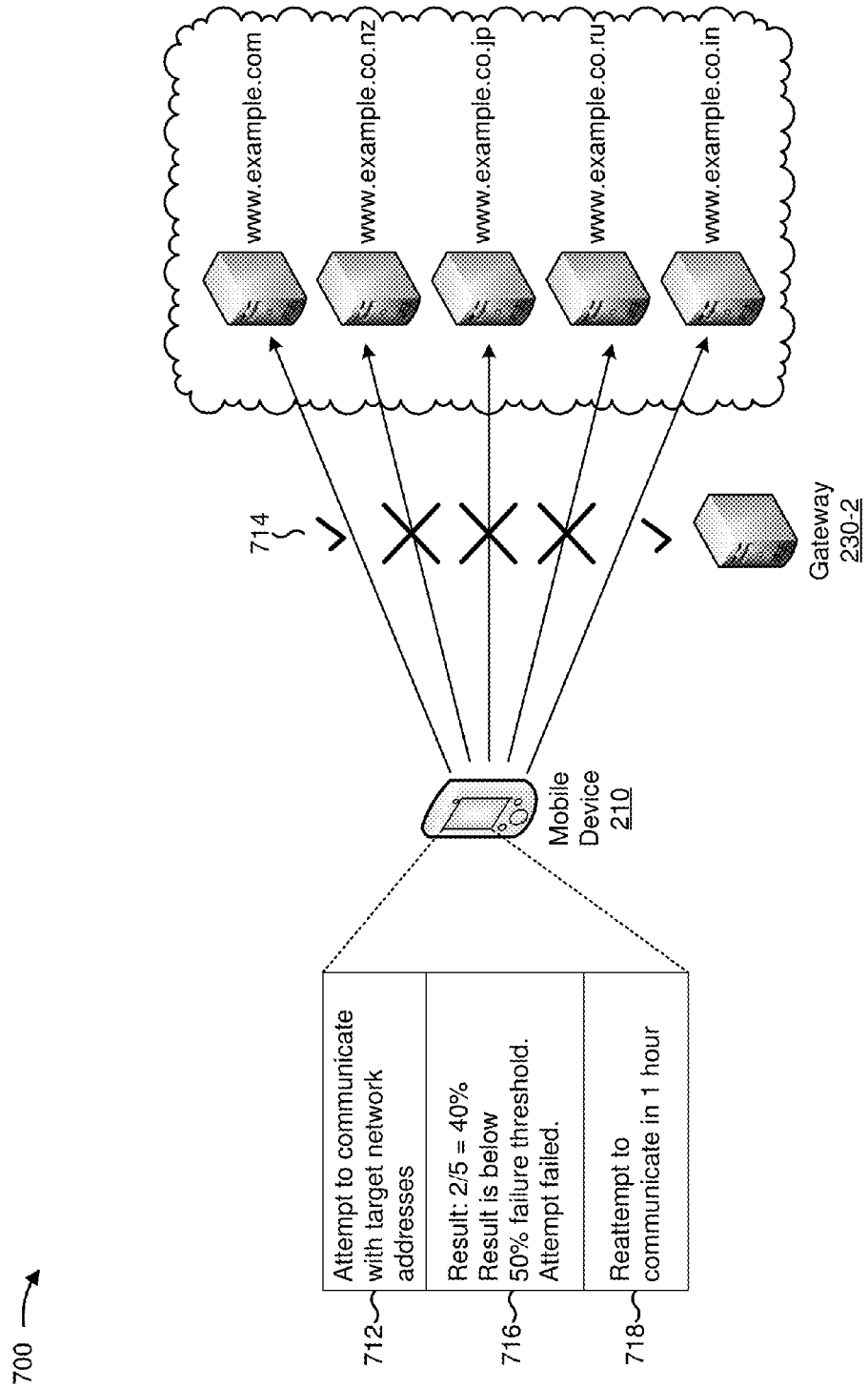

700
712
Attempt to communicate with target network addresses
716
Result: 2/5 = 40%
Result is below 50% failure threshold.
Attempt failed.
718
Reattempt to communicate in 1 hour
Mobile Device 210
714
Gateway 230-2
www.example.com
www.example.co.nz
www.example.co.jp
www.example.co.ru
www.example.co.in

FIG. 7C

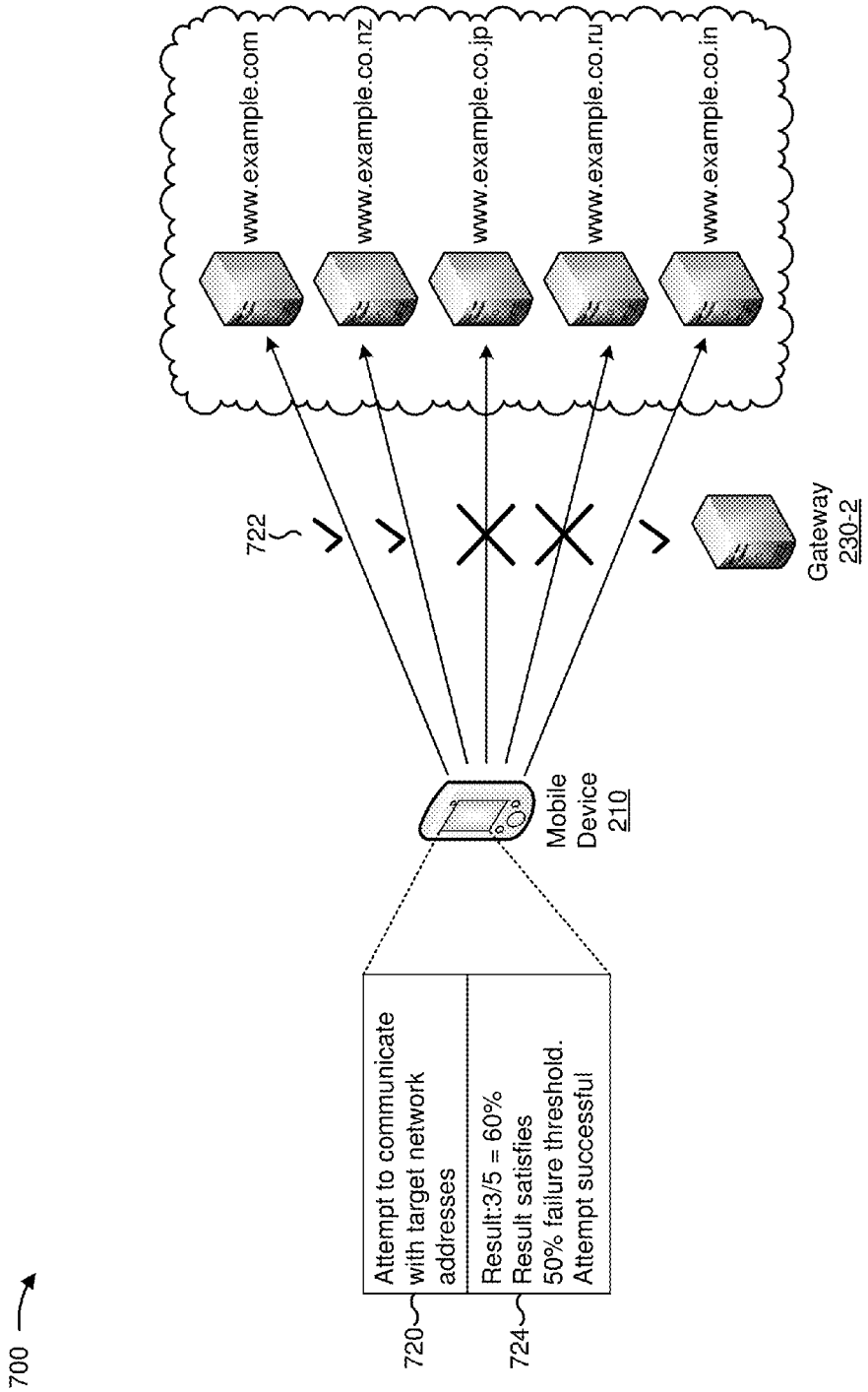

700
720
Attempt to communicate with target network addresses
724
Result:3/5 = 60%
Result satisfies 50% failure threshold.
Attempt successful
Mobile Device 210
722
Gateway 230-2
www.example.com
www.example.co.nz
www.example.co.jp
www.example.co.ru
www.example.co.in

FIG. 7D

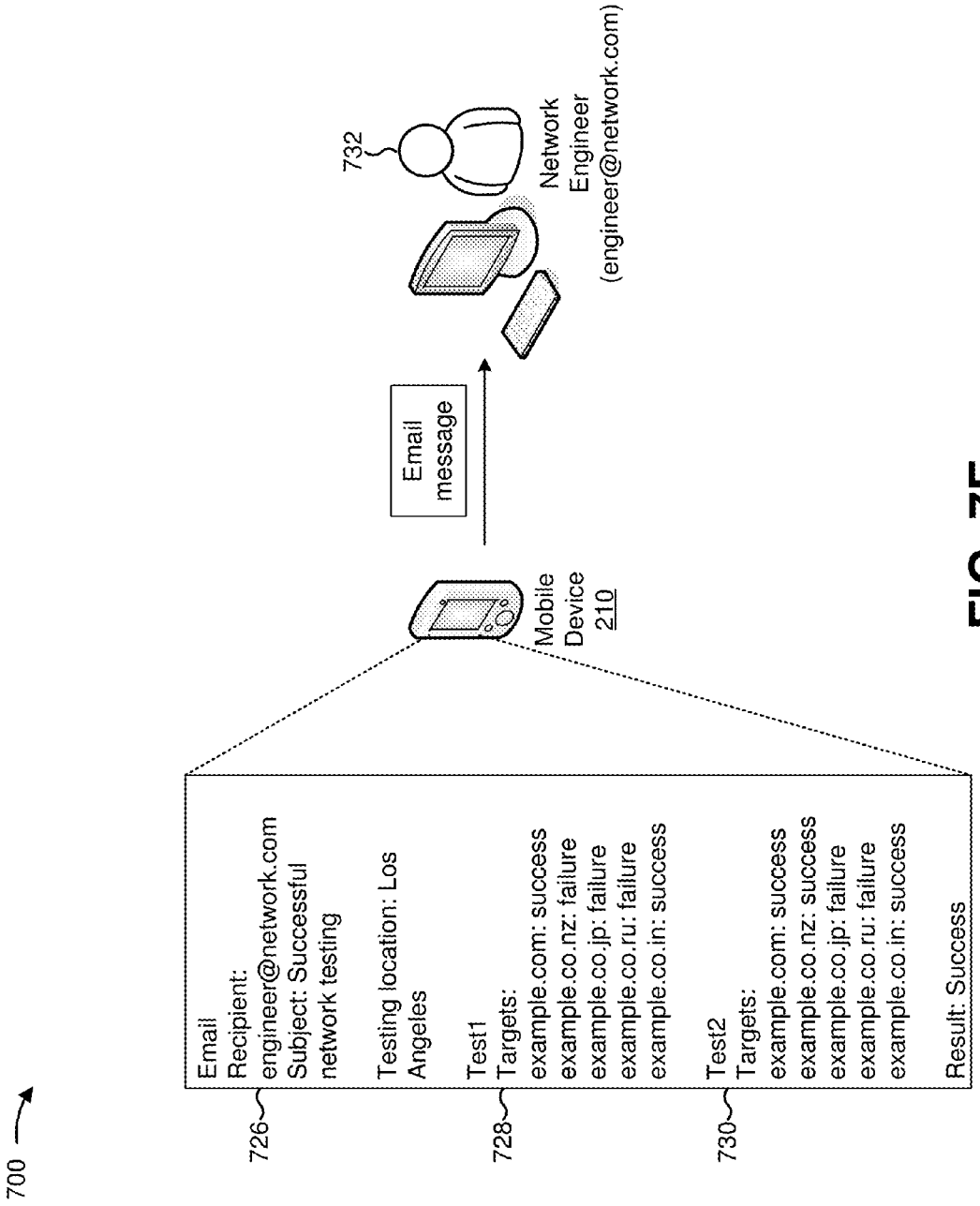

700
726
Email
Recipient:
engineer@network.com
Subject: Successful
network testing
Testing location: Los
Angeles
728
Test1
Targets:
example.com: success
example.co.nz: failure
example.co.jp: failure
example.co.ru: failure
example.co.in: success
730
Test2
Targets:
example.com: success
example.co.nz: success
example.co.jp: failure
example.co.ru: failure
example.co.in: success
Result: Success
Mobile
Device
210
Email
message
732
Network
Engineer
(engineer@network.com)

FIG. 7E

CELLULAR DATA TESTING SYSTEM

BACKGROUND

A mobile device may communicate with other devices via a cellular network. Devices of the cellular network may route network traffic (e.g., packets, etc.) from the mobile device to the other devices and/or from the other devices to the mobile device.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGS. **1**A and **1**B are diagrams of an overview of an example implementation described herein;

FIG. **2** is a diagram of an example environment in which systems and/or methods, described herein, may be implemented;

FIG. **3** is a diagram of example components of one or more devices of FIG. **2**;

FIG. **4** is a flow chart of an example process for configuring a cellular data testing system;

FIGS. **5**A-**5**D are diagrams of an example implementation relating to the example process shown in FIG. **4**;

FIG. **6** is a flow chart of an example process for performing a cellular data test; and

FIGS. **7**A-**7**E are diagrams of an example implementation relating to the example process shown in FIG. **6**.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

The following detailed description of example implementations refers to the accompanying drawings. The same reference numbers in different drawings may identify the same or similar elements.

A mobile device may provide network traffic (e.g., packets, etc.) to another device, and/or may receive network traffic from the other device, via a cellular network. The mobile device may be associated with a particular location. Gateways, associated with the cellular network, may provide the network traffic based on the particular location. For example, a first gateway may be associated with a first location, a second gateway may be associated with a second location, and so on. The mobile device may test whether a gateway is functioning correctly by attempting to provide network traffic to a set of target network addresses via the gateways. However, the mobile device may be capable of testing only a subset of the gateways associated with the cellular network, based on only the subset of the gateways being associated with the particular location of the mobile device. Implementations described herein may enable the mobile device to test gateways associated with another location (e.g., a location remote from the mobile device), by reconfiguring the mobile device to transmit network traffic to the set of target network addresses as if located at the other location.

FIGS. **1**A and **1**B are diagrams of an overview of an example implementation **100** described herein. As shown in FIG. **1**A, mobile devices may transmit network traffic to a network address (e.g., to a device associated with the network address). As shown, a first gateway (e.g., gateway **1**) may provide network traffic associated with mobile devices that are located at a first location (e.g., location **1**) and a second gateway (e.g., gateway **2**) may provide network traffic associated with mobile devices that are located at a second location (e.g., location **2**).

As shown in FIG. **1**B, a mobile device at location **2** may perform a cellular data test. As further shown, the mobile device may determine to perform the cellular data test based on a testing location of location **1**. Assume that the mobile device configures a component of the mobile device (e.g., a subscriber identity module (SIM) card of the mobile device) so that the cellular network routes network traffic, associated with the mobile device, via gateway **1**. As shown, the mobile device may transmit network traffic via gateway **1** to perform the cellular data test with regard to the network address. As shown, the mobile device may determine that the cellular data test is successful. For example, the mobile device may determine that the cellular data test is successful based on receiving network traffic from the network address (e.g., in response to the network traffic transmitted to the network address via gateway **1**).

In this way, the mobile device may test a cellular data connection by transmitting network traffic to a network address. The mobile device, at a first location, may cause the network traffic to be routed via a gateway at a second location, which may conserve resources used to test the gateway at the second location and/or improve versatility of the cellular data testing system.

FIG. **2** is a diagram of an example environment **200** in which systems and/or methods, described herein, may be implemented. As shown in FIG. **2**, environment **200** may include a mobile device **210**, a server device **220**, one or more gateways **230-1** through **230**-N (N≥1) (hereinafter referred to collectively as "gateways **230**," and individually as "gateway **230**"), and a cellular network **240**. Devices of environment **200** may interconnect via wired connections, wireless connections, or a combination of wired and wireless connections.

Mobile device **210** may include a device capable of receiving, generating, storing, processing, and/or providing information via cellular network **240**. For example, mobile device **210** may include a communications and/or computing device, such as a mobile phone (e.g., a smart phone, etc.), a laptop computer, a tablet computer, a handheld computer, or a similar device. Mobile device **210** may establish a session with cellular network **240**. Mobile device **210** may provide network traffic to and/or receive network traffic from devices associated with one or more target network addresses. Mobile device **210** may include a subscriber identity model (SIM) card, which may identify a location associated with mobile device **210**. Mobile device **210** may modify the location identified by the SIM card based on information identifying a testing location.

Server device **220** may include one or more devices capable of receiving, generating, storing, processing, and/or providing information. For example, server device **220** may include a computing device, such as a server, a desktop computer, a laptop computer, a tablet computer, or a similar device. Server device may receive, store, and/or provide information related to a cellular data test (e.g., location information, notification preferences, target information, testing preferences, notifications, etc.).

Gateway **230** may include one or more devices capable of providing connectivity for mobile device **210** to external networks (e.g., networks other than cellular network **240**). For example, gateway **230** may include one or more data processing and/or traffic transfer devices, such as a gateway (e.g., a packet data network gateway, a service gateway, or the like), a router, a modem, a switch, a firewall, a NIC, a hub, a bridge, a server device, an OADM, or any other type of device that processes and/or transfers traffic. Gateway **230** may provide network traffic (e.g., packets, etc.) from mobile

device **210** to a device associated with an external network (e.g., a device associated with a target network address), and/or may provide network traffic to mobile device **210** from the device associated with the external network. Gateways **230-1** through **230-N** may be associated with particular locations (e.g., geographical regions, cities, states, countries, etc.). For example, a first gateway **230-1** may be associated with a different location than a second gateway **230-2**, which may be associated with a different location that a third gateway **230-3**, and so on.

Cellular network **240** may include one or more wireless networks. For example, cellular network **240** may include an LTE network, a 3G network, a code division multiple access (CDMA) network, and/or a combination of these or another type of cellular network. Cellular network **240** may include one or more gateways **230**, which may provide connectivity for mobile device **210** to external networks associated with target network addresses.

The number and arrangement of devices and networks shown in FIG. **2** are provided as an example. In practice, there may be additional devices and/or networks, fewer devices and/or networks, different devices and/or networks, or differently arranged devices and/or networks than those shown in FIG. **2**. Furthermore, two or more devices shown in FIG. **2** may be implemented within a single device, or a single device shown in FIG. **2** may be implemented as multiple, distributed devices. Additionally, or alternatively, a set of devices (e.g., one or more devices) of environment **200** may perform one or more functions described as being performed by another set of devices of environment **200**.

FIG. **3** is a diagram of example components of a device **300**. Device **300** may correspond to mobile device **210**, server device **220**, and/or gateway **230**. In some implementations, mobile device **210**, server device **220**, and/or gateway **230** may include one or more devices **300** and/or one or more components of device **300**. As shown in FIG. **3**, device **300** may include a bus **310**, a processor **320**, a memory **330**, a storage component **340**, an input component **350**, an output component **360**, and a communication interface **370**.

Bus **310** may include a component that permits communication among the components of device **300**. Processor **320** is implemented in hardware, firmware, or a combination of hardware and software. Processor **320** may include a processor (e.g., a central processing unit (CPU), a graphics processing unit (GPU), an accelerated processing unit (APU), etc.), a microprocessor, and/or any processing component (e.g., a field-programmable gate array (FPGA), an application-specific integrated circuit (ASIC), etc.) that can be programmed to perform a function. Memory **330** may include a random access memory (RAM), a read only memory (ROM), and/or another type of dynamic or static storage device (e.g., a flash memory, a magnetic memory, an optical memory, etc.) that stores information and/or instructions for use by processor **320**.

Storage component **340** may store information and/or software related to the operation and use of device **300**. For example, storage component **340** may include a hard disk (e.g., a magnetic disk, an optical disk, a magneto-optic disk, a solid state disk, etc.), a compact disc (CD), a digital versatile disc (DVD), a floppy disk, a cartridge, a magnetic tape, and/or another type of computer-readable medium, along with a corresponding drive.

Input component **350** may include a component that permits device **300** to receive information, such as via user input (e.g., a touch screen display, a keyboard, a keypad, a mouse, a button, a switch, a microphone, etc.). Additionally, or alternatively, input component **350** may include a sensor for sensing information (e.g., a global positioning system (GPS) component, an accelerometer, a gyroscope, an actuator, etc.). Output component **360** may include a component that provides output information from device **300** (e.g., a display, a speaker, one or more light-emitting diodes (LEDs), etc.).

Communication interface **370** may include a transceiver-like component (e.g., a transceiver, a separate receiver and transmitter, etc.) that enables device **300** to communicate with other devices, such as via a wired connection, a wireless connection, or a combination of wired and wireless connections. Communication interface **370** may permit device **300** to receive information from another device and/or provide information to another device. For example, communication interface **370** may include an Ethernet interface, an optical interface, a coaxial interface, an infrared interface, a radio frequency (RF) interface, a universal serial bus (USB) interface, a Wi-Fi interface, a cellular network interface, or the like.

Device **300** may perform one or more processes described herein. Device **300** may perform these processes in response to processor **320** executing software instructions stored by a computer-readable medium, such as memory **330** and/or storage component **340**. A computer-readable medium is defined herein as a non-transitory memory device. A memory device includes memory space within a single physical storage device or memory space spread across multiple physical storage devices.

Software instructions may be read into memory **330** and/or storage component **340** from another computer-readable medium or from another device via communication interface **370**. When executed, software instructions stored in memory **330** and/or storage component **340** may cause processor **320** to perform one or more processes described herein. Additionally, or alternatively, hardwired circuitry may be used in place of or in combination with software instructions to perform one or more processes described herein. Thus, implementations described herein are not limited to any specific combination of hardware circuitry and software.

The number and arrangement of components shown in FIG. **3** are provided as an example. In practice, device **300** may include additional components, fewer components, different components, or differently arranged components than those shown in FIG. **3**. Additionally, or alternatively, a set of components (e.g., one or more components) of device **300** may perform one or more functions described as being performed by another set of components of device **300**.

FIG. **4** is a flow chart of an example process **400** for configuring a cellular data testing system. In some implementations, one or more process blocks of FIG. **4** may be performed by mobile device **210**. Additionally, or alternatively, one or more process blocks of FIG. **4** may be performed by another device or a group of devices separate from or including mobile device **210**, such as server device **220** and/or gateway **230**.

As shown in FIG. **4**, process **400** may include receiving location information identifying a testing location for a cellular data test (block **410**). For example, mobile device **210** may receive location information. The location information may identify a testing location. Mobile device **210** may be located at the testing location, or may be remote from the testing location. Based on the testing location, mobile device **210** may perform a cellular data test to test access to one or more target network addresses via cellular network **240**.

In some implementations, the location information may identify geographic coordinates, a postal code, a city, a state, or the like. In some implementations, mobile device **210** may determine the location information. For example, mobile device **210** may determine a current location of mobile device **210**, and may use the current location as the testing location. As another example, mobile device **210** may determine the location information based on a default setting (e.g., a default testing location stored by mobile device **210**, server device **220**, etc.). Additionally, or alternatively, the location information may identify a region that is associated with a particular gateway **230**. Mobile device **210** may determine the testing location based on the region. In this way, mobile device **210** may perform a cellular data test with regard to the particular gateway **230**, irrespective of a location of mobile device **210**.

In some implementations, mobile device **210** may be located at the testing location. For example, mobile device **210** may be included in a cellular network region that includes the testing location. In some implementations, mobile device **210** may be remote from the testing location. For example, the location information may identify a testing location in California, and mobile device **210** may be located in Massachusetts. In this way, mobile device **210** may perform cellular data testing via a gateway **230** that is associated with a remote testing location, which may improve versatility of the cellular data testing system and/or conserve resources used for testing cellular network **240**.

Mobile device **210** may receive the location information via a user interface, in some implementations. For example, a user of mobile device **210** may input the location information. Additionally, or alternatively, mobile device **210** may receive the location information from another device. For example, mobile device **210** may receive the location information from server device **220**.

As further shown in FIG. **4**, process **400** may include receiving notification preferences for the cellular data test (block **420**). For example, mobile device **210** may receive notification preferences for the cellular data test. The notification preferences may identify notifications to provide based on the cellular data test, recipients of the notifications, and/or conditions for providing the notifications. In some implementations, mobile device **210** may receive the notification preferences via a user interface of mobile device **210**. For example, a user may input the notification preferences. Additionally, or alternatively, mobile device **210** may receive the notification preferences from another device, such as server device **220**. Additionally, or alternatively, mobile device **210** may determine the notification preferences (e.g., based on default notification preferences, etc.).

In some implementations, the notification preferences may relate to a failure notification, to be provided when the cellular data test is unsuccessful. For example, the notification preferences may identify an address to which to provide a failure notification (e.g., a Mobile Directory Number (MDN), an International Mobile Station Equipment Identity (IMEI), an email address, an Internet Protocol (IP) address, etc.), content to include in the failure notification (e.g., information identifying target network addresses, information identifying the testing location, a quantity of cellular data tests performed by mobile device **210**, a test identifier identifying the cellular data test, information identifying mobile device **210**, etc.), or the like.

In some implementations, the notification preferences may relate to a success notification, to be provided when the cellular data test is successful. For example, the notification preferences may identify an address to which to provide a success notification (e.g., an MDN, an IMEI, an email address, an IP address, etc.), content to include in the success notification (e.g., information identifying target network addresses, information identifying the testing location, a quantity of cellular data tests performed before the successful cellular data test, a test identifier identifying the cellular data test, information identifying mobile device **210**, etc.), or the like.

In some implementations, the notification preferences may indicate whether to provide a success notification and/or a failure notification. For example, the notification preferences may indicate to provide a success notification if the cellular data test is successful, and to provide a failure notification if the cellular data test is unsuccessful. As another example, the notification preferences may indicate not to provide a success notification if the cellular data test is successful, which may reduce a quantity of notifications provided by mobile device **210** and, thus, conserve resources of mobile device **210** and/or cellular network **240** (e.g., when mobile device **210** performs cellular data tests frequently, such as on an hourly basis, on a daily basis, etc.).

As further shown in FIG. **4**, process **400** may include receiving target information identifying one or more target network addresses for the cellular data test (block **430**). For example, mobile device **210** may receive target information. The target information may identify one or more target network addresses for the cellular data test. In some implementations, mobile device **210** may receive the target information via a user interface of mobile device **210**. For example, a user may input the target information via the user interface. Additionally, or alternatively, mobile device **210** may receive the target information from another device, such as server device **220**. Additionally, or alternatively, mobile device **210** may determine the target information (e.g., based on default target information, based on target information associated with a particular testing location, etc.).

The target information may identify one or more target network addresses for the cellular data test. For example, the target information may include one or more IP addresses, Uniform Resource Locators (URLs), Uniform Resource Identifiers (URIs), MDNs, IMEIs, email addresses, or the like. In some implementations, the target information may include multiple target network addresses. For example, the target information may specify several target network addresses, may specify a range of target network addresses, may specify a set of target network addresses to test in a specific order, or the like.

In some implementations, the target information may identify network addresses associated with a toll-free data service. The toll-free data service may charge an entity other than a subscriber associated with mobile device **210** for data provided to and/or received from mobile device **210**. The target information may identify target network addresses associated with the toll-free data service in order to test whether network traffic, provided to and/or received from devices associated with the toll-free data service, is properly routed by gateway **230** and/or other devices of network **240**. In this way, mobile device **210** may determine whether a toll-free data service is properly implemented based on the cellular data test, which may simplify implementation of the toll-free data service and/or improve reliability of cellular network **240**.

In some implementations, mobile device **210** may determine the target information. For example, a testing location may be associated with one or more target network addresses, and mobile device **210** may determine the one or

more target network addresses based on the testing location. As another example, a user may provide a search query, and mobile device **210** may determine target network addresses based on the search query (e.g., URLs associated with search results of the search query, etc.). As another example, a user may specify a type of network service (e.g., Voice over IP, Voice over LTE, video calling, etc.), and mobile device **210** may select one or more target network addresses that are associated with the type of network service. As another example, mobile device **210** may query a server for the target network addresses. In this way, mobile device **210** may determine target network addresses, which may conserve processor resource otherwise used to obtain the target network addresses from a user or another device.

As further shown in FIG. **4**, process **400** may include receiving testing preferences for the cellular data test (block **440**). For example, mobile device **210** may receive testing preferences for the cellular data system. The testing preferences may relate to a failure threshold, a quantity of cellular data tests to perform, an interval of time in between performing cellular data tests, or the like. In some implementations, mobile device **210** may receive the testing preferences via a user interface of mobile device **210**. For example, a user may input the testing preferences. Additionally, or alternatively, mobile device **210** may receive the testing preferences from another device, such as server device **220**. Additionally, or alternatively, mobile device **210** may determine the testing preferences (e.g., based on default testing preferences, based on testing preferences associated with a particular testing location, etc.).

The testing preferences may relate to determining whether the cellular data test is successful. For example, the testing preferences may identify a failure threshold. The failure threshold may specify a quantity, a ratio, or the like. In some implementations, the failure threshold may include a ratio based on a quantity of target network addresses associated with devices that receive the network traffic of the cellular data test, as compared to a quantity of target network addresses that are associated with devices that do not receive the network traffic of the cellular data test. If the cellular data test satisfies the failure threshold, mobile device **210** may determine that the cellular data test is successful. For example, if the failure threshold is 75%, and the cellular data test successfully contacts nine target network addresses out of ten target network addresses, mobile device **210** may determine that the cellular data test is successful, and mobile device **210** may, for example, transmit a success notification based on the notification preferences.

In some implementations, the testing preferences may identify a quantity of cellular data tests to perform. For example, assume that mobile device **210** performs a first cellular data test to communicate with a set of target network addresses, and the first cellular data test does not satisfy the failure threshold. If the testing preferences specify to perform one cellular data test, mobile device **210** may not perform a second cellular data test, and may transmit a failure notification, in some implementations. If the testing preferences specify to perform two cellular data tests, mobile device **210** may perform a second cellular data test to communicate with the set of target network addresses. If the second attempt does not satisfy the failure threshold, mobile device **210** may transmit the failure notification. If the second attempt satisfies the failure threshold, mobile device **210** may transmit a success notification. In this way, mobile device **210** may perform multiple cellular data tests based on the testing preferences, which may improve versatility of the cellular data test and/or reduce a quantity of false positives and/or false negatives associated with the cellular data test.

As further shown in FIG. **4**, process **400** may include storing the location information, the notification preferences, the target information, and/or the testing preferences (block **450**). For example, mobile device **210** may store the location information, the notification preferences, the target information, and/or the testing preferences. In some implementations, mobile device **210** may store the location information, the notification preferences, the target information, and/or the testing preferences locally. Additionally, or alternatively, mobile device **210** may provide the location information, the notification preferences, the target information, and/or the testing preferences to another device (e.g., server device **220**, etc.) for storage. The other device may provide the location information, the notification preferences, the target information, and/or the testing preferences to mobile device **210** based on mobile device **210** requesting the location information, the notification preferences, the target information, and/or the testing preferences, or based on mobile device **210** initiating a cellular data test.

In this way, mobile device **210** may configure a cellular data test to communicate with one or more target network addresses based on a testing location, which may permit mobile device **210** to test data connections via cellular network **240** in a variety of locations and via a variety of gateways **230**, irrespective of a location of mobile device **210**.

Although FIG. **4** shows example blocks of process **400**, in some implementations, process **400** may include additional blocks, fewer blocks, different blocks, or differently arranged blocks than those depicted in FIG. **4**. Additionally, or alternatively, two or more of the blocks of process **400** may be performed in parallel.

FIGS. **5**A-**5**D are diagrams of an example implementation **500** relating to example process **400** shown in FIG. **4**. FIGS. **5**A-**5**D show an example of configuring a cellular data testing system. For the purpose of FIGS. **5**A-**5**D, assume that mobile device **210** provides a cellular data testing system that includes a user interface. Assume further that the user interface is provided by mobile device **210** (e.g., via a screen of mobile device **210**, etc.).

As shown in FIG. **5**A, and by reference number **502**, mobile device **210** may receive a user interaction to specify location information. As shown, in some cases, a user may specify to use a current location of mobile device **210**. In such a case, mobile device **210** may determine the current location of mobile device **210** (e.g., based on a connection with cellular network **240**, based on a global positioning system component of mobile device **210**, etc.). As shown by reference number **504**, mobile device **210** may receive a user interaction to specify a testing location. Based on the specified testing location, mobile device **210** may configure a SIM card, of mobile device **210**, to communicate with target network addresses via a gateway **230** associated with the testing location. Here, as shown by reference number **506**, mobile device **210** receives information specifying a testing location of Los Angeles, Calif., and a user confirms the location of Los Angeles, Calif. Assume that mobile device **210** stores the location information locally.

As shown, in some cases, mobile device **210** may receive information specifying a particular gateway **230** to test. For example, gateways **230** may be associated with device identifiers (e.g., IP addresses, etc.), and mobile device **210** may receive information identifying a particular gateway **230**. Based on the information identifying the particular

gateway **230**, mobile device **210** may determine a testing location associated with the particular gateway **230**, and may configure a SIM card of mobile device **210** accordingly. Here, mobile device **210** does not receive information specifying a particular gateway **230**.

As shown in FIG. **5**B, and by reference number **508**, mobile device **210** may receive a user interaction to specify notification preferences. As shown by reference number **510**, based on the user interaction to specify the notification preferences, mobile device **210** may provide a user interface to receive the notification preferences. As shown by reference number **512**, in some cases, a user may specify to use default notification preferences. In that case, mobile device **210** may use locally stored default notification preferences, may obtain the default notification preferences from another device (e.g., server device **220**, etc.), or the like. Here, mobile device **210** does not receive an indication to use default notification preferences.

As shown by reference number **514**, mobile device **210** may receive a notification preference that specifies to provide an SMS message to an MDN of 555-175-8821 in the event of an unsuccessful cellular data test. As shown, the user interface may permit a user to input an email address to which to provide a failure notification. Here, mobile device **210** does not receive an email address. As shown by reference number **516**, mobile device **210** may receive a notification preferences that specifies to provide an email message to an email address of "engineer@network.com" in the event of a successful cellular data test. Assume that mobile device **210** stores the notification preferences locally in memory.

As shown in FIG. **5**C, and by reference number **518**, mobile device **210** may receive a user interaction to specify target information. The target information may identify target network addresses for the cellular data test. As shown by reference number **520**, mobile device **210** may receive a set of URLs as target network addresses (e.g., www.example.com, www.example.co.nz, www.example.co.jp, www.example.co.ru, and www.example.co.in). As shown by reference number **522**, in some cases, mobile device **210** may receive IP addresses as target network addresses. Here, mobile device **210** does not receive IP addresses as target network addresses.

As shown in FIG. **5**D, and by reference number **524**, mobile device **210** may receive a user interaction to specify testing preferences. The testing preferences may include preferences related to performing the cellular data test. As shown by reference number **526**, mobile device **210** may receive information identifying a failure threshold of 50%. When a cellular data test results in successful communication with less than 50% of the five target network addresses, mobile device **210** may determine that the cellular data test is unsuccessful based on the failure threshold.

As shown by reference number **528**, mobile device **210** may receive information specifying a quantity of failed attempts before transmitting a failure notification. Here, mobile device **210** specifies four failures. Based on the quantity of failed attempts, mobile device **210** may attempt to communicate with the five target network addresses four times each before identifying the attempt as a failure. As shown by reference number **530**, mobile device **210** may receive information specifying a testing interval. The testing interval may identify an interval of time in between attempts. Here, the testing interval includes a time period of one hour.

As indicated above, FIGS. **5**A-**5**D are provided merely as an example. Other examples are possible and may differ from what was described with regard to FIGS. **5**A-**5**D.

FIG. **6** is a flow chart of an example process **600** for performing a cellular data test. In some implementations, one or more process blocks of FIG. **6** may be performed by mobile device **210**. In some implementations, one or more process blocks of FIG. **6** may be performed by another device or a group of devices separate from or including mobile device **210**, such as server device **220** and/or gateway **230**.

As shown in FIG. **6**, process **600** may include receiving an instruction to perform a cellular data test (block **610**). For example, mobile device **210** may receive an instruction to perform a cellular data test. In some implementations, mobile device **210** may receive the instruction via a user interface. For example, a user may interact with an element of the user interface (e.g., a button, a link, etc.) to provide the instruction. Additionally, or alternatively, mobile device **210** may receive the instruction from another device. For example, server device **220** may provide the instruction to mobile device **210**.

In some implementations, mobile device **210** may perform the cellular data test without user input. For example, mobile device **210** may perform the cellular data test periodically (e.g., every five minutes, every hour, every twelve hours, every day, every week, etc.). Additionally, or alternatively, mobile device **210** may perform the cellular data test based on failing to communicate with a network address. For example, mobile device **210** may attempt to communicate with a device associated with a network address, and may fail to communicate with the device. Mobile device **210** may perform the cellular data test with regard to a set of target network addresses based on failing to communicate with the device. In this way, mobile device **210** may perform the cellular data test based on failing to communicate with a device associated with a network address, which may permit mobile device **210** to determine whether the failure to communicate is associated with the network address or with cellular network **240**. Further, mobile device **210** may conserve resources by limiting tests to occasions when a potential network problem is occurring.

As further shown in FIG. **6**, process **600** may include ending an existing session with a cellular network and/or deleting locally stored browsing information based on the instruction (block **620**). For example, mobile device **210** may provide network traffic to and/or receive network traffic from cellular network **240** via an existing session (e.g., a multimedia communication session, a Voice over IP session, a video call session, a Voice over LTE session, an Internet session, etc.). Mobile device **210** may end the existing session, which may permit mobile device **210** to establish a new session and, thus, improve reliability and/or accuracy of test results obtained via the new session.

In some implementations, mobile device **210** may delete locally stored browsing information based on the instruction. For example, mobile device **210** may delete cookies, may end existing sessions with web services, may close existing browser tabs, may unblock blocked webpages, or the like. By clearing locally stored browsing information, mobile device **210** may ensure that a failure to communicate with a target network address is not caused by the locally stored browsing information.

As further shown in FIG. **6**, process **600** may include obtaining location information, notification preferences, target information, and/or testing preferences (block **630**). For example, mobile device **210** may obtain location informa-

tion, notification preferences, target information, and/or testing preferences. In some implementations, mobile device **210** may obtain the location information, notification preferences, target information, and/or testing preferences from local storage. For example, mobile device **210** may locally store the location information, notification preferences, target information, and/or testing preferences based on performing the operations described in connection with FIG. **4**, and may obtain the information from local storage.

In some implementations, mobile device **210** may obtain the location information, notification preferences, target information, and/or testing preferences from server device **220**. For example, server device **220** may store location information, notification preferences, target information, and/or testing preferences for a cellular data test. Mobile device **210** may determine to perform a cellular data test (e.g., based on receiving an instruction to perform a cellular data test, based on a failure to transmit network traffic to a device associated with a network address, etc.), and may obtain the location information, notification preferences, target information, and/or testing preferences from server device **220**.

In some implementations, server device **220** may store location information, notification preferences, target information, and/or testing preferences for a variety of cellular data tests, and mobile device **210** may obtain location information, notification preferences, target information, and/or testing preferences for a particular cellular data test (e.g., based on a location of mobile device **210** and/or a device associated with a target network address, based on a device type of mobile device **210**, based on results of cellular data tests performed by other mobile devices **210**, etc.). In this way, mobile device **210** may obtain location information, notification preferences, target information, and/or testing preferences from server device **220**, which may permit an administrator of server device **220** to cause desired cellular data tests to be performed and, thus, improve reliability of cellular network **240**.

In some implementations, mobile device **210** may obtain the location information, notification preferences, target information, and/or testing preferences based on receiving the instruction to perform the cellular data test. For example, mobile device **210** may prompt a user to provide information and/or preferences via a user interface of mobile device **210**, based on receiving the instruction to perform the cellular data test.

As further shown in FIG. **6**, process **600** may include configuring a component based on the location information (block **640**). For example, mobile device **210** may configure a component of mobile device **210** based on the location information. In some implementations, a SIM card may store information identifying a location of mobile device **210**. Mobile device **210** may configure the SIM card to associate mobile device **210** and/or the SIM card with the testing location.

Cellular network **240** may route network traffic, of mobile device **210**, based on the location identified by the SIM card. For example, cellular network **240** may provide network traffic to target network addresses via a gateway **230** that is selected based on the location identified by the SIM card. The location identified by the SIM card may be independent of an actual location of mobile device **210**. For example, mobile device **210** may be capable of setting a testing location on the SIM card, irrespective of the actual location of mobile device **210**. By setting the testing location on the SIM card, mobile device **210** may perform the cellular data test via a first gateway **230** when in a region associated with a second gateway **230**, which may reduce expense associated with testing cellular network **240** and/or improve versatility of the cellular data testing system.

As further shown in FIG. **6**, process **600** may include establishing a new session with the cellular network (block **650**). For example, mobile device **210** may establish a new session with cellular network **240** to perform the cellular data test. In some implementations, mobile device **210** may establish the new session based on a protocol, such as a session initiation protocol, a transmission control protocol, or the like. By ending the existing session and establishing the new session, mobile device **210** may ensure that testing results are unaffected by information associated with the existing session.

In some implementations, mobile device **210** may select a particular type of session to initiate based on a target network address. For example, if a target network address is associated with a VoIP service, mobile device **210** may initiate a VoIP session. As another example, if a target network address is an IP address, mobile device **210** may initiate an Internet Protocol session. In this way, mobile device **210** may determine a particular type of session to initiate based on a target network address, which may reduce a quantity of user input required to perform the cellular data test and, thus, conserve resources of mobile device **210**.

As further shown in FIG. **6**, process **600** may include attempting to communicate with one or more target network addresses that are identified by the target information (block **660**). For example, mobile device **210** may attempt to communicate with one or more target network addresses. The one or more target network addresses may be identified by the target information.

Mobile device **210** may attempt to provide one or more packets to devices associated with the one or more target network addresses, in some implementations. For example, mobile device **210** may provide network traffic, as one or more packets, to be routed via a particular gateway **230** that is in the testing location. Additionally, or alternatively, mobile device **210** may provide a message to the one or more target network addresses. For example, mobile device **210** may generate an email, a voice message, a system message, or the like, and may provide the message to one or more target network addresses.

In some implementations, mobile device **210** may attempt to communicate with the one or more target network addresses by attempting to establish a session with devices associated with the one or more target network addresses. For example, if a target network address is associated with a video calling service, mobile device **210** may attempt to establish a video calling session with a device associated with the target network address. As another example, if a target network address is associated with a virtual private network service, mobile device **210** may attempt to establish a virtual private network session with a device associated with the target network address. In this way, mobile device **210** may test network services by attempting to establish sessions with the network services, which may reduce a quantity of network traffic transmitted by mobile device **210** and, thus, conserve resources of mobile device **210** and/or cellular network **240**.

As further shown in FIG. **6**, process **600** may include determining a result of attempting to communicate with the one or more target network addresses (block **670**). For example, mobile device **210** may determine a result of attempting to communicate with the one or more target network addresses. The result may include, for example, a failure, a success, a timeout, a partial success, or the like.

Mobile device **210** may determine the result based on receiving a response from a target network address, or based on not receiving a response from a target network address.

In some implementations, mobile device **210** may determine that an attempt to communicate is successful. For example, mobile device **210** may receive an expected response from a target network address (e.g., a message accepting a session with mobile device **210**, a response to one or more packets transmitted toward the target network address, etc.) and/or cellular network **240** (e.g., a message indicating that the communication is successful, a message indicating that network traffic is successfully delivered to a device associated with the target network address, etc.). Additionally, or alternatively, mobile device **210** may determine that an attempt to communicate is unsuccessful. For example, mobile device **210** may receive information indicating that the attempt to communicate is unsuccessful (e.g., information indicating that an email is undeliverable, information indicating that a target network address does not exist or is unreachable, etc.).

In some implementations, mobile device **210** may attempt to communicate with a set of target network addresses. For example, mobile device **210** may provide one or more packets to each target network address in the set of target network addresses. Mobile device **210** may determine that one or more of the attempts to communicate are unsuccessful, and/or that one or more of the attempts to communicate are successful. Mobile device **210** may, in some implementations, determine whether the successful and/or unsuccessful attempts to communicate satisfy a failure threshold.

As further shown in FIG. **6**, process **600** may include selectively reattempting to communicate with the one or more target network addresses, and/or providing a notification, based on the result (block **680**). For example, mobile device **210** may selectively perform an action based on whether the successful and/or unsuccessful attempts to communicate satisfy a failure threshold. In some implementations, mobile device **210** may reattempt to communicate with the one or more target network addresses. For example, when the successful and/or unsuccessful attempts do not satisfy the failure threshold, mobile device **210** may reattempt to communicate with the one or more target network devices.

In some implementations, mobile device **210** may provide a notification based on the result and/or based on the notification preferences. For example, if the result (e.g., a ratio of successful attempts to unsuccessful attempts) satisfies the failure threshold, mobile device **210** may provide a success notification to an entity identified in the notification preferences. For example, mobile device **210** may provide an email, a short message service (SMS) message, a phone call, a system message, or the like. In this way, mobile device **210** may notify an entity of a successful cellular data test based on notification preferences, which may improve versatility of the cellular data testing system.

As another example, if the result does not satisfy the failure threshold, mobile device **210** may provide a failure notification to an entity identified in the notification preferences. In some implementations, mobile device **210** may not provide a notification based on an unsuccessful cellular data test. For example, if testing preferences indicate to perform a particular quantity of cellular data tests before providing a failure notification, mobile device **210** may determine whether mobile device **210** has performed the particular quantity of cellular data tests. If mobile device **210** has not performed the particular quantity of cellular data tests, mobile device **210** may not provide the failure notification. In such a case, mobile device **210** may reattempt to communicate with the one or more target network addresses. Additionally, or alternatively, if mobile device **210** has performed the particular quantity of cellular data tests, mobile device **210** may provide the failure notification.

In some implementations, mobile device **210** may provide a notification to a user of mobile device **210** based on the result. For example, mobile device **210** may provide a notification via a user interface of mobile device **210**. The notification may include information related to the cellular data test (e.g., the target network addresses, the failure threshold, a quantity of successful attempts and/or unsuccessful attempts, etc.).

In some implementations, mobile device **210** may selectively perform an action without user input (e.g., automatically). For example, mobile device **210** may perform a first cellular data test, and may determine a first result (e.g., a first ratio of successful attempts to unsuccessful attempts, etc.). Mobile device **210** may perform a second cellular data test (e.g., after a particular period of time, based on a failure to communicate with a network address, etc.), and may determine a second result. Mobile device **210** may compare the first result and the second result, and may perform an action (e.g., without user intervention, input, etc.) based on comparing the first result and the second result.

For example, if the first result is different from the second result, mobile device **210** may provide a notification to one or more entities, may perform a third cellular data test, may store information associated with the first result and/or the second result, or the like. As another example, if the first result does not differ from the second result, mobile device **210** may provide a notification to one or more entities, may schedule a third cellular data test in the future, may store information associated with the first result and/or the second result, or the like. In this way, mobile device **210** may perform a cellular data test via a particular gateway **230**, and may automatically provide notifications and/or perform actions based on a result of the cellular data test, which may conserve processor resources associated with mobile device **210** and/or may conserve resources used to receive user input for the cellular data test.

Although FIG. **6** shows example blocks of process **600**, in some implementations, process **600** may include additional blocks, fewer blocks, different blocks, or differently arranged blocks than those depicted in FIG. **6**. Additionally, or alternatively, two or more of the blocks of process **600** may be performed in parallel.

FIGS. **7**A-**7**E are diagrams of an example implementation **700** relating to example process **600** shown in FIG. **6**. FIGS. **7**A-**7**E show an example of performing a cellular data test. For the purpose of FIGS. **7**A-**7**E, assume that the operations described in connection with FIGS. **5**A-**5**D have been performed. Assume further that mobile device **210** is located in Natick, Mass.

As shown in FIG. **7**A, and by reference number **702**, mobile device **210** may receive a user interaction to cause mobile device **210** to perform a cellular data test. As shown by reference number **704**, mobile device **210** may obtain location information, notification preferences, target information, and testing preferences. As shown, mobile device **210** may obtain the location information, notification preferences, target information, and testing preferences from storage (e.g., storage associated with mobile device **210**). As further shown, the location information, notification preferences, target information, and testing preferences may include the information received in connection with FIGS. **5**A-**5**D, above.

As shown in FIG. **7**B, and by reference number **706**, mobile device **210** may end an existing cellular session with cellular network **240**. As further shown, mobile device **210** may establish a new cellular session with cellular network **240**. As shown, mobile device **210** may delete locally stored browser information (e.g., cookies, browser history, etc.) to perform the cellular data test.

As shown by reference number **708**, mobile device **210** may configure a SIM card of mobile device **210** to store information identifying a testing location of Los Angeles, Calif. Assume that mobile device **210** modifies the SIM card to set the device location of mobile device **210** based on the location information. As shown, mobile device **210** is located in Natick, Mass., which is associated with gateway **230-1**. As shown by reference number **710**, based on setting the device location of mobile device **210** to Los Angeles, mobile device **210** may be associated with gateway **230-2**, which is associated with the testing location of Los Angeles, Calif.

As shown in FIG. **7**C, and by reference number **712**, mobile device **210** may perform a first cellular data test by attempting to communicate with the target network addresses. As shown by reference number **714**, mobile device **210** may transmit network traffic to the five target network addresses. As shown, mobile device **210** may transmit the network traffic via gateway **230-2** based on gateway **230-2** being associated with the location of Los Angeles, Calif.

As shown, mobile device **210** successfully communicates with two of the five target network addresses (e.g., the attempt to communicate with www.example.com and the attempt to communicate with www.example.co.in). As further shown, mobile device **210** unsuccessfully attempts to communicate with three of the five target network addresses (e.g., the attempts to communicate with www.example-.co.nz, www.example.co.jp, and www.example.co.ru). As shown by reference number **716**, mobile device **210** may determine whether the first cellular data test satisfies the failure threshold of 50%. Here, the first cellular data test does not satisfy the failure threshold, based on three of the five attempts to communicate being unsuccessful. As shown by reference number **718**, mobile device **210** may perform a second cellular data test with regard to the five target network addresses after one hour passes (e.g., based on the testing preferences).

As shown in FIG. **7**D, and by reference number **720**, mobile device **210** may perform a second cellular data test with regard to the target network addresses. Assume that one hour had passed between the first cellular data test and the second cellular data test. As shown by reference number **722**, mobile device **210** may provide network traffic to the five target network addresses via gateway **230-2**. As further shown, mobile device **210** successfully communicates with three of the five target network addresses (e.g., www.example.com, www.example.co.nz, and www.example.co.in). As shown, mobile device **210** unsuccessfully attempts to communicate with two of the five target network addresses (e.g., www.example.co.jp and www.example.co.ru).

As shown by reference number **724**, mobile device **210** may determine whether the second cellular data test satisfies the failure threshold of 50%. Here, the second cellular data test satisfies the failure threshold based on three of the five attempts to communicate being successful. Based on the second cellular data test being successful, mobile device **210** may determine to provide an email message, and to stop performing cellular data tests.

As shown in FIG. **7**E, mobile device **210** may provide an email message based on the second cellular data test. As shown by reference number **726**, mobile device **210** may provide the email message to a particular address based on the notification preferences (e.g., engineer@network.com). As shown by reference number **728**, the email message may include information describing the first cellular data test. Here, the email message identifies the five target network addresses and identifies whether the attempt to communicate with each target network address was successful.

As shown by reference number **730**, the email message may include information describing the second cellular data test. Here, the email message identifies the five target network addresses and identifies whether the attempt to communicate with each target network address was successful. Further, the email message indicates that the second cellular data test was successful. As shown by reference number **732**, a device associated with the email address of engineer@network.com may receive the email message.

As indicated above, FIGS. **7**A-**7**E are provided merely as an example. Other examples are possible and may differ from what was described with regard to FIGS. **7**A-**7**E.

In this way, mobile device **210** may perform cellular data testing via a gateway **230** associated with a testing location, which may or may not be associated with a location of mobile device **210**. By testing gateways **230** associated with different testing locations independent of a location of mobile device **210**, mobile device **210** may reduce expense and/or network resources involved in performing the cellular data testing and/or conserve resources of a network engineer administrator.

The foregoing disclosure provides illustration and description, but is not intended to be exhaustive or to limit the implementations to the precise form disclosed. Modifications and variations are possible in light of the above disclosure or may be acquired from practice of the implementations.

As used herein, the term component is intended to be broadly construed as hardware, firmware, or a combination of hardware and software.

Some implementations are described herein in connection with thresholds. As used herein, satisfying a threshold may refer to a value being greater than the threshold, more than the threshold, higher than the threshold, greater than or equal to the threshold, less than the threshold, fewer than the threshold, lower than the threshold, less than or equal to the threshold, equal to the threshold, etc.

Certain user interfaces have been described herein and/or shown in the figures. A user interface may include a graphical user interface, a non-graphical user interface, a text-based user interface, etc. A user interface may provide information for display. In some implementations, a user may interact with the information, such as by providing input via an input component of a device that provides the user interface for display. In some implementations, a user interface may be configurable by a device and/or a user (e.g., a user may change the size of the user interface, information provided via the user interface, a position of information provided via the user interface, etc.). Additionally, or alternatively, a user interface may be pre-configured to a standard configuration, a specific configuration based on a type of device on which the user interface is displayed, and/or a set of configurations based on capabilities and/or specifications associated with a device on which the user interface is displayed.

It will be apparent that systems and/or methods, described herein, may be implemented in different forms of hardware,

firmware, or a combination of hardware and software. The actual specialized control hardware or software code used to implement these systems and/or methods is not limiting of the implementations. Thus, the operation and behavior of the systems and/or methods were described herein without reference to specific software code—it being understood that software and hardware can be designed to implement the systems and/or methods based on the description herein.

Even though particular combinations of features are recited in the claims and/or disclosed in the specification, these combinations are not intended to limit the disclosure of possible implementations. In fact, many of these features may be combined in ways not specifically recited in the claims and/or disclosed in the specification. Although each dependent claim listed below may directly depend on only one claim, the disclosure of possible implementations includes each dependent claim in combination with every other claim in the claim set.

No element, act, or instruction used herein should be construed as critical or essential unless explicitly described as such. Also, as used herein, the articles "a" and "an" are intended to include one or more items, and may be used interchangeably with "one or more." Furthermore, as used herein, the term "set" is intended to include one or more items (e.g., related items, unrelated items, a combination of related and unrelated items, etc.), and may be used interchangeably with "one or more." Where only one item is intended, the term "one" or similar language is used. Also, as used herein, the terms "has," "have," "having," or the like are intended to be open-ended terms. Further, the phrase "based on" is intended to mean "based, at least in part, on" unless explicitly stated otherwise.

What is claimed is:

1. A mobile device, comprising:

one or more processors to:

receive preferences related to performing a cellular data test in a cellular network,

the preferences identifying one or more target network addresses and a threshold for determining whether the cellular data test is successful;

receive location information identifying a test location;

configure a component of the mobile device to communicate with the one or more target network addresses via a gateway associated with the test location;

perform the cellular data test by transmitting network traffic to the one or more target network addresses via the gateway;

determine a result of the cellular data test based on transmitting the network traffic to the one or more target network addresses via the gateway,

the result being determined based on comparing a first quantity of the one or more target network addresses that are associated with devices that receive the network traffic with a second quantity of the one or more target network addresses that are associated with devices that do not receive the network traffic;

determine whether the result satisfies the threshold; and

selectively provide a notification based on whether the result satisfies the threshold.

2. The mobile device of claim **1**, where the one or more processors are further to:

receive information identifying a recipient network address for the notification; and

provide the notification based on the recipient network address.

3. The mobile device of claim **1**, where the cellular data test is a first cellular data test; and

where the one or more processors are further to:

receive information specifying a condition for performing a second cellular data test based on the result; and

selectively perform the second cellular data test based on the result.

4. The mobile device of claim **1**, where the mobile device is located at a particular location,

the particular location being a location independent of the test location.

5. The mobile device of claim **1**, where the one or more processors are further to:

receive an instruction to perform the cellular data test;

end an existing session with the cellular network based on the instruction; and

establish a new session with the cellular network via which to perform the cellular data test.

6. The mobile device of claim **5**, where the one or more processors are further to:

delete locally stored browsing information based on receiving the instruction.

7. A computer-readable medium storing instructions, the instructions comprising:

one or more instructions that, when executed by one or more processors of a mobile device, cause the one or more processors to:

obtain preferences related to performing a cellular data test in a cellular network,

the preferences identifying one or more target network addresses and a threshold for determining whether the cellular data test is successful;

obtain location information identifying a test location;

receive an instruction to perform the cellular data test;

configure a component of the mobile device to communicate with the one or more target network addresses via a gateway associated with the test location and based on the instruction;

perform the cellular data test by transmitting network traffic to the one or more target network addresses via the gateway;

determine a result of the cellular data test based on transmitting the network traffic to the one or more target network addresses via the gateway,

the result being determined based on comparing a first quantity of the one or more target network addresses that are associated with devices that receive the network traffic with a second quantity of the one or more target network addresses that are associated with devices that do not receive the network traffic;

determine whether the result satisfies the threshold; and

selectively provide a notification based on whether the result satisfies the threshold.

8. The computer-readable medium of claim **7**, where the instructions further comprise:

one or more instructions that, when executed by the one or more processors, cause the one or more processors to:

provide the notification to a particular network address based on the preferences.

9. The computer-readable medium of claim **7**, where the instructions further comprise:

one or more instructions that, when executed by the one or more processors, cause the one or more processors to:

configure a subscriber identity module card of the mobile device based on the test location.

10. The computer-readable medium of claim **7**, where the gateway is a packet data network gateway; and

where the network traffic includes one or more packets.

11. The computer-readable medium of claim **7**, where the instructions further comprise:

one or more instructions that, when executed by the one or more processors, cause the one or more processors to:

receive the preferences via a user interface; and

receive the instruction via the user interface.

12. The computer-readable medium of claim **7**, where the instructions further comprise:

one or more instructions that, when executed by the one or more processors, cause the one or more processors to:

provide information identifying the one or more target network addresses; and

provide information indicating whether one or more devices, associated with the one or more target network addresses, received the network traffic.

13. A method, comprising:

obtaining, by a mobile device, preferences related to performing a cellular data test in a cellular network,

the preferences identifying one or more target network addresses and a threshold for determining whether the cellular data test is successful;

obtaining, by the mobile device, location information identifying a test location;

receiving, by the mobile device, an instruction to perform the cellular data test;

ending, by the mobile device, an existing session with the cellular network based on the instruction;

establishing, by the mobile device, a new session with the cellular network after ending the existing session;

configuring, by the mobile device, a component of the mobile device to communicate with the one or more target network addresses via a gateway associated with the test location;

performing, by the mobile device, the cellular data test by transmitting network traffic to the one or more target network addresses via the gateway;

determining, by the mobile device, a result of the cellular data test based on transmitting the network traffic to the one or more target network addresses via the gateway,

the result being determined based on comparing a first quantity of the one or more target network addresses that are associated with devices that receive the network traffic with a second quantity of the one or more target network addresses that are associated with devices that do not receive the network traffic;

determining, by the mobile device, whether the result satisfies the threshold; and

providing, by the mobile device, a notification based on whether the result satisfies the threshold.

14. The method of claim **13**, further comprising:

selectively transmitting second network traffic to the one or more target network addresses or providing the notification,

the second network traffic being transmitted when the result does not satisfy the threshold, and

the notification being provided when the result satisfies the threshold.

15. The method of claim **14**, further comprising:

obtaining information identifying an interval of time; and

transmitting the second network traffic a length of time after transmitting the first network traffic,

the length of time corresponding to the interval of time.

16. The method of claim **13**, where the location information identifies a particular gateway; and

where the method further comprises:

determining the test location based on the particular gateway.

17. The method of claim **13**, where the mobile device is located at a particular location,

the particular location being independent of the test location.

18. The method of claim **13**, further comprising:

deleting locally stored browsing information based on the instruction and before establishing the new session.

19. The mobile device of claim **1**, where the one or more processors are further to:

predefine a quantify of failed attempts as the threshold; and

provide a failure notification when a quantity of failed attempts satisfies the threshold.

20. The computer-readable medium of claim **7**, where the cellular data test is a first cellular data test and where the instructions further comprise:

one or more instructions that, when executed by the one or more processors, cause the one or more processors to:

receive information specifying a condition for performing a second cellular data test based on the result of the first cellular data test; and

selectively perform the second cellular data test based on the result.

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