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Li et al.

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(54) **LOCATION-BASED TELEPHONE CALLS OVER A WIRELESS LOCAL AREA NETWORK (WLAN)**

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(22) Filed: **Aug. 26, 2014**

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H04W 4/02 (2009.01)
H04W 48/16 (2009.01)
H04W 76/02 (2009.01)

(52) **U.S. Cl.**
CPC ***H04W 4/02*** (2013.01); ***H04W 48/16*** (2013.01); ***H04W 76/02*** (2013.01)

(58) **Field of Classification Search**
CPC H04W 4/02; H04W 48/16; H04W 76/02
USPC 455/404.1–404.2, 414.1–414.2, 455/456.1–457, 521
See application file for complete search history.

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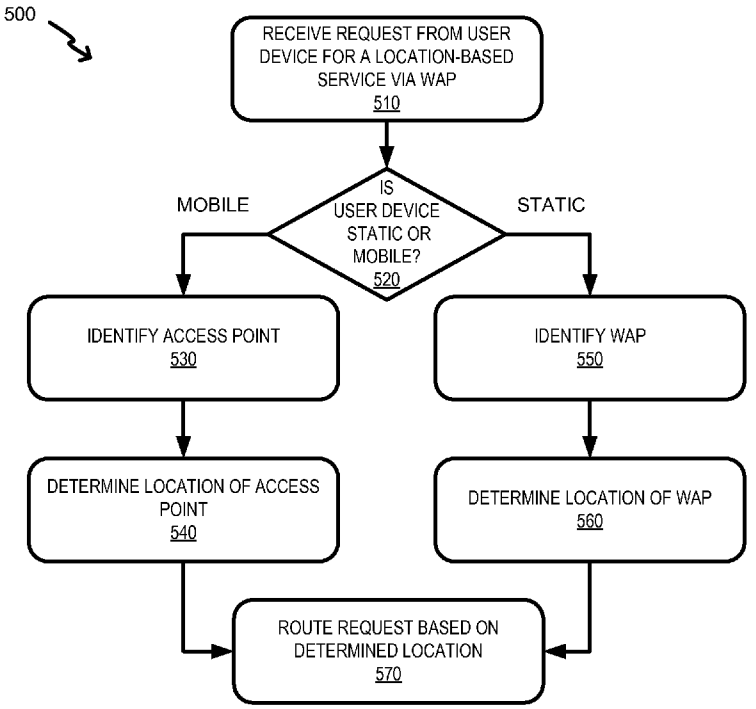
Primary Examiner — Michael Mapa

(57) **ABSTRACT**

A request to access a location-based service is received via a wireless access point (WAP). A WAP identifier associated with the WAP may be identified based on the request and a particular geographic location associated with the WAP may be determined based on the identifier. For example, a WAP information service (WIS) may store data associating geographic locations and WAP identifiers corresponding to a plurality of WAPs that include the WAP, and the particular geographic location may be determined by querying the WIS, based on the particular WAP identifier, to identify the particular geographic location. A communication may be established between the user device and location-based service based on the particular geographic location associated with the WAP.

20 Claims, 10 Drawing Sheets



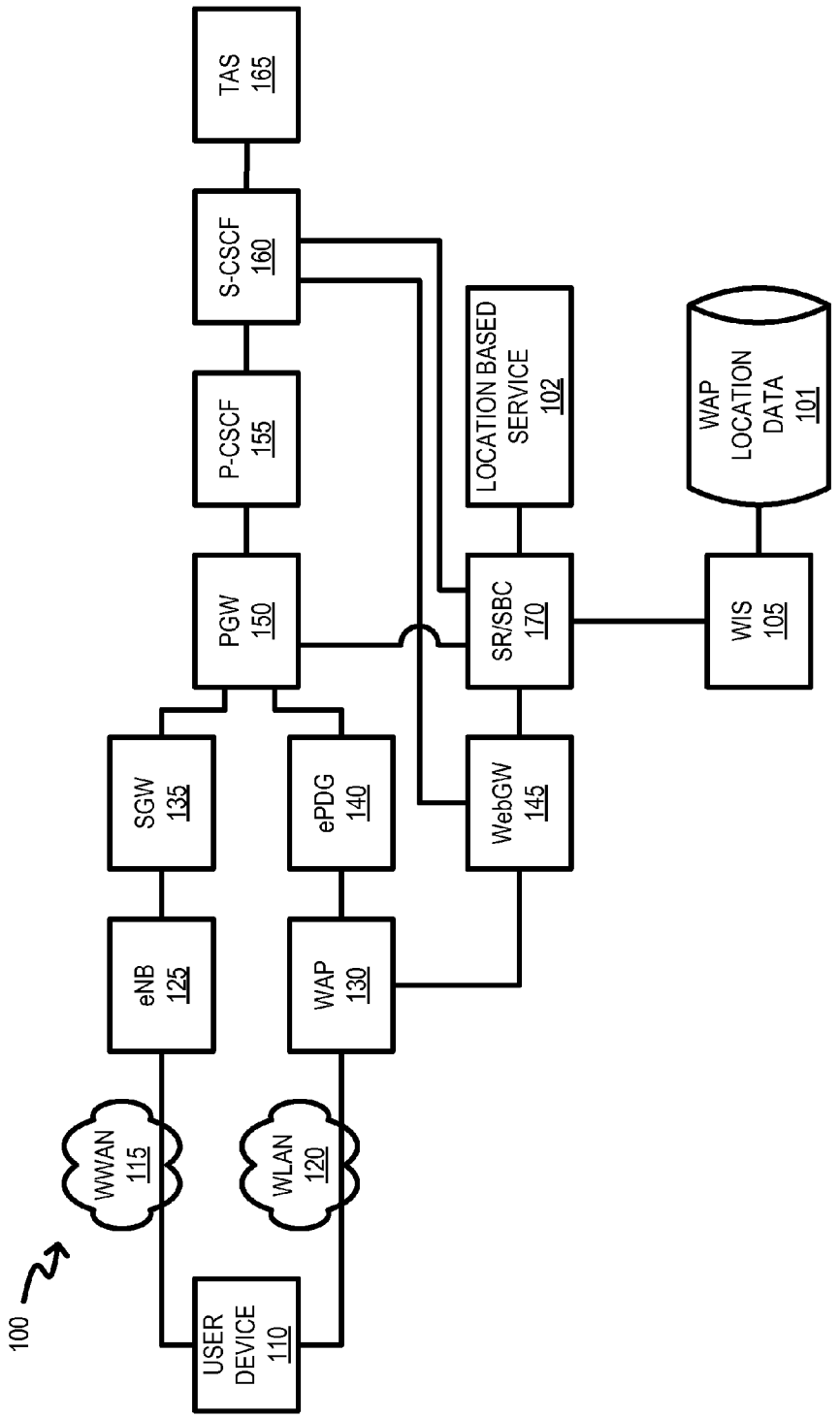

100
USER DEVICE 110
WWAN 115
WLAN 120
eNB 125
WAP 130
SGW 135
ePDG 140
WebGW 145
PGW 150
P-CSCF 155
S-CSCF 160
TAS 165
SR/SBC 170
LOCATION BASED SERVICE 102
WIS 105
WAP LOCATION DATA 101

FIG. 1

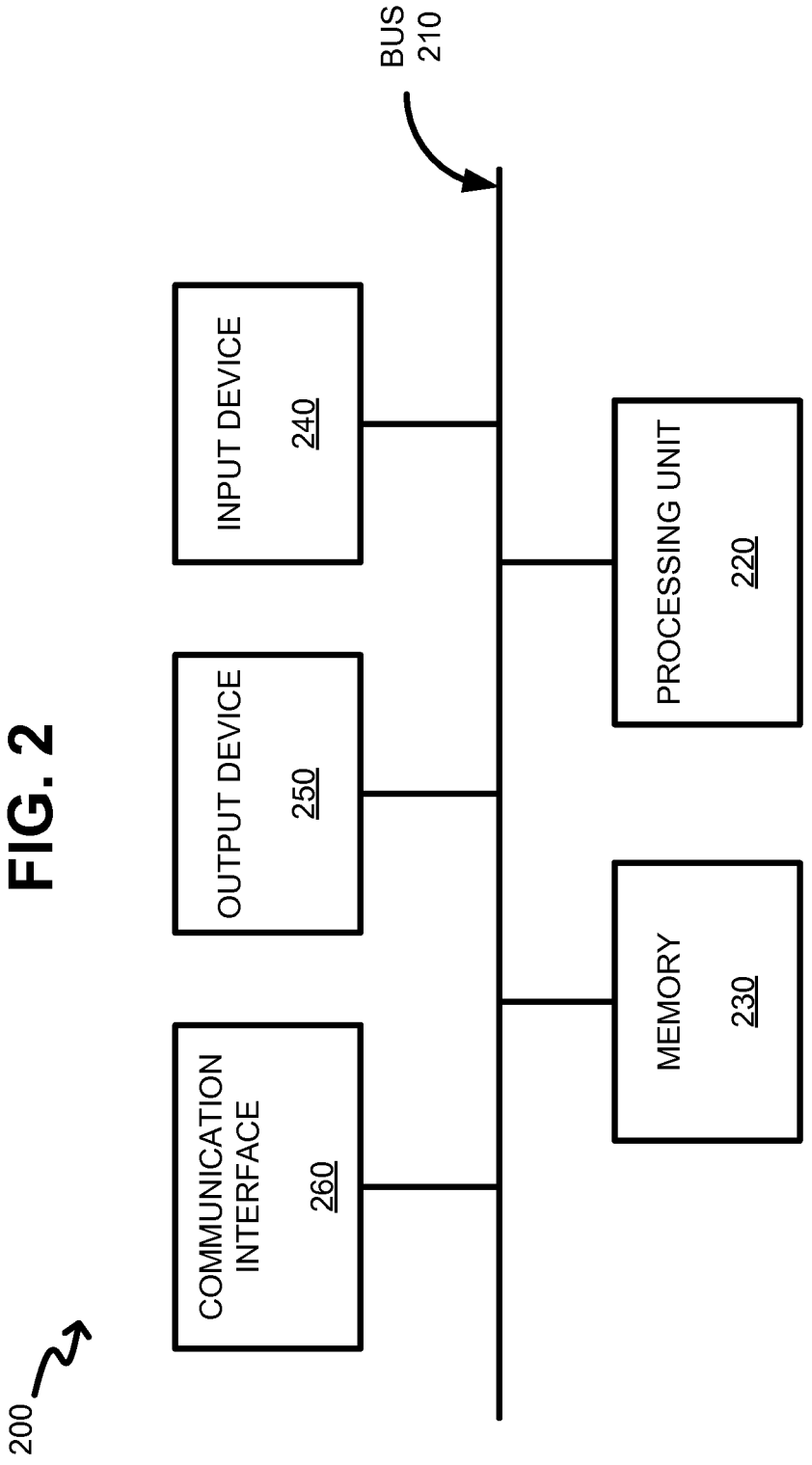
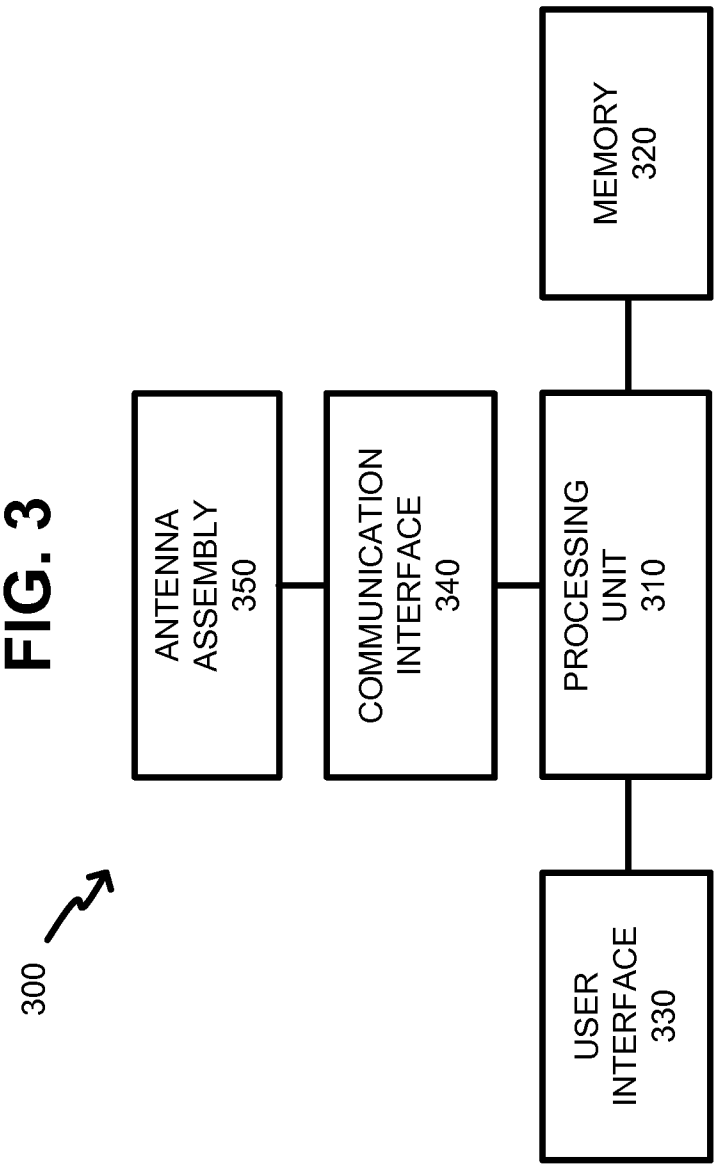

200
BUS
210
INPUT DEVICE
240
OUTPUT DEVICE
250
COMMUNICATION INTERFACE
260
PROCESSING UNIT
220
MEMORY
230

FIG. 2

FIG. 3


300
ANTENNA ASSEMBLY 350
COMMUNICATION INTERFACE 340
PROCESSING UNIT 310
MEMORY 320
USER INTERFACE 330

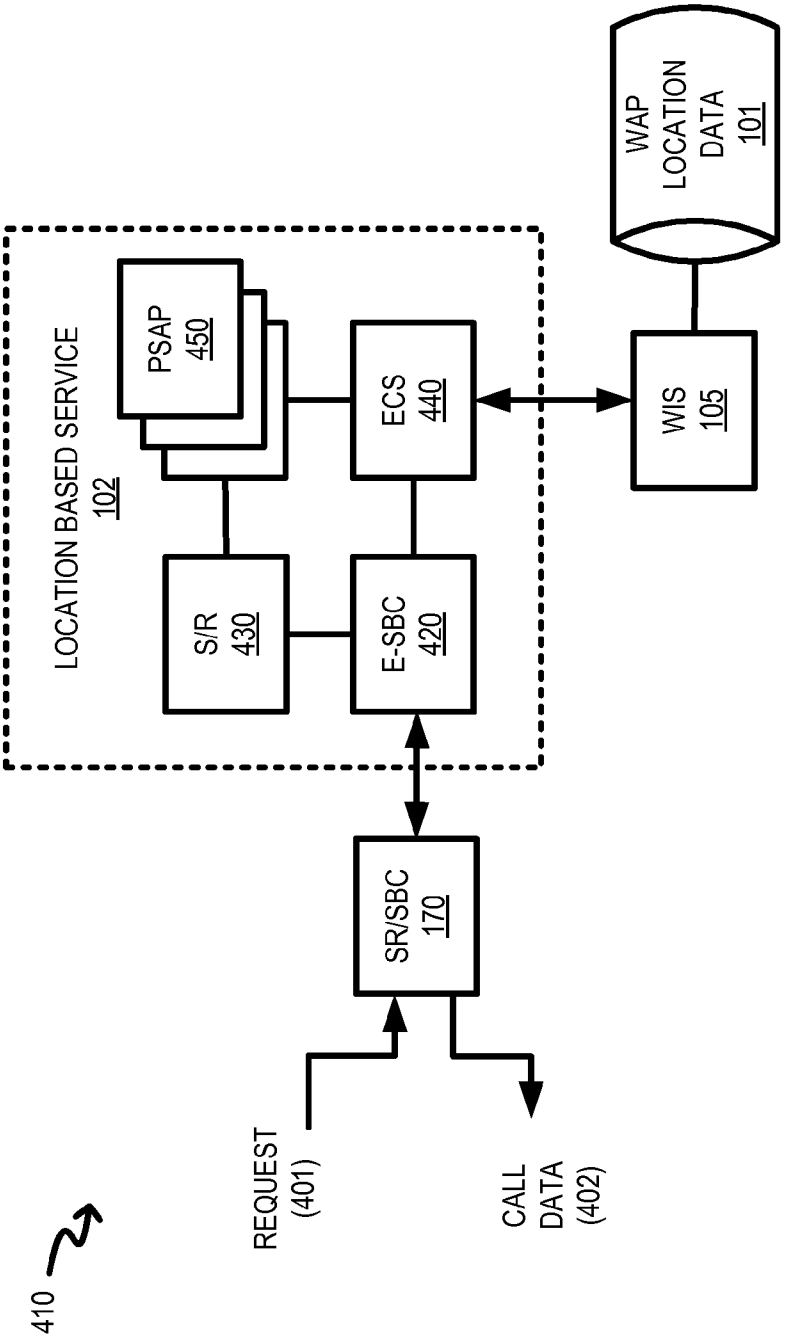

WAP LOCATION DATA 101
LOCATION BASED SERVICE 102
PSAP 450
ECS 440
WIS 105
S/R 430
E-SBC 420
SR/SBC 170
REQUEST (401)
CALL DATA (402)
410

FIG. 4A

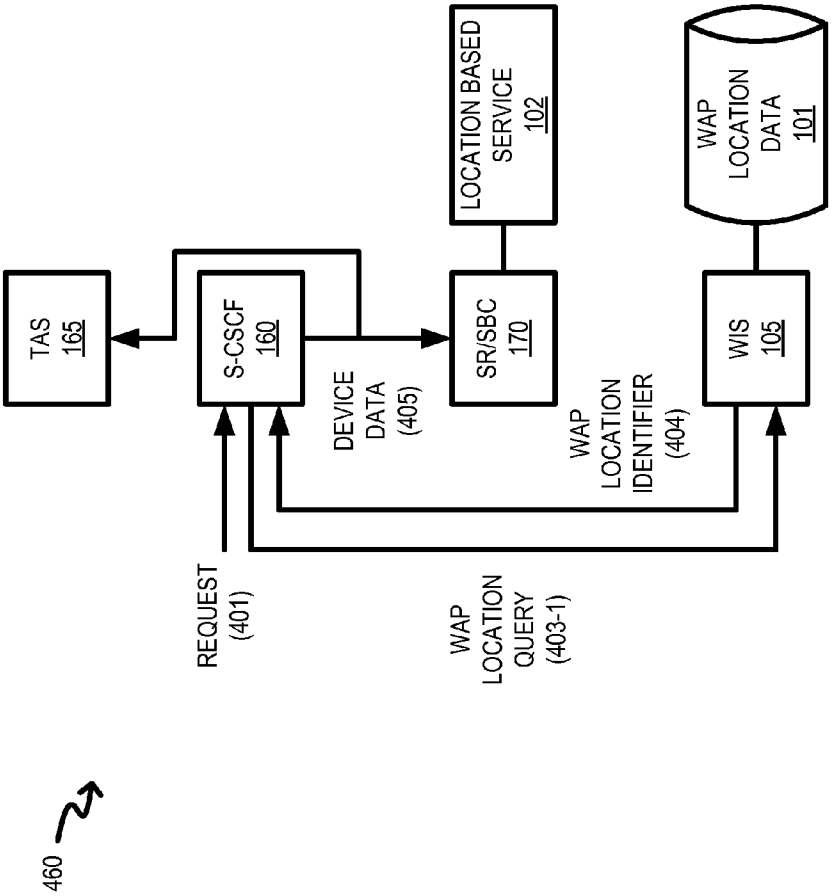

TAS 165
S-CSCF 160
SR/SBC 170
LOCATION BASED SERVICE 102
WAP LOCATION DATA 101
WIS 105
REQUEST (401)
DEVICE DATA (405)
WAP LOCATION QUERY (403-1)
WAP LOCATION IDENTIFIER (404)
460

FIG. 4B

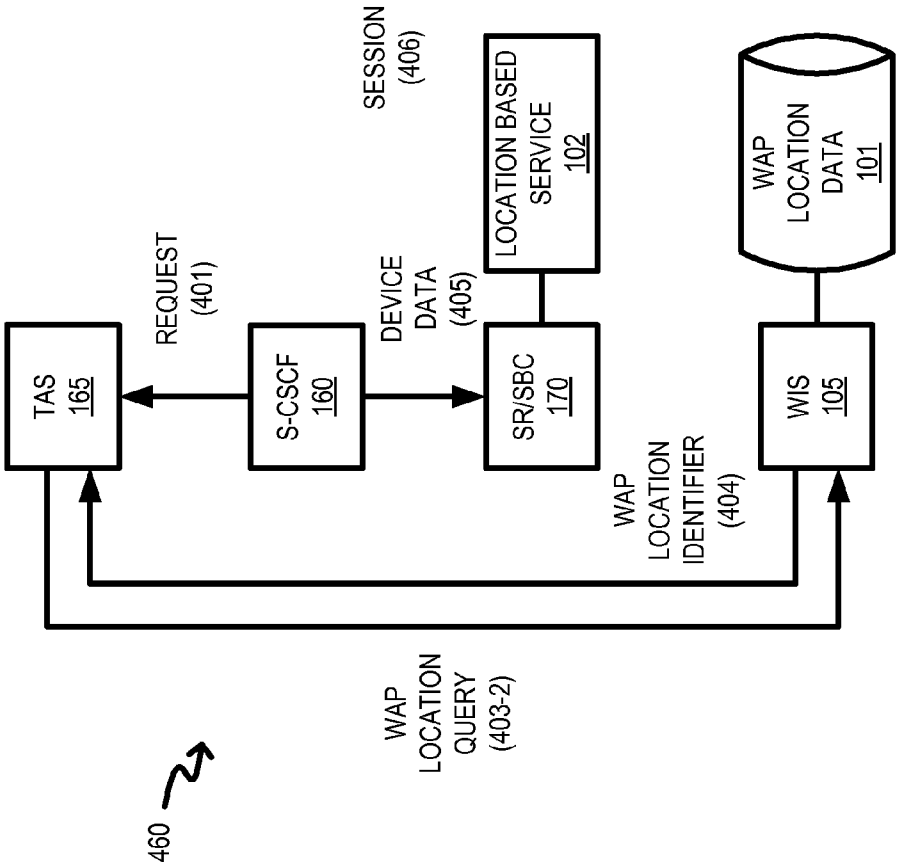

460
TAS 165
S-CSCF 160
SR/SBC 170
WIS 105
LOCATION BASED SERVICE 102
WAP LOCATION DATA 101
REQUEST (401)
DEVICE DATA (405)
SESSION (406)
WAP LOCATION IDENTIFIER (404)
WAP LOCATION QUERY (403-2)

FIG. 4C

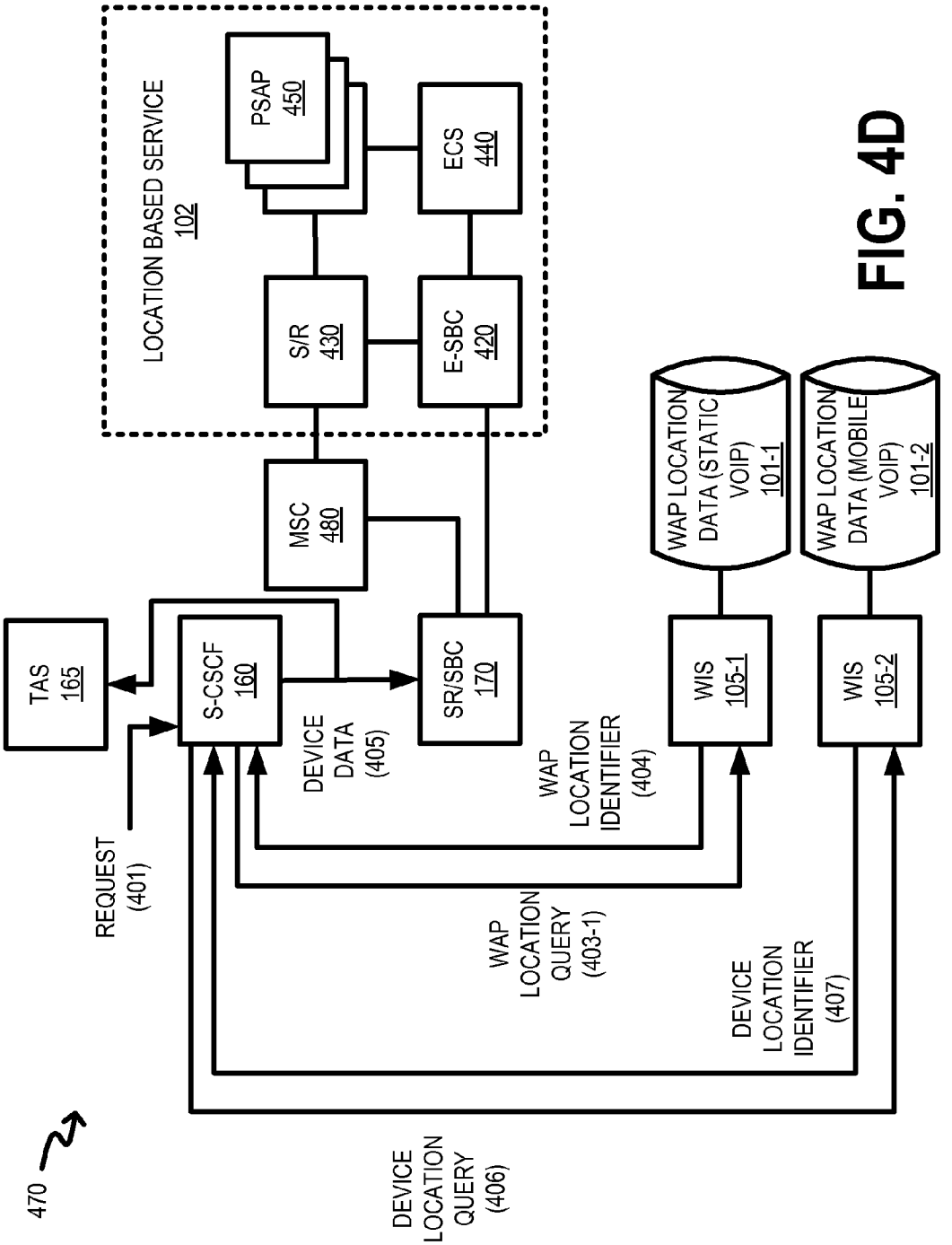

LOCATION BASED SERVICE
102
PSAP
450
ECS
440
S/R
430
E-SBC
420
MSC
480
TAS
165
S-CSCF
160
SR/SBC
170
WAP LOCATION DATA (STATIC VOIP)
101-1
WAP LOCATION DATA (MOBILE VOIP)
101-2
WIS
105-1
WIS
105-2
REQUEST
(401)
DEVICE DATA
(405)
WAP LOCATION IDENTIFIER
(404)
WAP LOCATION QUERY
(403-1)
DEVICE LOCATION IDENTIFIER
(407)
DEVICE LOCATION QUERY
(406)
470

FIG. 4D

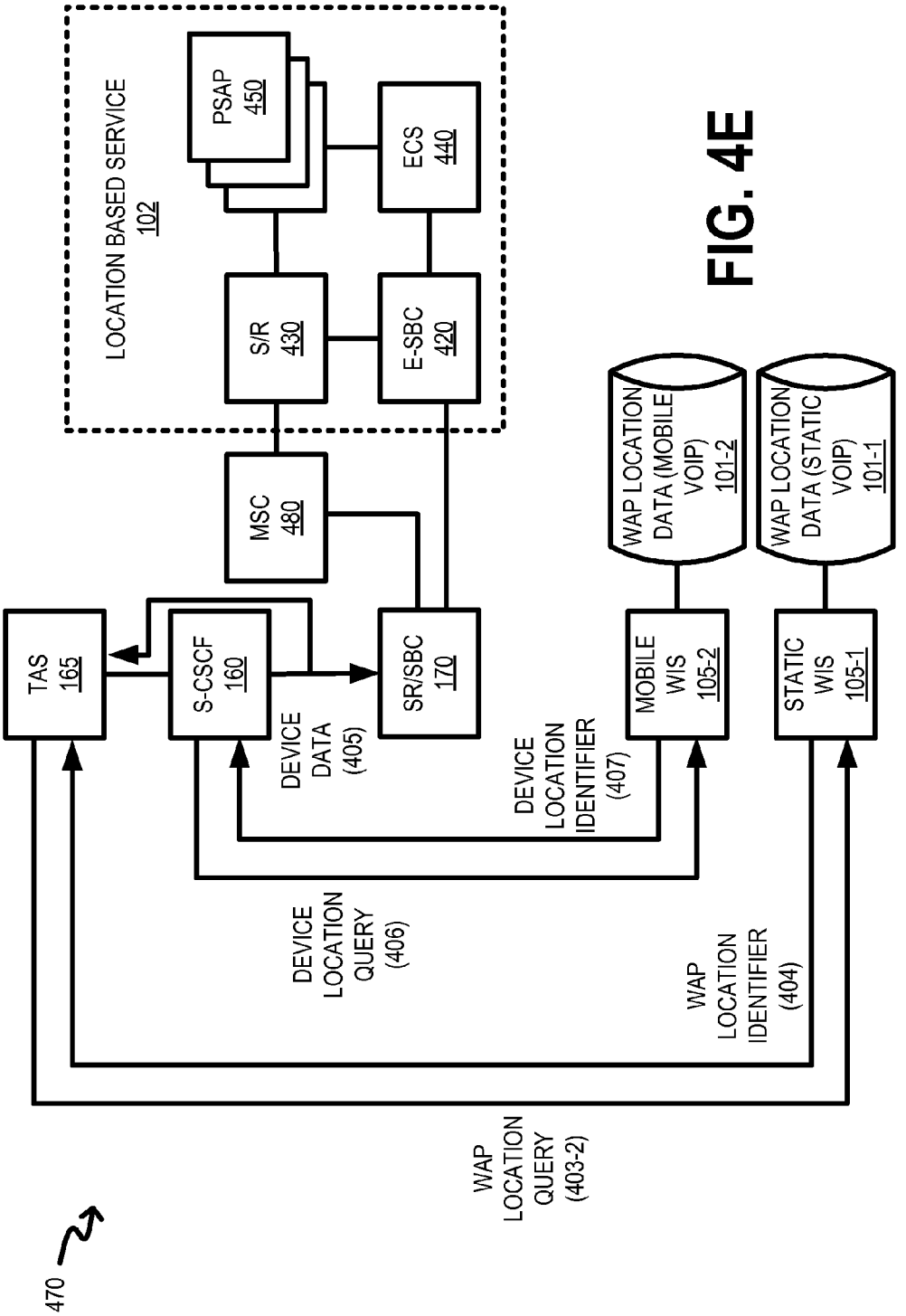

LOCATION BASED SERVICE
102
PSAP
450
ECS
440
S/R
430
E-SBC
420
MSC
480
TAS
165
S-CSCF
160
SR/SBC
170
WAP LOCATION DATA (MOBILE VOIP)
101-2
WAP LOCATION DATA (STATIC VOIP)
101-1
MOBILE WIS
105-2
STATIC WIS
105-1
DEVICE DATA (405)
DEVICE LOCATION IDENTIFIER (407)
DEVICE LOCATION QUERY (406)
WAP LOCATION IDENTIFIER (404)
WAP LOCATION QUERY (403-2)
470

FIG. 4E

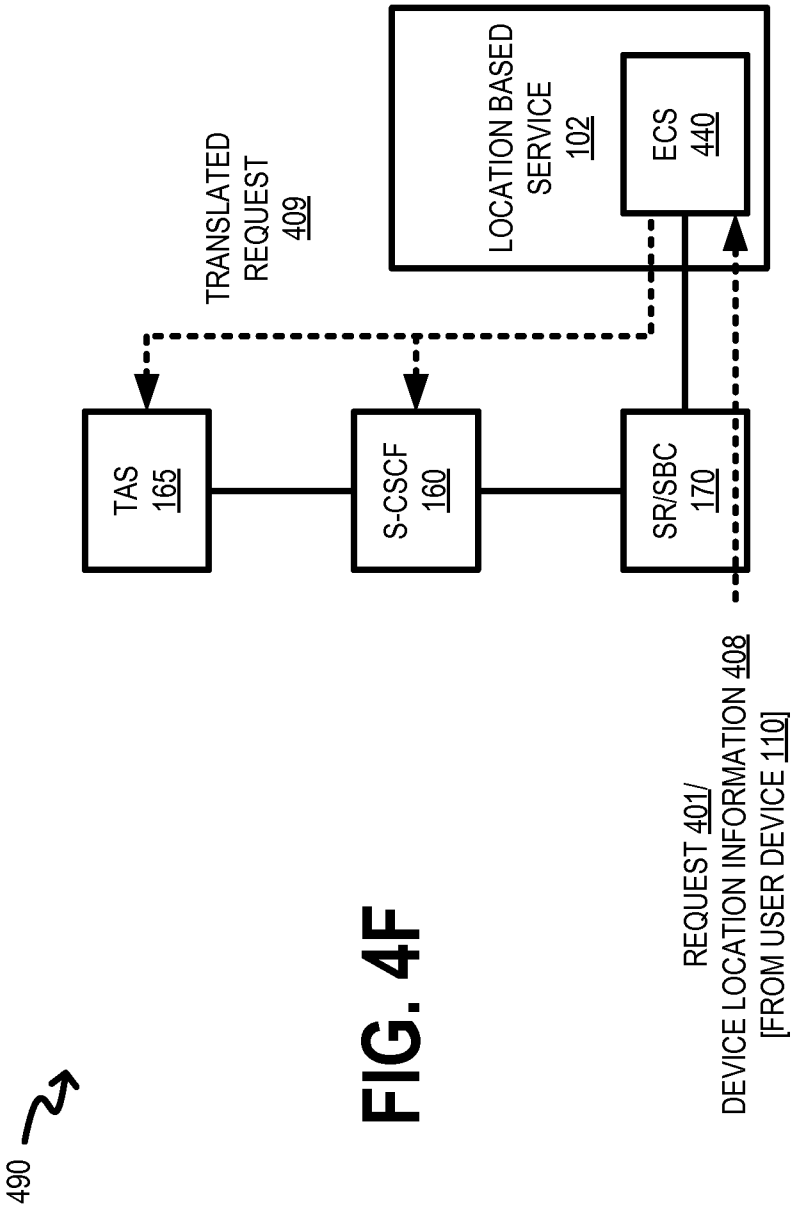
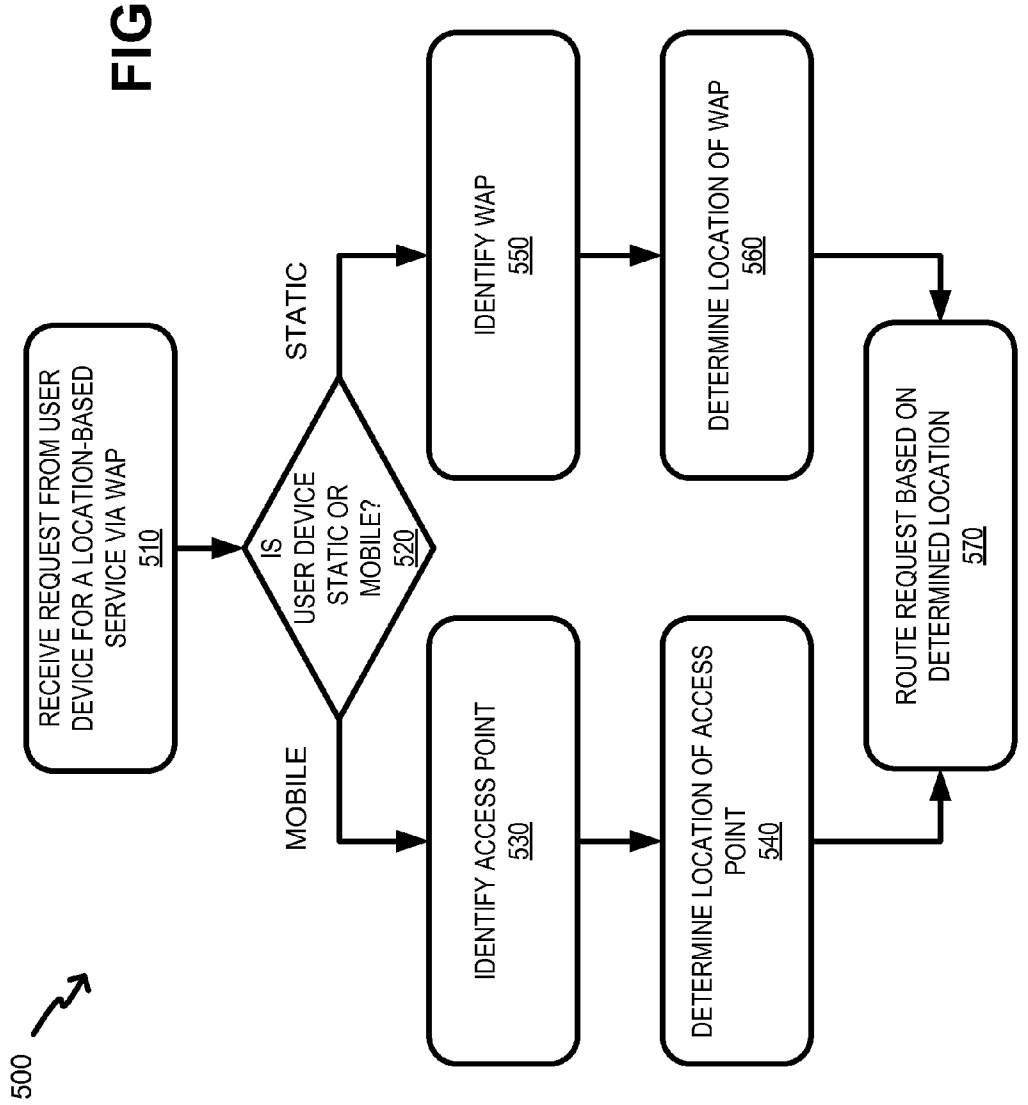

490
TAS 165
S-CSCF 160
SR/SBC 170
ECS 440
LOCATION BASED SERVICE 102
TRANSLATED REQUEST 409
REQUEST 401/
DEVICE LOCATION INFORMATION 408
[FROM USER DEVICE 110]

FIG. 4F

FIG. 5


500
RECEIVE REQUEST FROM USER DEVICE FOR A LOCATION-BASED SERVICE VIA WAP
510
IS USER DEVICE STATIC OR MOBILE?
520
STATIC
MOBILE
IDENTIFY WAP
550
DETERMINE LOCATION OF WAP
560
IDENTIFY ACCESS POINT
530
DETERMINE LOCATION OF ACCESS POINT
540
ROUTE REQUEST BASED ON DETERMINED LOCATION
570

LOCATION-BASED TELEPHONE CALLS OVER A WIRELESS LOCAL AREA NETWORK (WLAN)

BACKGROUND

A wireless local area network (WLAN) may link a user device, such as a smart phone or a tablet, to a wireless access point (WAP), such as a wireless router, via wireless communications such as spread-spectrum or Orthogonal frequency-division multiplexing (OFDM) radio signals. For example, a WLAN may be based on various International Institute of Electrical and Electronics Engineers (IEEE) 802.11 standards, which are branded as Wi-Fi®. The WAP may be coupled to a service network, such as a wired, wireless or fiber optic, wide area network (WAN), to provide the user device with access to the Internet. WLANs have become popular because WAPs are relatively easy and inexpensive to install, and because WLANs enable multiple user devices to enter and move within local coverage areas to connect to the Internet.

A provider of "N11" (such as 711 for telecommunications relay services (TRS) and 911 for emergency call calls), short code dialing, "8yy" calls, 7 digit dialing, or other location-based services may use various techniques to determine a location of the user device communicating via a base station of a wireless data network, such as a long-term evolution (LTE) network. For example, the service provider may determine a location of a base station in the LTE network. Alternatively, if the user device supports global positioning system (GPS), the GPS location of the user device can be provided to the location-based service using various protocols, such as the open mobile alliance (OMA) secure user plane location (SUPL) protocol, the LTE location positioning protocol (LPP), etc.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a diagram of an exemplary network in which systems and/or methods described herein may be implemented;

FIG. **2** is a diagram of exemplary components of one or more devices of the network illustrated in FIG. **1**;

FIG. **3** is a diagram of exemplary components of a user equipment of the network depicted in FIG. **1**;

FIGS. **4**A-**4**F are diagrams of exemplary operations capable of being performed by portions of the network illustrated in FIG. **1**; and

FIG. **5** is a flow chart of an exemplary process for handling a request, received via a wireless access point, for a location-based service, according to an implementation described herein.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

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

Systems and/or methods described herein may relate to receiving, from a user device, a request to access a location-based service via a wireless access point (WAP). A WAP identifier associated with the WAP may be identified based on the request and a particular geographic location associated with the WAP may be determined based on the identifier. For example, a WAP information service (WIS) may store data associating geographic locations and WAP identifiers corresponding to a plurality of WAPs that include the WAP, and the particular geographic location may be determined by querying the WIS, based on the particular WAP identifier, to identify the particular geographic location. A communication may be established between the user device and location-based service based on the particular geographic location associated with the WAP.

As used herein, the terms "caller" and/or "user" may be used interchangeably. Also, the terms "caller" and/or "user" are intended to be broadly interpreted to include a user device or a user of the user device.

FIG. **1** is a diagram of an exemplary network **100** that may include a WAP information server (WIS) **105** to acquire and store WAP location data **101** that may be used to provide a location-based service **102** to a user device **110** communicating via a WAP **130**, according to one implementation. As shown in FIG. **1**, network **100** may include WIS **105**, user device **110**, a wireless wide area network (WWAN) **115**, a wireless local area network (WLAN) **120**), an enhanced e-Node (eNB) **125**, a serving gateway (SGW) **135**, an evolved packet data gateway (ePDG) **140**, an Internet (e.g., the "world-wide web") gateway (webGW) **145**, a packet data network (PDN) gateway (PGW) **150**, a proxy call session control function (P-CSCF) **155**, a serving CSCF (S-CSCF) **160**, a telephony application servicer (TAS) **165**, and a switch relay/session border control (SR/SBC) **170**.

Components of network **100** may interconnect via wired and/or wireless connections or links. A single one of each of WIS **105**, user device **110**, WWAN **115**, WLAN **120**, eNB **125**, SGW **135**, ePDG **140**, webGW **145**, PGW **150**, P-CSCF **155**, S-CSCF **160**, TAS **165**, and SR/SBC **170** has been illustrated in FIG. **1** for simplicity. In practice, there may be a plurality of WISes **105**, user devices **110**, WWANs **115**, WLANs **120**, eNBs **125**, SGWs **135**, ePDGs **140**, webGWs **145**, PGWs **150**, P-CSCFs **155**, S-CSCFs **160**, TASes **165**, and/or SR/SBCs **170** in network **100**. Also, in some instances, one or more of the components of network **100** may perform one or more functions described as being performed by another one or more of the components of network **100**.

WIS **105** may collect and store WAP location data **101** identifying locations of WAPs **130**. WAP location data **101** may include, for example, an IP address, a media access control (MAC) address, an electronic serial number (ESN), a mobile equipment identifier (MEID), an international mobile equipment identity (IMEI), or other device identifier associated with WAP **130**. WAP location data **101** further include information identifying a geographic location associated with the WAP **130**. For example, WAP location data **101** may include information identifying a street address, a city, a state, region, country, a longitude/latitude pair, etc. associated with WAP **130**. For example, WIS **105** (or another device) may provide an interface (e.g., a web page) for registering WAP **130** with a service network (e.g., a network connecting WAP **130** to location-based service **102**), and an operator of WAP **130** may identify an associated location via the interface during registration of WAP **130**.

In addition or alternatively, WIS **105** may include, in WAP location data **101**, data identifying an eNB **125** associated with the WAP **130** (e.g., a particular eNB **125** that is geographically closest to, and/or in engaged in wireless communications with, user device **110** and/or WAP **130**—e.g., via WLAN **120**). For example, WAP location data **101** may include an identifier associated with eNB **125** (e.g., a network address), a tracking area code (TAC) that identifies a tracking area within WWAN **115**, an enhanced global cell identity (ECGI) identifies a cell associated with eNB **125**, etc For example, WIS **105** may receive data from user device **110**

identifying eNB **125** (e.g., the eNB **125** connected communicating with user device **110** via WWAN **115**)/

When a request to access location-based service **102** is received from user device **110** via a particular WAP **130**, one or more components of network **100** (e.g., SGW **135**, ePDG **140**, webGW **145**, PGW **150**, P-CSCF **155**, S-CSCF **160**, TAS **165**, or SR/SBC **170**) may identify the particular WAP **130** (e.g., based on a source network address or other information associated with the request), and may interface with WIS **105** to request a geographic location of the particular WAP **130**. The geographic location may be used to identify an appropriate location-based service **102** (e.g., a particular location-based service **102** associated with the geographic location of the particular WAP **130**), and the request may be forwarded via network **100** to the appropriated location-based service **102**.

User device **110** may include a digital telephone (e.g., a device implementing voice over internet, or VoIP, technology), a cellular telephone, a smart phone, a PDA (e.g., that can include a radiotelephone, a pager, Internet/intranet access, etc.), a laptop computer (e.g., with a WLAN network card), or other types of mobile communication devices. In one implementation, user device **110** may include a mobile communication device that is capable of supporting location-based services, such as requesting emergency services, via WAP **130**.

WWAN **115** may link user device **110** to eNB **125** using mobile telecommunication cellular network technologies from a wireless service provider, such as long-term evolution (LTE), worldwide interoperability for microwave access (WiMAX), universal mobile telecommunications system (UMTS), Code division multiple access 2000 (CDMA2000), global system for mobile communications (GSM), cellular digital packet data (CDPD) or mobitex, to transfer data. WWAN **115** may exchange voice and/or data between user device **110** and eNB **125**. For example, a connection may be established via WWAN **115** to support VoIP communications between user device **110** and eNB **125**.

WLAN **120** may link user device **110** to WAP **130** via short range wireless communications, such as spread-spectrum or Orthogonal frequency-division multiplexing (OFDM) radio signals. For example, WLAN **120** may be based on various International Institute of Electrical and Electronics Engineers (IEEE) 802.11 standards, which are branded as Wi-Fi®.

The eNB **125** may include one or more computation and/or communication devices that may receive voice and/or data from SGW **135** and may transmit that voice and/or data to user device **110** via an air interface, such as WWAN **115**. The eNB **125** may also receive voice and/or data from user device **110** over the air interface (e.g., WWAN **115**) and may transmit the voice and/or data to SGW **135** or another user device **110**.

WAP **130** may include a wireless device, such as a wireless router, to receive voice and/or data from ePDG **140** and may transmit that voice and/or data to user device **110** via a short-range air interface (e.g., via WLAN **120**). WAP **130** may also receive voice and/or data from user device **110** over WLAN **120** and may transmit the voice and/or data to ePDG **140** or another user device **110**. WAP **130** may be coupled to a service network, such as a wired, wireless or fiber optic, wide area network (WAN), to provide the user device with access to the Internet.

In one implementation, WAP **130** may include a wireless broadband device, such as a broadband unit that includes a WLAN module capable of communicating with user device **110** via WLAN **120**. The broadband unit may include a broadband home router (BHR) capable of communicating with a customer premises network. In another implementation, WAP **130** may include a broadband modem that behaves like a DSL modem except that WAP **130** connects via WLAN **120** to user device **110**. For example, WAP **130** may connect to a router or switch that connects to various devices (e.g., computers) located at a customer premises.

SGW **135** may include a traffic transfer device (or network device), such as a gateway, a router, a switch, a firewall, a NIC, a hub, a bridge, a proxy server, an optical add drop multiplexor (OADM), or some other type of device that processes and/or transfers traffic. In one implementation, SGW **135** may control and manage one or more base stations (e.g., eNB **125**), and may perform data processing to manage utilization of radio network services. SGW **135** may transmit/receive voice and data to/from eNB **125**, other SGWs, and/or PGW **150**. SGW **135** may provide a local anchor point for inter-base station handover, and may provide IP routing and forwarding functions.

The ePDG **140** may include one or more devices to enable secure data transmissions with a user device **110** via WAP **130**. For example, ePDG **140** may act as a termination node of internet protocol security (IPsec) tunnels established with the user device **110** via WAP **130** (e.g., via WLAN **120**). The ePDG **140** may manage sessions with user device **110** via WAP **130** to provide access to the Internet for certain types of user device **110**, such as a smart phone or other device compatible with voice over internet protocol (VoIP) technology.

WebGW **145** may include one or more devices to manage sessions with user device **110** via WAP **130** to provide access to the Internet for certain types of user device **110** that are not compatible with ePDG **140**. For example, WebGW **145** may manage internet access (e.g., by providing a connection to SR/SBC **170** for a personal computer, a laptop, a tablet, etc.

PGW **150** may include a traffic transfer device (or network device), such as a gateway, a router, a switch, a firewall, a network interface card (NIC), a hub, a bridge, a proxy server, an optical add-drop multiplexer (OADM), or some other type of device that processes and/or transfers traffic. In one implementation, PGW **150** may connect to a packet data network, and PGW **150** may perform policy enforcement, per-user based packet filtering (e.g., by deep packet inspection), charging support, lawful interception, user device IP address allocation, packet screening, etc. related to packet data network.

P-CSCF **155** may include one or more server devices, or other types of computation or communication devices, that gather, process, search, and/or provide information in a manner described herein. In one implementation, P-CSCF **155** may function as a proxy server for user device **110**, where session initiation protocol (SIP) signaling traffic to and from user device **110** may go through P-CSCF **155**. P-CSCF **155** may validate and then forward requests from user device **110**, and may process and forward responses to user device **110**.

S-CSCF **160** may include one or more server devices, or other types of computation or communication devices, that gather, process, search, and/or provide information in a manner described herein. In one implementation, S-CSCF **160** may be a central node of the signaling plane, and may perform session control. S-CSCF **160** may handle SIP registrations, may inspect signaling messages, may decide to which device(s) a SIP message may be forwarded, may provide routing services, etc. S-CSCF **160** may further invoke various application servers (e.g., WIS **105** and/or TAS **165**) when performing routing functions.

TAS **165** may include one or more server devices that function as a back-to-back SIP user agent to maintain a call state for user device **110**. TAS **165** may include, for example, a device to implement service logic that provides call pro-

cessing services, such as digit analysis, routing, call setup, call waiting, call forwarding, conferencing, etc.

SR/SBC **170** may provide for signaling as well as a set up, maintenance, and/or tear down of media channels, such as VoIP sessions, video streams, instant messaging sessions, etc. SR/SBC **170** may also control call admission to location-based service **102**. For example, SR/SBC **170** may monitor SIP transmission via a data network to enable VoIP sessions with an emergency messaging entity, such as a public safety answering point (PSAP). In another example, SR/SBC **170** may initiate communications over a circuit switched communications network, such as a public switched telephone network (PSTN) to support location-based service **102**. SR/SBC **170** may also function as a firewall so that user device **110** and/or WAP **130** cannot determine how a call is routed to location-based service **102**. For example, SR/SBC **170** may hide external and internal IP addresses associated with user device **110**, WAP **130**, and/or location-based service **102**.

Although FIG. **1** shows exemplary components of network **100**, in other implementations, network **100** may contain fewer components, different components, differently arranged components, or additional components than those depicted in FIG. **1**.

FIG. **2** is a diagram of exemplary components of a device **200** that may correspond to one or more devices of network **100**. As illustrated, device **200** may include a bus **210**, a processing unit **220**, a main memory **230**, a ROM **240**, a storage device **250**, an input device **260**, an output device **270**, and/or a communication interface **280**. Bus **210** may include a path that permits communication among the components of device **200**.

Processing unit **220** may include one or more processors, microprocessors, or other types of processing units that may interpret and execute instructions. Main memory **230** may include a RAM or another type of dynamic storage device that may store information and instructions for execution by processing unit **220**. ROM **240** may include a ROM device or another type of static storage device that may store static information and/or instructions for use by processing unit **220**. Storage device **250** may include a magnetic and/or optical recording medium and its corresponding drive.

Input device **260** may include a mechanism that permits an operator to input information to device **200**, such as a keyboard, a mouse, a pen, a microphone, voice recognition and/or biometric mechanisms, etc. Output device **270** may include a mechanism that outputs information to the operator, including a display, a printer, a speaker, etc. Communication interface **280** may include any transceiver-like mechanism that enables device **200** to communicate with other devices and/or systems. For example, communication interface **280** may include mechanisms for communicating with another device or system via a network.

As described herein, device **200** may perform certain operations in response to processing unit **220** executing software instructions contained in a computer-readable medium, such as main memory **230**. A computer-readable medium may be defined as a non-transitory memory device. A memory device may include space within a single physical memory device or spread across multiple physical memory devices. The software instructions may be read into main memory **230** from another computer-readable medium or from another device via communication interface **280**. The software instructions contained in main memory **230** may cause processing unit **220** to perform processes described herein. Alternatively, hardwired circuitry may be used in place of or in combination with software instructions to implement processes described herein. Thus, implementations described herein are not limited to any specific combination of hardware circuitry and software.

Although FIG. **2** shows exemplary components of device **200**, in other implementations, device **200** may include fewer components, different components, differently arranged components, or additional components than those depicted in FIG. **2**. Alternatively, or additionally, one or more components of device **200** may perform one or more other tasks described as being performed by one or more other components of device **200**.

FIG. **3** depicts a diagram of exemplary components of a communications device **300** that may correspond to, for example, user device **110**. As illustrated, communications device **300** may include a processing unit **310**, memory **320**, a user interface **330**, a communication interface **340**, and/or an antenna assembly **350**.

Processing unit **310** may include one or more processors, microprocessors, ASICs, FPGAs, or the like. Processing unit **310** may control operation of communications device **300** and its components. In one implementation, processing unit **310** may control operation of components of communications device **300** in a manner described herein.

Memory **320** may include a RAM, a ROM, and/or another type of memory to store data and instructions that may be used by processing unit **310**.

User interface **330** may include mechanisms for inputting information to communications device **300** and/or for outputting information from communications device **300**. Examples of input and output mechanisms might include buttons (e.g., control buttons, keys of a keypad, a joystick, etc.) or a touch screen interface to permit data and control commands to be input into communications device **300**; a speaker to receive electrical signals and output audio signals; a microphone to receive audio signals and output electrical signals; a display to output visual information (e.g., text input into communications device **300**); and/or a vibrator to cause communications device **300** to vibrate.

Communication interface **340** may include, for example, a transmitter that may convert baseband signals from processing unit **310** to radio frequency (RF) signals and/or a receiver that may convert RF signals to baseband signals. Alternatively, communication interface **340** may include a transceiver to perform functions of both a transmitter and a receiver. Communication interface **340** may connect to antenna assembly **350** for transmission and/or reception of the RF signals.

Antenna assembly **350** may include one or more antennas to transmit and/or receive RF signals over the air. Antenna assembly **350** may, for example, receive RF signals from communication interface **340** and transmit them over the air, and receive RF signals over the air and provide them to communication interface **340**. In one implementation, for example, communication interface **340** may communicate with a network and/or devices connected to a network.

As will be described in detail below, communications device **300** may perform certain operations described herein in response to processing unit **310** executing software instructions of an application contained in a computer-readable medium, such as memory **320**. The software instructions may be read into memory **320** from another computer-readable medium or from another device via communication interface **340**. The software instructions contained in memory **320** may cause processing unit **310** to perform processes that will be described later. Alternatively, hardwired circuitry may be used in place of or in combination with software instructions to implement processes described herein. Thus, implementa-

tions described herein are not limited to any specific combination of hardware circuitry and software.

Although FIG. **3** shows exemplary components of communications device **300**, in other implementations, communications device **300** may include fewer components, different components, differently arranged components, or additional components than those depicted in FIG. **3**. Alternatively, or additionally, one or more components of communications device **300** may perform one or more other tasks described as being performed by one or more other components of communications device **300**.

FIG. **4**A is a diagram of exemplary operations performed within a first portion **410** of network **100** to connect user device **110** to location-based service **102** via WAP **130**. As shown in FIG. **4**A, first portion **410** may include location-based service **102**, WIS **105**, and SR/SBC **170**, and these components may operate as described above with respect to network **100**. The operations performed in first portion **410** are described with respect to a particular location-based service **102** for handling an emergency call, such as a 911 call, but it should be appreciated that location-based service **102** may be associated with other functions and/or entities. In the particular example shown in FIG. **4**A, location-based service **102** may include an emergency SBC (E-SBC) **420**, a selective router (SR) **430**, an emergency call server (ECS) **440**, and a public safety answering point (PSAP) **450** corresponding to a final destination of an emergency call where a "911" operator is located. It should be appreciated, however, that different location-based services **102** may include few, more, or different components.

In first portion **410**, a request **401** for location-based service **102**, initiated by user device **110** via WAP **130**, may be forwarded within network **100** (e.g., via ePDG **140** and PGW **150** or via webGW **145**) to SR/SBC **170**. Request **401** may be a session initiation protocol (SIP) invitation requesting a connection between user device **110** and an appropriate PSAP **450** (to be identified via WIS **105**) and may include data identifying WAP **130**. SR/SBC **170** may forward data associated with request **401** to location-based service **102**, such as to E-SBC **420**.

E-SBC **420** may include one or more devices to control communications to and from location-based services **102**. E-SBC **420** may filter request **401** (e.g., determine whether request **401** relates an associated location-based service **102**) and may forward a copy of request **401** to other components of location-based services **102**. For example, E-SBC **420** may forward a copy of request **401** to SR **430** and/or ECS **440**.

SR **430** may include a server device, or other types of computation or communication devices, to route request **401** (e.g., a 911 call) to the appropriate PSAP **450**, as determined by ECS **440**. SR **430** may include a data transfer device, such as a gateway, a router, a switch, a firewall, a network interface card (NIC), a hub, a bridge, a proxy server, an optical add-drop multiplexer (OADM), or some other type of device that processes and/or transfers data.

PSAP **450** may include a server device, or other types of computation or communication devices, responsible for answering an emergency call from user device **110** (e.g., via WAP **130**). PSAP **450** may communicate with emergency personnel (e.g., police, fire, and/or ambulance services, not shown in FIG. **4**A) to provide information associated with emergency calls. Various PSAPs **450** may be associated with different locations (e.g., different regions, cities, counties, states, countries), and location-based service **102** may route request **401** to an appropriate particular PSAP **450** responsible for the geographic location associated with user device **110**.

In the context of first portion **410**, ECS **440** may include a server device, or other types of computation or communication devices, to identify the appropriate PSAP **450** based on the geographic location of WAP **130**. For example, ECS **440** may extract an identifier for WAP **130** from request **401** and may use this information to interface with WIS **105** (e.g., via other components of network **100** such as SR/SBC **170**) to determine the geographic location for WAP **130**. For example, ECS **440** may use the identifier for WAP **130** to query WAP location data **101** to identify the geographic location for WAP **130** and/or identify an associated eNB **125**. If ECS **440** determines data identifying an associated eNB, ECS **440** may interface with another component of network **100** (e.g., a location server not shown in FIG. **1** or **4**A) to determine a geographic location associated with eNB **125**. ECS **440** may further determine a particular PSAP **450** associated with the geographic location. For example, ECS **440** may interface with PSAPs **450** to determine a particular PSAP **450** that would accept request **401** from the identified geographic location. In addition or alternatively, ECS **440** may store data identifying locations associated with PSAPs **450** and may select a particular PSAP **450** to handle request **401** based on the stored data.

E-SBC **420** may generate call data **402** to enable components of network **100** to establish a SIP session or other communications between user device **110** and the selected PSAP **450**. For example, E-SBC **420** may cause a first session to be established between E-SBC **420** and the appropriate PSAP **450** via SR **430**, and E-SBC **420** may generate call data **402** to enable components of network **100** (e.g., P-CSCF **155**, S-CSCF **160**, TAS **165** and/or SR/SBC **170**) to establish a second session between user device **110** and E-SBC **420** via WAP **130**. E-SBC **420** may further bridge the first and second sessions to establish the call between user device **110** and the appropriate PSAP **450**.

Although FIG. **4**A shows exemplary components of first portion **410**, in other implementations, first portion **410** may include fewer components, different components, differently arranged components, or additional components than those depicted in FIG. **4**A. Alternatively, or additionally, one or more components of first portion **410** may perform one or more other tasks described as being performed by one or more other components of first portion **410**.

FIGS. **4**B and **4**C are diagrams of exemplary operations performed within a second portion **460** of network **100** to connect user device **110** to location-based service **102** via WAP **130**. As shown in FIGS. **4**B and **4**C, second portion **460** may include location-based service **102**, WIS **105**, S-CSCF **160**, TAS **165**, and SR/SBC **170**, and these components may generally operate as described above with respect to network **100**

In FIG. **4**B, in a first exemplary operation within second portion **460**, data associated with request **401** for location-based service **102**, initiated by user device **110** via WAP **130**, may be forwarded within network **100** (e.g., by webGW **145** or P-CSCF **155**) to S-CSCF **160**. Request **401** may be a session initiation protocol (SIP) invitation requesting a connection between user device **110** and an appropriate PSAP **450** (located inside location-based service **102** as shown in FIG. **4**A and to be identified via WIS **105**) and may include data (e.g., a MAC address) identifying WAP **130**. S-CSCF **160** may extract the data identifying WAP **130** from request **401** and may use the data identifying WAP **130** to determine a location associated with WAP **130**. For example, S-CSCF **160** may forward, to WIS **105**, a WAP location query **403** (shown in FIGS. **4**B and **4**D as WAP location query **403-1**) based on the data identifying WAP **130**, and WIS **105** may use

the data to determine the location associated with WAP **130**. WIS **105** may forward, to S-CSCF **160**, WAP location identifier **404** that includes data (e.g., ECGI, TAC and/or other location identifier) identifying a geographic location of WAP **130**.

As further shown in FIG. **4**B, S-CSCF **160** may generate device data **405** based on the geographic location of WAP **130**. For example, S-CSCF **160** may generate session messages and commands based on the location of WAP **130** in order to request a session with an appropriate location-based service **102** (e.g., a particular location-based service **102** associated with the geographic location of WAP **130**). For example, S-CSCF **160** may forward a SIP registration message that includes a multimedia private access network information (mPANI) header that may identify an access technology (e.g. WLAN **120** and WAP **130**) used by user device **110** to connect to network **100** and the location of WAP **130** (and closely situated user device **110**). For example, S-CSCF **160** may forward device data **405** (e.g., messages that include the mPANI header) to TAS **165** and/or to SR/SBC **170** to establish a SIP session or other connection to particular location-based service **102** associated with the location of WAP **130**.

In FIG. **4**C, in a second exemplary operation within second portion **460** of network **100**, TAS **165** (and not S-CSCF **160**) may determine an identifier for WAP **130** (e.g., based on request **401**) and may use the identifier of WAP **130** to determine a location associated with WAP **130**. For example, TAS **165** may forward, to WIS **105**, a WAP location query **403** (shown in FIGS. **4**C and **4**E as WAP location query **403-2**) based on the identifier of WAP **130**, and WIS **105** may use the data to determine the location associated with WAP **130**. WIS **105** may forward, to TAS **165**, WAP location identifier **404** that include data (e.g., ECGI, TAC and/or other location identifier) identifying a geographic location of WAP **130**.

As further shown in FIG. **4**C, TAS **165** may generate device data **405** based on the geographic location of WAP **130**. For example, TAS **165** may generate session messages and commands based on the location of WAP **130** and initiate a session with an appropriate location-based service **102** associated with the geographic location of WAP **130**. For example, TAS **165** may forward a SIP registration message that includes the mPANI header identifying the location of WAP **130**. For example, TAS **165** may forward device data **405** (e.g., messages that include the mPANI header) to S-CSCF **160**. S-CSCF **160** may forward device data **405** to SR/SBC **170** to establish a SIP session or other connection to particular location-based service **102** associated with the location of WAP **130**.

Although FIGS. **4**B and **4**C show exemplary components of second portion **460**, in other implementations, second portion **460** may include fewer components, different components, differently arranged components, or additional components than depicted in FIGS. **4**B and **4**C. Alternatively, or additionally, one or more components of second portion **460** may perform one or more other tasks described as being performed by one or more other components of second portion **460**.

In another implementation different from that of FIGS. **4**A-**4**C, network **100** may determine whether user device **110** is placing calls from a single location associated with WAP **130** (e.g., messaging via static VoIP) or whether user device **110** is moving within network **100** and is only temporarily connected through WAP **130** (e.g., user device **110** is located in an moving automobile). For example, S-CSCF **160**, TAS **165**, or another component of network **100** may determine whether user device **110** is connected to WAP **130** for at least a particular (i.e., a threshold) time period and/or is attempting to connect to eNB **125** (e.g., via WWAN **115**).

FIGS. **4**D and **4**E are diagrams of exemplary operations that may be performed within a third portion **470** of network **100**. As shown in FIGS. **4**D and **4**E, third portion **470** may include location-based service **102**, WIS **105** (shown in FIGS. **4**D and **4**E as static WIS **105-1** and mobile WIS **105-2**), S-CSCF **160**, TAS **165**, and SR/SBC **170**. These components may generally operate as described above with respect to network **100**. However, static WIS **105-1** may store WAP location data **101-1** associated with static VoIP communications with user device **110**, such as publicly available (e.g., a directory of publicly accessible WAPs **130**) data that includes an identifier and location data (e.g., ECGI and/or TAC identifiers) associated with WAP **130**, and mobile WIS **105-2** may store WAP location data **101-1** associated with mobile VoIP communications with user device **110**, such as internal data used in service network, such as an identifier and location data (e.g., ECGI and/or TAC identifiers) associated with an access point corresponding to WAP **130**.

In the exemplary operations of third portion **470** shown in FIG. **4**D, data associated with request **401** for location-based service **102**, initiated by user device **110** via WAP **130**, may be forwarded within network **100** (e.g., by webGW **145** or P-CSCF **155**) to S-CSCF **160**. S-CSCF **160** may extract the data identifying WAP **130** from request **401** and may further determine whether user device **110** is static (e.g., is connected to WAP **130** for more than a threshold time period) or is mobile (e.g., is connected to WAP **130** for less than the threshold time period). In one implementation, when user device **110** is mobile, user device may be sending a request for location-based service **102** from another WAP **130** and eNB **125**, and WAP **130** may represent a future access point (e.g., user device **110** appears to be moving toward WAP **130**) that is identified based on a pattern in prior access points used by user device **110**.

If user device **110** is static, S-CSCF **160** may proceed as described in the discussion of FIG. **4**B. For example, S-CSCF **160** may forward, to WIS **105-1**, a WAP location query **403-2** that includes a device identifier associated with WAP **130** extracted from request **401**. WIS **105-1** may use the device identifier to determine a location associated with WAP **130**. WIS **105-1** may forward, to S-CSCF **160**, WAP location identifier **404** that includes data (e.g., ECGI, TAC and/or other location identifier) identifying the geographic location of WAP **130**.

If user device **110** is mobile, S-CSCF **160** may forward, to WIS **105-2**, a device location query **406** that includes a MAC address or other information associated with WAP **130**. The MAC address may be extracted from request **401** or determined based on analyzing the movement of user device **110**. WIS **105-2** may use the MAC address to determine a location associated with WAP **130**. WIS **105-2** may forward, to S-CSCF **160**, device location identifier **407** that includes data (e.g., ECGI, TAC and/or other location identifier) associated with the geographic location of WAP **130**.

In the exemplary operations of third portion **470** shown in FIG. **4**E, TAS **165** may extract the data identifying WAP **130** (e.g., from request **401** received from S-CSCF **160** or another component of network **100**) and may further determine whether user device **110** is static or is mobile. If user device **110** is static, TAS **165** may proceed as described in the discussion of FIG. **4**C. For example, TAS **165** may forward, to WIS **105-1**, a WAP location query **403-2** that includes a device identifier associated with WAP **130** extracted from request **401**. WIS **105-1** may use the device identifier to determine a location associated with WAP **130**. WIS **105-1**

may forward, to TAS **165**, WAP location identifier **404** that includes data (e.g., ECGI, TAC and/or other location identifier) identifying the geographic location of WAP **130**.

If user device **110** is mobile, TAS **165** may forward a message to cause S-CSCF **160** to forward, to WIS **105-2**, a device location query **406** that includes a MAC address or other information associated with WAP **130**. The MAC address may be extracted from request **401** or determined based on analyzing the movement of user device **110**. WIS **105-2** may use the MAC address to determine a location associated with WAP **130**. WIS **105-2** may forward, to S-CSCF **160**, device location identifier **407** that includes data (e.g., ECGI, TAC and/or other location identifier) associated with the geographic location of WAP **130**.

As further shown in FIG. **4**E, S-CSCF **160** may generate device data **405** based on the geographic location of WAP **130** (as received, for example, in WAP location identifier **404** from WIS **105-1** or in device location identifier **407** from WIS **105-2**). For example, S-CSCF **160** may generate, as device data **405**, session messages and commands based on the location of WAP **130** in order to request a session with an appropriate location-based service **102** (e.g., a particular location-based service **102** associated with the geographic location of WAP **130**). For example, S-CSCF **160** may forward a SIP registration message that includes an mPANI header identifying the location of WAP **130**. For example, S-CSCF **160** may forward device data **405** (e.g., messages that include the mPANI header) to TAS **165** and/or to SR/SBC **170** to establish a SIP session or other connection to particular location-based service **102** associated with the location of WAP **130**. When user device **110** is mobile, SR/SBC **170** may interact with MSC **480** to establish the connection to location-based service **102** so that the connection may be maintained even if user device moves to connect to another access point (e.g., another WAP **130** not shown in FIG. **4**E and/or eNB **125**). MSC **480** may include a server device or other types of computation or communication devices to set up and release an end-to-end connection, and to handle mobility and handover requirements during the call.

Although FIGS. **4**D and **4**E shows exemplary components of third portion **470**, in other implementations, third portion **470** may include fewer components, different components, differently arranged components, or additional components than those depicted in FIGS. **4**D and **4**E. Alternatively, or additionally, one or more components of third portion **470** may perform one or more other tasks described as being performed by one or more other components of third portion **470**.

In another implementation, request **401** for location based service **102** may be handled within network **100** without accessing WIS **105**. For example, FIG. **4**F shows a diagram of exemplary operations that may be performed within a fourth portion **490** of network **100** to handle request **401** without accessing WIS **105**. As shown in FIG. **4**F, fourth portion **490** may include location-based service **102**, S-CSCF **160**, TAS **165**, SR/SBC **170**, and ECS **440**. These components may generally operate as described above with respect to network **100**.

As shown in FIG. **4**F, user device **110** may determine device location information **408** identifying a geographic location associated with user device **110**. For example, user device **110** may determine a geographic location (e.g., longitude and latitude values) based on collected GPS data, based on processing signals received from one or more eNBs **125**, etc. User device **110** may determine device location information **408** when connecting to WAP **130** and/or when forwarding request **401** for location-based service **102**. In another implementation, user device **110** may receive device location information **408** from another device, such as from eNB **125**, WAP **130**, and/or from another user device **110**.

As further shown in FIG. **4**F, user device may forward request **401** toward SR/SBC **170** (e.g., via WebGW **145**, PPGW **150**, or S-CSCF **160**), and SR/SBC **170** may forward request **401** toward location-based service **102**. Request **401** may include device location information **408**, and ECS **440** in location-based service **102** may determine a modified request **409** that may be used S-CSCF **160** and/or TAS **165** to establish a session between user device **110** and an appropriate location-based service **102**. For example, ECS **440** may determine a cell identifier (e.g., ECGI and/or TAC identifiers) associated with the geographic location identified in device location information **408**, and ECS **440** may replace, in request **401**, location data **408** with the cell identifier to form modified request **409**. ECS **440** may forward modified request **409** to S-CSCF **160**, TAS **165**, or another component of network **100**. S-CSCF **160**, TAS **165**, or the other component of network **100** may use the data included in modified request **409** (e.g., the cell identifier) to establish the session between user device **110** and the appropriate location-based service **102**.

Although FIG. **4**F shows exemplary components of fourth portion **490**, in other implementations, fourth portion **490** may include fewer components, different components, differently arranged components, or additional components than depicted in FIG. **4**F. Alternatively, or additionally, one or more components of fourth portion **490** may perform one or more other tasks described as being performed by one or more other components of fourth portion **490**.

FIG. **5** is a flow chart of an exemplary process **500** for handling a request for a location-based service **102** received via WAP **130**. In one implementation, process **500** may be performed by one or more components of network **100**, such as WIS **105**, P-CSCF **155**, S-CSCF **160**, TAS **165**, and/or SR/SBC **170**.

As shown in FIG. **5**, process **500** may include receiving, from user device **110**, a request for location-based service **102** via WAP **130** (block **510**). For example, in implementations described above in connection with FIGS. **4**A-**4**F, user device **110** may forward a SIP INVITE to connect to location-based service **102** (e.g., for a 911 call). When the SIP INVITE is forwarded via WAP **130**, WAP **130** may modify the SIP INVITE to include data identifying WAP **130** and may forward the modified SIP INVITE to another component of network **100**, such as to S-CSCF **160**, TAS **165**, and/or SR/SBC **170** via ePDG **140**, webGW **145**, PGW **150**, and/or P-CSCF **155**.

As shown in FIG. **5** process **500** may further include determining whether the user device **110** is static or mobile (block **520**). For example, S-CSCF **160**, may determine how long user device **110** has been connected to WAP **130** and may classify user device **110** as static if user device **110** has been connected to WAP **130** (e.g., via WLAN **120**) for a least a threshold amount of time.

As further shown in FIG. **5**, if user device **110** is mobile (block **520**—"Mobile"), process **500** may further include identifying an access point identifier associated with WAP **130** (block **530**) and determining a location associated with the access point identifier (block **540**). For example, as described above with respect to third portion **470** in FIGS. **4**D and **4**E, S-CSCF **160** or TAS **165** may forward device location query **406** that includes a MAC address or other information associated with WAP **130**. The MAC address may be extracted from request **401** or determined based on analyzing the movement of user device **110**. WIS **105-2** may use the

MAC address to determine a location associated with WAP **130**. WIS **105-2** may forward, to S-CSCF **160** or TAS **165**, device location identifier **407** that includes data (e.g., ECGI, TAC and/or other location identifier) associated with the geographic location of WAP **130**.

Alternatively, if user device **110** is static (block **520**—"Static"), process **500** may further include identifying WAP **130** (block **550**) and determining a location associated with WAP **130** (block **560**). For example, as described above with respect to first portion **410** in FIG. **4**A, SR/SBC **170** may extract an identifier of WAP **130** (e.g., a device identifier) from request **401** and forward the WAP identifier to location-based service **102**. Location-based service **102** uses the WAP identifier to determine an associated location and may initiate an appropriate connection to user device **110**.

Alternatively, as described above with respect to second portion **460** in FIGS. **4**B and **4**C, S-CSCF **160** or TAS **165** may forward WAP location query **403** that includes an identifier for WAP **130**. WIS **105** may use the WAP identifier to determine a location associated with WAP **130**. WIS **105-2** may forward, to S-CSCF **160** or TAS **165**, WAP location identifier **404** that includes data (e.g., ECGI, TAC and/or other location identifier) associated with the geographic location of WAP **130**.

Continuing with FIG. **5**, process **500** may also include routing the request to an appropriate location-based service **102** based on the geographic location associated with WAP **130** (block **570**). For example, S-CSCF **160** or TAS **165** may forward an SIP INVITE message that includes an mPANI header identifying the location of WAP **130** to location-based service **102**, and location-based service **102** may handle the SIP INVITE based on the mPANI header. For example, location-based service **102** may extract the location of WAP **130** from the mPANI header and may form an appropriate SIP session between user device **110** and an appropriate component location-based service **102**. For example, location-based service **102** may store a record identifying different components (e.g., different PSAP **450**) associated with geographic locations and may identify an appropriate component to connect to user device **110** based on the location of WAP **130**.

In the preceding specification, various preferred embodiments have been described with reference to the accompanying drawings. It will, however, be evident that various modifications and changes may be made thereto, and additional embodiments may be implemented, without departing from the broader scope of the invention as set forth in the claims that follow. The specification and drawings are accordingly to be regarded in an illustrative rather than restrictive sense.

Also, while a series of blocks has been described with respect to process **500** in FIG. **5**, the order of the blocks in process **500** may be modified in other implementations to include additional, fewer, and/or different blocks. Furthermore, non-dependent blocks in process **500** may be performed in parallel.

It will be apparent that different aspects of the description provided above may be implemented in many different forms of software, firmware, and hardware in the implementations illustrated in the figures. The actual software code or specialized control hardware used to implement these aspects is not limiting of the implementations. Thus, the operation and behavior of these aspects were described without reference to the specific software code—it being understood that software and control hardware can be designed to implement these aspects 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 the 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 other claim, the disclosure of the implementations includes each dependent claim in combination with every other claim in the claim set.

No element, act, or instruction used in the present application should be construed as critical or essential unless explicitly described as such. Also, as used herein, the article "a" is intended to include one or more items. Where only one item is intended, the term "one" or similar language is used. 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 method comprising:

receiving, by a processor, a request from a user device to access a location-based service via a wireless access point (WAP);

determining whether the user device is static or mobile, wherein determining whether the user device is static or mobile includes:

determining a length of time that the user device has accessed the WAP;

determining that the user device is mobile when the length of time that the user device has accessed the WAP is less than a threshold amount; and

determining that the user device is static when the length of time that the user device has accessed the WAP satisfies the threshold amount;

identifying, by the processor, a particular WAP identifier associated with the WAP based on the request;

determining, by the processor, a particular geographic location based on the identifier and based on determining whether the user device is static or mobile, wherein a first WAP information service (WIS) stores data associating first geographic locations and WAP identifiers corresponding to a plurality of WAPs that include the WAP, wherein a second WIS stores data associating the WAP identifiers and second geographic locations corresponding to other access points, wherein the first geographic locations differ from the second geographic locations, and wherein determining the particular geographic location includes:

querying, based on determining that the user device is static, the first WIS based on the particular WAP identifier to identify, as the particular geographic location, one of the first geographic locations corresponding to the WAP, and

querying, based on determining that the user device is mobile, the second WIS based on the particular WAP identifier to identify, as the particular geographic location, one of the second geographic locations; and

establishing, by the processor, a communication between the user device and the location-based service based on the particular geographic location.

2. The method of claim **1**, wherein the processor is associated with a call session control function (CSCF) or a telephony application servicer (TAS).

3. The method of claim **1**, wherein the location-based service is associated with handling an emergency call.

4. The method of claim **1**, wherein the processor is associated with an emergency call service (ECS), and wherein establishing the communication includes:

selecting a particular public safety answering point (PSAP) from a plurality of PSAPs based on the particular geographic location, and

establishing the communication between the user device and the particular PSAP.

5. The method of claim **1**, wherein establishing the communication includes forwarding a session initiation protocol (SIP) message that includes header data identifying the particular geographic location.

6. The method of claim **1**, wherein querying the first WIS based on the particular WAP identifier includes identifying at least one of a tracking area code (TAC) associated with the WAP or an enhanced global cell identity (ECGI) associated with the WAP.

7. The method of claim **1**, wherein the WAP is a first WAP, and wherein establishing the communication between the user device and the location-based service based on the particular geographic location includes:

when the user device is mobile, establishing, via the first WAP, a first connection between the user device and the location-based service;

detecting, during communications via the first connection, that the user device connects to a second WAP;

establishing, via the second WAP and based on detecting that the user device connects to the second WAP, a second connection between the user device and the location-based service via the second WAP; and

releasing the first connection based on establishing the second connection, wherein releasing the first connection causes the user device to be handed over to the second WAP.

8. A device comprising:

a memory configured to store instructions; and

a processor configured to execute one or more of the instructions to:

receive a request from a user device to access a location-based service via a wireless access point (WAP);

determine whether the user device is static or mobile, wherein the processor, when determining whether the user device is static or mobile, is further configured to:

determine a length of time that the user device has accessed the WAP;

determine that the user device is mobile when the length of time that the user device has accessed the WAP is less than a threshold amount; and

determine that the user device is static when the length of time that the user device has accessed the WAP satisfies the threshold amount;

identify a particular WAP identifier associated with the WAP based on the request;

determine a particular geographic location based on the identifier and based on determining whether the user device is static or mobile, wherein a first WAP information service (WIS) stores data associating first geographic locations and WAP identifiers corresponding to a plurality of WAPs that include the WAP, wherein a second WIS stores data associating the WAP identifiers and second geographic locations corresponding to other access points, wherein the first geographic locations differ from the second geographic locations, and wherein the processor, when determining the particular geographic location, is further configured to:

query, when the user device is static, the first WIS based on the particular WAP identifier to identify, as the particular geographic location, one of the first geographic locations corresponding to the WAP, and

query, when the user device is mobile, the second WIS based on the particular WAP identifier to identify, as the particular geographic location, one of the second geographic locations; and

establish a communication between the user device and the location-based service based on the particular geographic location.

9. The device of claim **8**, wherein device is associated with a call session control function (CSCF) or a telephony application servicer (TAS).

10. The device of claim **8**, wherein the location-based service is associated with handling an emergency call.

11. The device of claim **8**, wherein the device is associated with an emergency call service (ECS), and wherein the processor, when establishing the communication, is further configured to execute one or more of the instructions to:

select a particular public safety answering point (PSAP) from a plurality of PSAPs based on the particular geographic location, and

establish the communication between the user device and the particular PSAP.

12. The device of claim **8**, wherein the processor, when establishing the communication, is further configured to execute one or more of the instructions to:

forward a session initiation protocol (SIP) message that includes header data identifying the particular geographic location.

13. The device of claim **8**, wherein the processor, when querying the first WIS based on the particular WAP identifier, is further configured to execute one or more of the instructions to:

identify at least one of a tracking area code (TAC) associated with the WAP or an enhanced global cell identity (ECGI) associated with the WAP.

14. The device of claim **8**, wherein the WAP is a first WAP, and wherein the processor, when establishing the communication between the user device and the location-based service based on the particular geographic location, is further configured to:

establish, via the first WAP and when the user device is mobile, a first connection between the user device and the location-based service;

detect, during communications via the first connection, that the user device connects to a second WAP;

establish, via the second WAP and based on detecting that the user device connects to the second WAP, a second connection between the user device and the location-based service via the second WAP; and

release the first connection based on establishing the second connection, wherein releasing the first connection causes the user device to be handed over to the second WAP.

15. A non-transitory computer readable medium to store instructions, the instructions comprising:

one or more instructions that, when executed by a processor associated with a device, cause the processor to:

receive a request from a user device to access a location-based service via a wireless access point (WAP);

determine whether the user device is static or mobile, wherein the one or more instructions further cause the processor, when determining whether the user device is static or mobile, to:

determine a length of time that the user device has accessed the WAP;

determine that the user device is mobile when the length of time that the user device has accessed the WAP is less than a threshold amount; and

determine that the user device is static when the length of time that the user device has accessed the WAP satisfies the threshold amount;

identify a particular WAP identifier associated with the WAP based on the request;

determine a particular geographic location based on the identifier and based on determining whether the user device is static or mobile, wherein a first WAP information service (WIS) stores data associating first geographic locations and WAP identifiers corresponding to a plurality of WAPs that include the WAP, wherein a second WIS stores data associating the WAP identifiers and second geographic locations corresponding to other access points, wherein the first geographic locations differ from the second geographic locations, and wherein the one or more instructions further cause the processor, when determining the particular geographic location, to:

query, when the user device is static, the first WIS based on the particular WAP identifier to identify, as the particular geographic location, one of the first geographic locations corresponding to the WAP, and

query, when the user device is mobile, the second WIS based on the particular WAP identifier to identify, as the particular geographic location, one of the second geographic locations; and

establish a communication between the user device and the location-based service based on the particular geographic location.

16. The non-transitory computer readable medium of claim **15**, wherein device is associated with a call session control function (CSCF) or a telephony application servicer (TAS).

17. The non-transitory computer readable medium of claim **15**, wherein the location-based service is associated with handling an emergency call.

18. The non-transitory computer readable medium of claim **15**, wherein the device is associated with an emergency call service (ECS), and wherein the one or more instructions further cause the processor, when establishing the communication, to:

select a particular public safety answering point (PSAP) from a plurality of PSAPs based on the particular geographic location of the WAP, and

establish the communication between the user device and the particular PSAP.

19. The non-transitory computer readable medium of claim **15**, wherein the one or more instructions further cause the processor, when establishing the communication, to:

forward a session initiation protocol (SIP) message that includes header data identifying the particular geographic location.

20. The non-transitory computer readable medium of claim **15**, wherein the WAP is a first WAP, and wherein the one or more instructions further cause the processor, when establishing the communication between the user device and the location-based service based on the particular geographic location, to:

establish, via the first WAP and when the user device is mobile, a first connection between the user device and the location-based service;

detect, during communications via the first connection, that the user device connects to a second WAP;

establish, via the second WAP and based on detecting that the user device connects to the second WAP, a second connection between the user device and the location-based service via the second WAP; and

release the first connection based on establishing the second connection, wherein releasing the first connection causes the user device to be handed over to the second WAP.

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