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(54) **Title:** LOCATION DETECTION WITH STATIC DEVICES

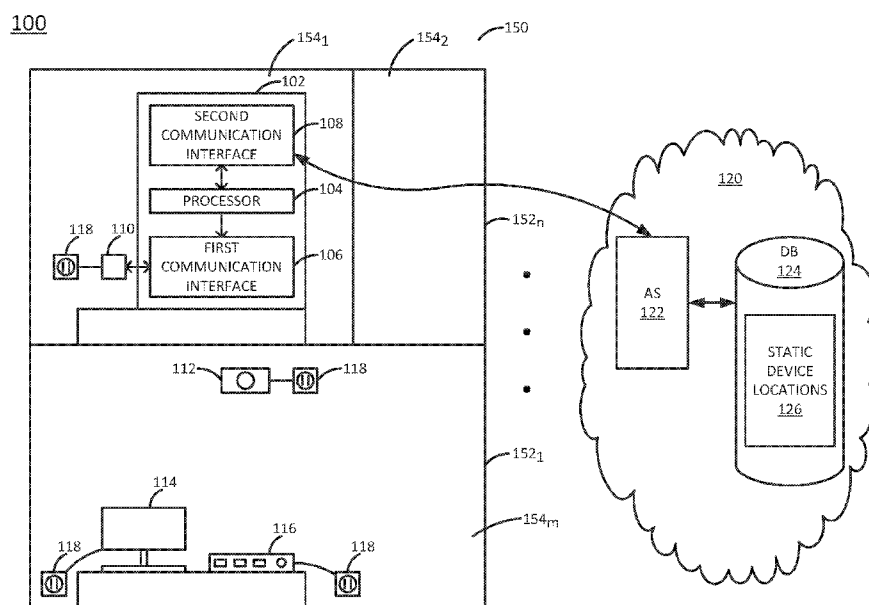


FIG. 1

(57) **Abstract:** In example implementations, an electronic device is provided. The electronic device includes a first communication interface, a second communication interface, and a processor. The first communication interface is to connect to a static device that is plugged into a power outlet. The second communication interface is to connect to a remote server that is to store location information of the static device. The processor is communicatively coupled to the first communication interface and the second communication interface. The processor is to receive identification information associated with the static device via the first communication interface, query the remote server to detect a location of the electronic device within a building based on the identification information, and receive the location of the electronic device within the building.

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MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM,
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LOCATION DETECTION WITH STATIC DEVICES

BACKGROUND

[0001] Electronic devices can be tracked outdoors using tracking technologies within the electronic devices. For example, global positioning system (GPS) radios can be used to track the outdoor locations of electronic devices. A GPS radio can determine that an electronic device is at a location, but may not be able to provide accurate information related to where the electronic device is inside the location.

[0002] Some locations may implement a radio frequency (RF) system to track electronic devices within the locations. An RF system may use a beacon for pinging and response to determine the locations of electronic devices within a location. Other RF systems may use triangulation of wireless signals to and from multiple RF radios to the electronic devices to determine the locations of the electronic devices. Other solutions may include optical light beacons and the use of ultrasound.

BRIEF DESCRIPTION OF THE DRAWINGS

[0003] FIG. 1 is a block diagram of an example system of the present disclosure that detects a location of an electronic device based on information associated with a static device;

[0004] FIG. 2 is a block diagram of an example electronic device of the present disclosure with location detection based on information associated with a static device;

[0005] FIG. 3 is an example process flow diagram updating a location of a static device when the static device is moved;

[0006] FIG. 4 is an example flow diagram of a method for detecting a location of an electronic device based on information associated with a static device;

[0007] FIG. 5 is an example non-transitory computer readable storage medium storing instructions executed by a processor to execute an application with location information determined from a static device; and

[0008] FIG. 6 is an example non-transitory computer readable storage medium storing instructions executed by a processor to update location information of a static device.

DETAILED DESCRIPTION

[0009] Examples described herein provide an apparatus and method to detect a location of an electronic device based on information from a static device. As noted above, GPS radios may not be sufficient to provide accurate location information within a building (e.g., a particular room and/or floor within the building). Some locations may implement expensive infrastructure to track electronic devices. For example, RF systems, optical light beacons, ultrasound signals, and the like may be used to track electronic devices within a building and may use many sensors placed throughout the building areas. In addition, these sensors may use power and/or network connectivity to function properly, thereby adding to the cost of deployment.

[0010] In addition to being expensive, these indoor tracking systems may not be accurate. For example, signal strength may change throughout a building, walls may reduce signal strength, and interference from other wireless devices may cause problems for these indoor tracking systems.

[0011] The present disclosure provides an apparatus and method that can track the location of an electronic device using existing infrastructure of a building. For example, the static devices within a building may be leveraged to provide accurate location information for the electronic device. Thus, additional infrastructure costs can be avoided, while still providing accurate location tracking of electronic devices within a building.

[0012] The location information may also be used to detect the location of

other wireless devices at the same location as the electronic device. In addition, the present disclosure may detect when a static device has been moved to a different location and update the location of the static device for subsequent connections to an electronic device.

[0013] FIG. 1 illustrates an example of a system 100 that includes an electronic device 102 of the present disclosure. The electronic device 102 may be a mobile device, such as a laptop computer, a tablet computer, smart phone, and the like. In an example, the electronic device 102 may include a processor 104, a first communication interface 106, and a second communication interface 108. The processor 104 may be communicatively coupled to the first communication interface 106 and the second communication interface 108 to transmit and receive information or data and control operation of the first communication interface 106 and the second communication interface 108.

[0014] In an example, the electronic device 102 may be at a building 150. However, the building 150 may have several different locations. For example, the building 150 may include different floors 152_1 to 152_n (also referred to herein as a floor 152 or floors 152) and different rooms 154_1 to 154_m (also referred to herein as a room 154 or rooms 154) on the different floors 152. A location within the building 150 may be defined as a particular room 154 on a particular floor 152. For example, the location may be room 154_2 on floor 152_n .

[0015] As noted above, the electronic device 102 may provide GPS signals that can detect that the electronic device 102 is in the building 150. However, the GPS signals are limited in ability to provide a specific location within the building. An example of the present disclosure may use static devices 110, 112, 114, and/or 116 to detect a location (e.g., a particular room 154 on a particular floor 152) of the electronic device 102 within the building 150.

[0016] In an example, the static device 110 may be a power brick. The static device 112 may be an overhead projector. The static device 114 may be a monitor. The static device 116 may be a docking station. However, other examples of static devices may be used that are not illustrated in FIG. 1. A static device may be defined as a device that is powered by a physical power plug connected to a power outlet 118 (e.g., a 120 volt wall outlet). The static

devices may also be capable of a wired or wireless connection to the electronic device 102.

[0017] In an example, the electronic device 102 may connect to the static devices 110, 112, 114, and/or 116 via the first communication interface 106. In the example described herein, the electronic device 102 may be connected to the static device 110 in room 154₁ on floor 152_n. The first communication interface 106 may be a wired or wireless connection. For example, the first communication interface 106 may be a universal serial bus (USB) type-C connection that uses a channel of the USB type C connection to receive information from the static device 110.

[0018] In an example, the first communication interface 106 may be a wireless connection. For example, the first communication interface 106 may use a wireless miracast connection to connect to the static device 114 (e.g., a monitor).

[0019] In an example, the first communication interface 106 may be connected to the static device 110 that is plugged into the power outlet 118. When the processor 104 detects the connection to the static device 110, the processor 104 may receive identification information associated with the static device 110 via the first communication interface 106. The identification information may be a unique identifier of the static device 110. The identification information may be a serial number, a media access control (MAC) address, a network address, and the like.

[0020] In an example, the processor 104 may also check a location status of the static device 110, as discussed in further detail below. The location status of the static device 110 may indicate if the static device 110 has been moved and allow the electronic device 102 to update the location information associated with the static device 110.

[0021] In an example, the processor 104 may be connected to an application server (AS) 122 in a network 120 via the second communication interface 108. The second communication interface 108 may be a wired or wireless interface. For example, the second communication interface 108 may communicate with the AS 122 via a wired Ethernet connection or a wireless connection over WiFi

or cellular communications.

[0022] The network 120 may be an Internet Protocol (IP) network. It should be noted that the network 120 has been simplified for ease of explanation and may include other devices that are not shown. For example, the network 120 may include a gateway, firewalls, routers, and other network devices.

[0023] The AS 122 may be communicatively coupled to a database (DB) 124. Although shown as separate components, the AS 122 and the DB 124 may be part of a single device. The AS 122 and the DB 124 may be operated by an enterprise associated with the building 150 and/or the electronic device 102. The AS 122 and the DB 124 may be remotely located from the building 150.

[0024] In an example, the DB 124 may store static device locations 126. The static device locations 126 may be stored as a table that stores a known location (e.g., a floor 152 and a room 154 in a building 150) of each static device 110, 112, 114, and 116. The static device locations 126 may be compiled when the static devices 110, 112, 114, and 116 are initially deployed in the building 150 and plugged into the wall outlets 118. For example, a technician may populate the static device locations 126 as the static devices 110, 112, 114, and 116 are deployed. In another example, the static device locations 126 may be provided by users of the electronic device 102 when the static devices 110, 112, 114, and 116 are connected to the electronic device 102 for the first time.

[0025] The electronic device 102 may query the AS 122 to detect a location of the electronic device 102 within the building 150 based on the identification information received from the static device 110 via the first communication interface 106. The AS 122 may find the known location of the static device 110 in the static device locations 126 stored in the DB 124 by matching the identification information. The location of the static device 110 may be transmitted back to the electronic device 102 and received by the processor 104.

[0026] In an example, the location information may be used by the electronic device 102 for other applications or functions. For example, the electronic

device 102 may execute a conferencing application. The conferencing application may request location information to be displayed on the graphical user interface (GUI) of the conferencing application. The location information may be provided to the conferencing application and shown in the GUI. For example, the GUI may show user John Smith at room 154₁ on floor 152_n of building 150.

[0027] In an example, the location information may be used to detect other wireless devices. For example, the electronic device may use a third communication interface (e.g., a short range radio, a Bluetooth connection, and the like) to detect additional wireless devices in the room 154₁. For example, a locator tag, a passive radio frequency (RF) tag, and the like may be in the room 154₁. The electronic device 102 may detect the tags and provide the location information to the AS 122. Thus, location information of the other wireless devices may also be updated once the location of the electronic device 102 is detected.

[0028] FIG. 2 illustrates a more detailed block diagram of the electronic device 102. The electronic device 102 may include the processor 104, the first communication interface 106, and the second communication interface 108, as illustrated in FIG. 1, and described above. The electronic device 102 may also include a third communication interface 202, a user interface 204, and a memory 206.

[0029] The third communication interface 202 may be a short range wireless radio (e.g., a Bluetooth radio) to detect additional wireless devices, as described above. The user interface 204 may include a display and/or input devices (e.g., a touch screen, a keyboard, a trackpad, a mouse, and the like). The user interface 204 may allow a user to input information (e.g., location information in some instances when location statuses of the static devices 110, 112, 114, and 116 are unconfirmed), view a GUI of conferencing applications, and the like.

[0030] In an example, the memory 206 may be a non-transitory computer readable medium. For example, the memory 206 may be a hard-disk drive, a solid state drive, a random access memory (RAM), a read-only memory (ROM), and the like. The memory 206 may store instructions that are executed by the

processor 104 to perform the functions described herein.

[0031] FIG. 3 illustrates an example process flow 300 to update a location of a static device when the static device is moved. For example, the process flow 300 may be implemented to help keep accurate location information in the static device locations 126 whenever static devices 110, 112, 114, and/or 116 are moved to different rooms 154.

[0032] The process flow 300 begins at block 302. At block 302, the static device 110 may be plugged into the wall outlet 118 in room 154₁ on floor 152_n of the building 150. The static device 110 may be a power brick. However, as noted above, the static device 110 may also be a projector, a monitor, a docking station, and the like, as illustrated by static devices 112, 114, and 116, respectively.

[0033] The static device 110 may have a location status 170. The location status 170 of the static device 110 may be confirmed. Although a value of “confirmed” is used in the example illustrated in FIG. 3, it should be noted that any flag, value, indicator, parameter, and the like, may be used to provide information to indicate whether the static device 110 has been moved.

[0034] At block 304, the static device 110 may be moved from the room 154₁ on floor 152_n to room 154₂ on floor 152_n. The static device 110 may be plugged into the power outlet 118 of the room 154₂. The static device 110 may detect a loss of power when the static device 110 is unplugged from the power outlet 118 in the room 154₁. As a result, the location status 170 of the static device 110 may change from confirmed in block 302 to unconfirmed in block 304.

[0035] At block 306, the electronic device 102 may connect to the static device 110. For example, the first communication interface 106 may connect to the static device 110 via a wired connection. In an example, the electronic device may connect to the static device 110 via a USB type-C connection.

[0036] In an example, upon detecting a connection, the processor 104 of the electronic device 102 may request identification information and the location status 170 of the static device 110. The information and location status 170 may be transmitted over a channel of the USB type-C connection.

[0037] The processor 104 may determine that the location information of the

static device 110 should be updated based on the unconfirmed value of the location status 170. In an example, a prompt may be displayed on the user interface 204 of the electronic device 102 in response to detecting the unconfirmed value of the location status 170. The prompt may request a user of the electronic device 102 to provide location information of the static device 110. The user may provide a room identifier of the room 154₂ (e.g., a room number, room ID, and the like) and a floor 152_n. The electronic device 102 may transmit the information to the AS 122, and the location information for the static device 110 may be updated in the static device locations 126.

[0038] At block 308 of the process flow 300, the electronic device 102 may change the location status back to confirmed from unconfirmed. In an example, the AS 122 may send a confirmation back to the electronic device 102 that the location information has been successfully updated. In response, the electronic device 102 may clear the location status 170. In other words, the location status 170 may be changed back to confirmed from unconfirmed in response to the confirmation from the AS 122.

[0039] Although the process flow 300 illustrates an example in which the location status 170 is changed to unconfirmed in response to unplugging the static device 110 from the power outlet 118, there may be other changes that can cause the location status 170 to change. For example, the static device 116 (e.g., a docking station) may be plugged into the power outlet 118. However, when the static device 116 is unplugged and moved, the network address or the media access control (MAC) address of the static device 116 may be changed. When the static device 116 detects that a new network address or MAC address is assigned, the static device 116 may change the location status 170 to unconfirmed. As a result, the static devices 110, 112, 114, and 116 may include a flag or the location status to detect when the static devices 110, 112, 114, and 116 are unplugged from the power outlets 118 and possibly moved.

[0040] FIG. 4 illustrates a flow diagram of an example method 400 for detecting a location of an electronic device based on information associated with a static device of the present disclosure. In an example, the method 400

may be performed by the electronic device 102, the apparatus 500 illustrated in FIG. 5 and described below, or the apparatus 600 illustrated in FIG. 6, and described below.

[0041] At block 402, the method 400 begins. At block 404, the method 400 connects to a static device. For example, an electronic device (e.g., a mobile device, laptop computer, a tablet computer, and the like) may be connected to a static device. The static device may be a power brick, a projector, a monitor, a docking station, and the like, that is powered by a connection to a power outlet. The electronic device may connect to the static device via a wired connection (e.g., via a USB connection) or a wireless connection (e.g., a mirror-cast signal for monitors, a short range wireless connection, and the like).

[0042] At block 406, the method 400 determines if a location status of the static device is confirmed. For example, in response to detecting the connection, the electronic device may request information from the static device. The information may include the location status of the static device. If the answer is no, the method 400 proceeds to block 408.

[0043] At block 408, the method 400 provides location information to a remote server. For example, the static device may have been moved. As a result, the location status may be changed from confirmed to unconfirmed, or some other similar value or flag. In response to detecting that the static device was moved, the electronic device may provide a prompt to the user to provide location information. For example, the user may provide a room number, floor number, and building number via the prompt to the electronic device. The location information may be transmitted to a remote server that tracks location information of the static devices.

[0044] At block 410, the method 400 changes the location status to confirmed on the static device. For example, the remote server may transmit back to the electronic device a confirmation message or signal that the location information for the static device has been successfully updated. The electronic device may change the location status back to confirmed, or any other similar value or indicator. The method 400 may return to block 406.

[0045] At block 406, if the answer is yes, then the method 400 may proceed

to block 412. At block 412, the method 400 receives identification information from the static device. In an example, the identification information may be a unique name for the static device, a serial number, or any other unique identifier.

[0046] At block 414, the method 400 queries a remote server to detect a location based on identification information of the static device. For example, the identification information may be transmitted to the remote server. The remote server may look up the location of the static device based on the identification information in a database or table that stores a location for each static device in a particular building.

[0047] At block 416, the method 400 receives the location of the static device. For example, the location may include a particular room number, on a particular floor, of a particular building.

[0048] At block 418, the method 400 determines if location is to be used for an application. If the answer is yes, the method 400 may proceed to block 420.

[0049] At block 420, the method 400 provides the location to the application. For example, the application may be a conferencing application. The conferencing application may display the location of the electronic device in a GUI of the conferencing application. The application may be for delivery. For example, electronic device may order office supplies that are to be delivered to the location. Other applications that can use the location may be within the scope of the present disclosure. The method 400 may then proceed to block 426, where the method 400 ends.

[0050] Referring back to block 418, if the answer is no, the method 400 may proceed to block 422. At block 422, the method 400 determines if other wireless devices are to be located. If the answer to block 422 is yes, then the method 400 may proceed to block 424. If the answer is no, the method 400 may proceed to block 426, where the method 400 ends.

[0051] At block 424, the method 400 may detect other wireless devices and update the locations of the other wireless devices. For example, wireless locator tags, passive RF ID tags, and the like may be located in the same room and floor as the electronic device. The locations of the wireless devices may be

noted or updated based on detection by the electronic device and the detected location of the electronic device. The locations of the other wireless devices may be transmitted to the remote server and also tracked by the remote server. The method 400 may then proceed to block 426. At block 426, the method 400 ends.

[0052] FIG. 5 illustrates an example of an apparatus 500. In an example, the apparatus 500 may be the electronic device 102. In an example, the apparatus 500 may include a processor 502 and a non-transitory computer readable storage medium 504. The non-transitory computer readable storage medium 504 may be encoded with instructions 506, 508, 510, 512, and 514 that, when executed by the processor 502, cause the processor 502 to perform various functions.

[0053] In an example, the instructions 506 may include detecting instructions 506. For example, the instructions 506 may detect a connection to a static device. The connection may be a wired or wireless connection.

[0054] The instructions 508 may include detecting instructions. For example, the instructions 508 may detect a change in a location status of the static device. For example, the static device may have been unplugged and moved. The static device may have been assigned a new network address or MAC address. In either case, the location status of the static device may change from confirmed to unconfirmed.

[0055] The instructions 510 may include connecting instructions. For example, the instructions 510 may connect to a remote server that is to store location information of the static device.

[0056] The instructions 512 may include providing instructions. For example, the instructions 512 may provide an updated location within the building of the static device to the remote server. In an example, the electronic device may prompt a user to provide a location in response to detecting that the location status of the static device has changed. The location may be sent to the remote server via the connection established in instructions 510.

[0057] The instructions 514 may include clearing instructions. For example, the instructions 514 may clear the change in location status of the static device.

In an example, the electronic device may receive a confirmation that the location of the static device was successfully updated. The electronic device may then clear the change by changing the location status back to confirmed from unconfirmed, or some similar value or indicator.

[0058] FIG. 6 illustrates an example of an apparatus 600. In an example, the apparatus 600 may be the electronic device 102. In an example, the apparatus 600 may include a processor 602 and a non-transitory computer readable storage medium 604. The non-transitory computer readable storage medium 604 may encoded with instructions 606, 608, 610, 612, and 614 that, when executed by the processor 602, cause the processor 602 to perform various functions.

[0059] In an example, the instructions 606 may include executing instructions 606. For example, the instructions 606 may execute an application that requests a location of the electronic device. For example, a conferencing application (e.g., a video conferencing application) may be executed on the electronic device. The conferencing application may display a location of each user (e.g., a particular room on a particular floor, in a particular building of an enterprise).

[0060] The instructions 608 may include receiving instructions. For example, the instructions 608 may receive identification information associated with a static device connected to the electronic device. In response, the electronic device may request identification information via a connection to the static device.

[0061] The instructions 610 may include querying instructions. For example, the instructions 610 may query a remote server that is to store location information of the static device to detect a location of the electronic device within a building based on the identification information associated with the static device. The remote server may look up a location of the static device based on the identification information.

[0062] The instructions 612 may include receiving instructions. For example, the instructions 612 may receive the location information of the electronic device within the building. For example, the remote server may transmit the room,

floor, and building information that provides a location of the static device to the electronic device. The location of the static device may be the detected location of the electronic device.

[0063] The instructions 614 may include providing instructions. For example, the instructions 614 may provide the location information to the application. The location may then be used by the application. For example, in a conferencing application, the location may be displayed in a GUI of the conferencing application.

[0064] It will be appreciated that variants of the above-disclosed and other features and functions, or alternatives thereof, may be combined into many other different systems or applications. Various presently unforeseen or unanticipated alternatives, modifications, variations, or improvements therein may be subsequently made by those skilled in the art which are also intended to be encompassed by the following claims.

CLAIMS

1. An electronic device, comprising:
 - a first communication interface to connect to a static device that is plugged into a power outlet;
 - a second communication interface to connect to a remote server that is to store location information of the static device;
 - a processor communicatively coupled to the first communication interface and the second communication interface, the processor to:
 - receive identification information associated with the static device via the first communication interface;
 - query the remote server to detect a location of the electronic device within a building based on the identification information; and
 - receive the location of the electronic device within the building.
2. The electronic device of claim 1, further comprising:
 - a third communication interface to detect additional wireless devices at the location within the building.
3. The electronic device of claim 1, wherein the first communication interface comprises a wired connection to the static device.
4. The electronic device of claim 3, wherein the wired connection comprises a universal serial bus (USB) type C connection to use a channel of the USB type C connection to receive the identification information when connected to the static device.
5. The electronic device of claim 1, wherein the identification information comprises a serial number of the static device.
6. A non-transitory computer readable storage medium encoded with instructions which, when executed, cause a processor of an electronic device to:

- detect a connection to a static device;
- detect a change in a location status of the static device;
- connect to a remote server that is to store location information of the static device;
- provide an updated location of the static device within a building to the remote server; and
- clear the change in location status of the static device.

7. The non-transitory computer readable storage medium of claim 6, wherein the instructions further cause the processor to:

- detect a subsequent connection to the static device;
- receive identification information associated with the static device;
- query the remote server to receive a location of the electronic device within the building based on the identification information associated with the static device.

8. The non-transitory computer readable storage medium of claim 6, wherein the change in location status is caused by unplugging the static device from a power outlet.

9. The non-transitory computer readable storage medium of claim 6, wherein the change in location status is caused by a change in a media access control (MAC) address of the static device.

10. The non-transitory computer readable storage medium of claim 6, wherein the instructions to clear comprises instructions to update the change in location status stored in the static device to confirmed from unconfirmed.

11. A non-transitory computer readable storage medium encoded with instructions which, when executed, cause a processor of an electronic device to:

- execute an application that requests a location of the electronic device;
- receive identification information associated with a static device

connected to the electronic device;

query a remote server that is to store location information of the static device to detect a location of the electronic device within a building based on the identification information associated with the static device;

receive the location information of the electronic device within the building; and

provide the location information to the application.

12. The non-transitory computer readable storage medium of claim 11, wherein the location information comprises a room number and a floor of the building.

13. The non-transitory computer readable storage medium of claim 11, wherein the location information is to be displayed within the application.

14. The non-transitory computer readable storage medium of claim 11, wherein the application comprises a conferencing application.

15. The non-transitory computer readable storage medium of claim 11, wherein the static device is a monitor, a docking station, a power brick, or a projector.

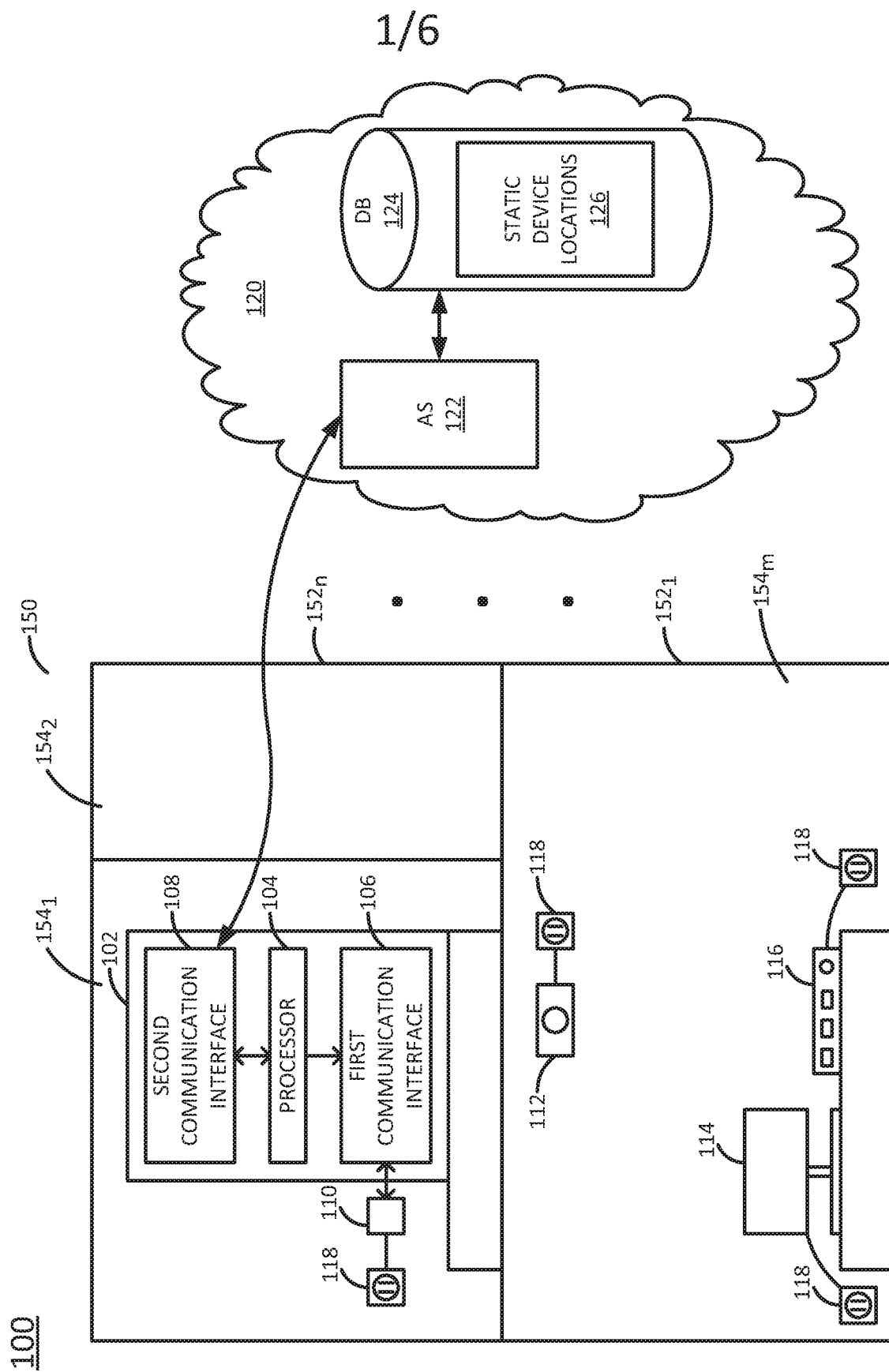


FIG. 1

102

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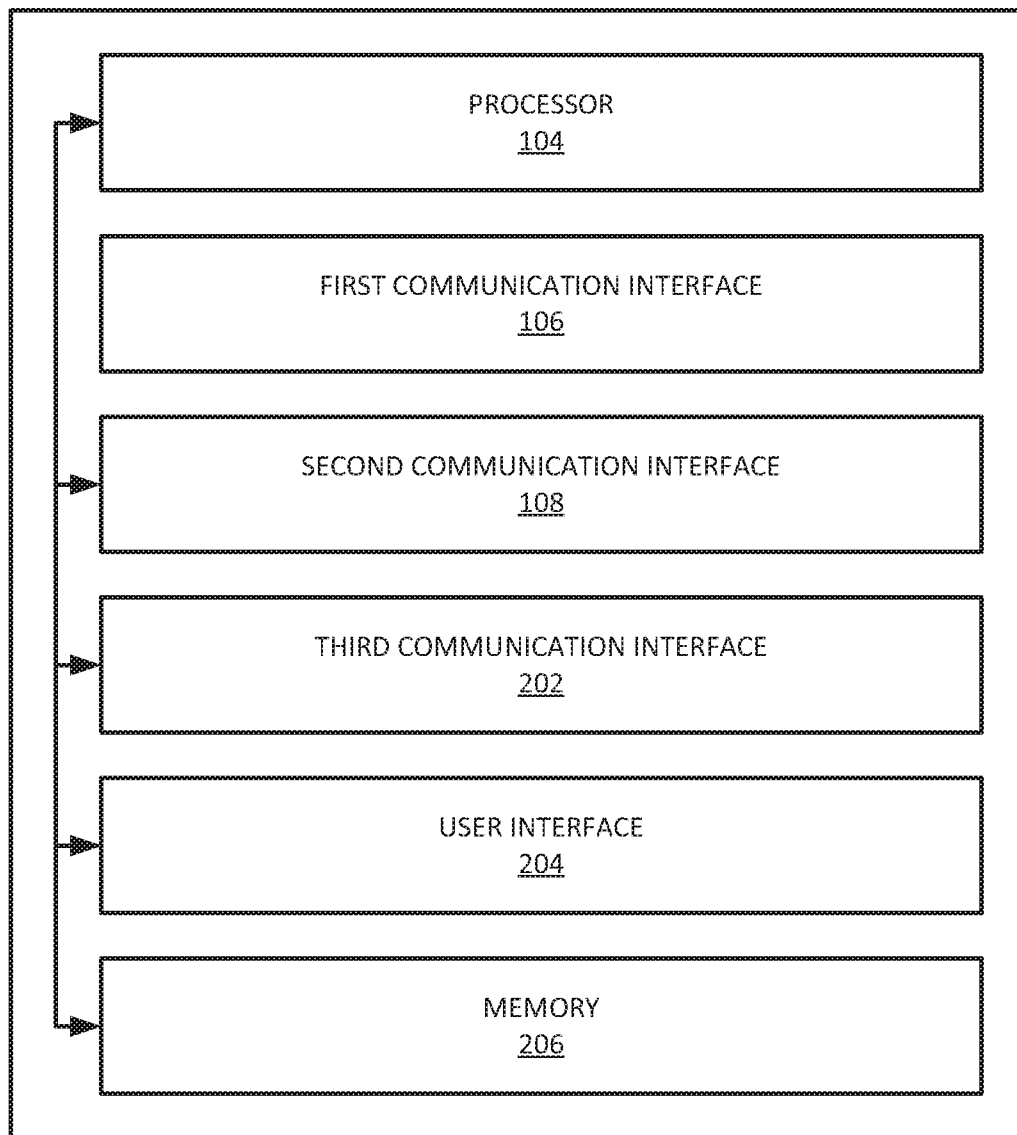


FIG. 2

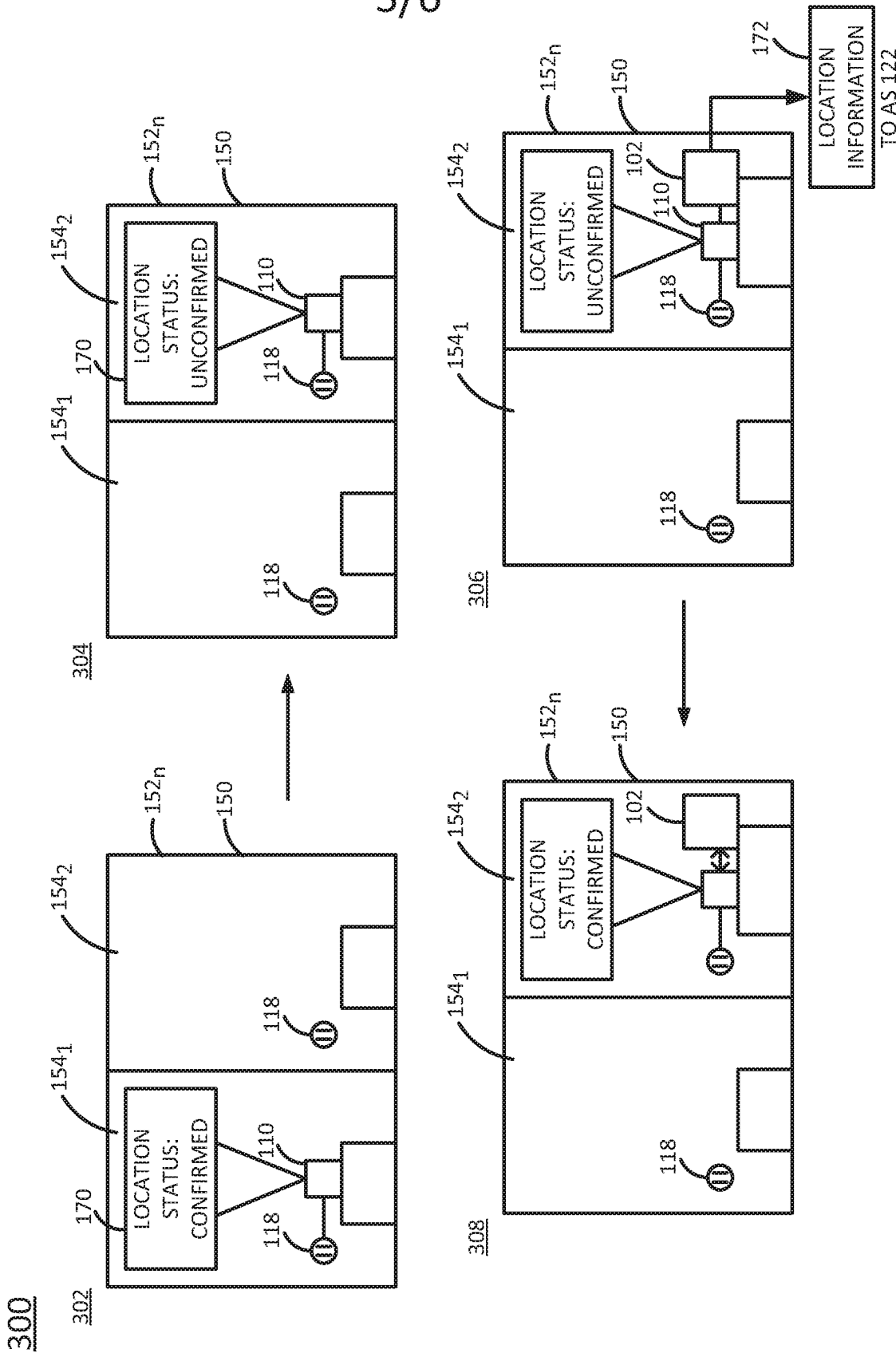


FIG. 3

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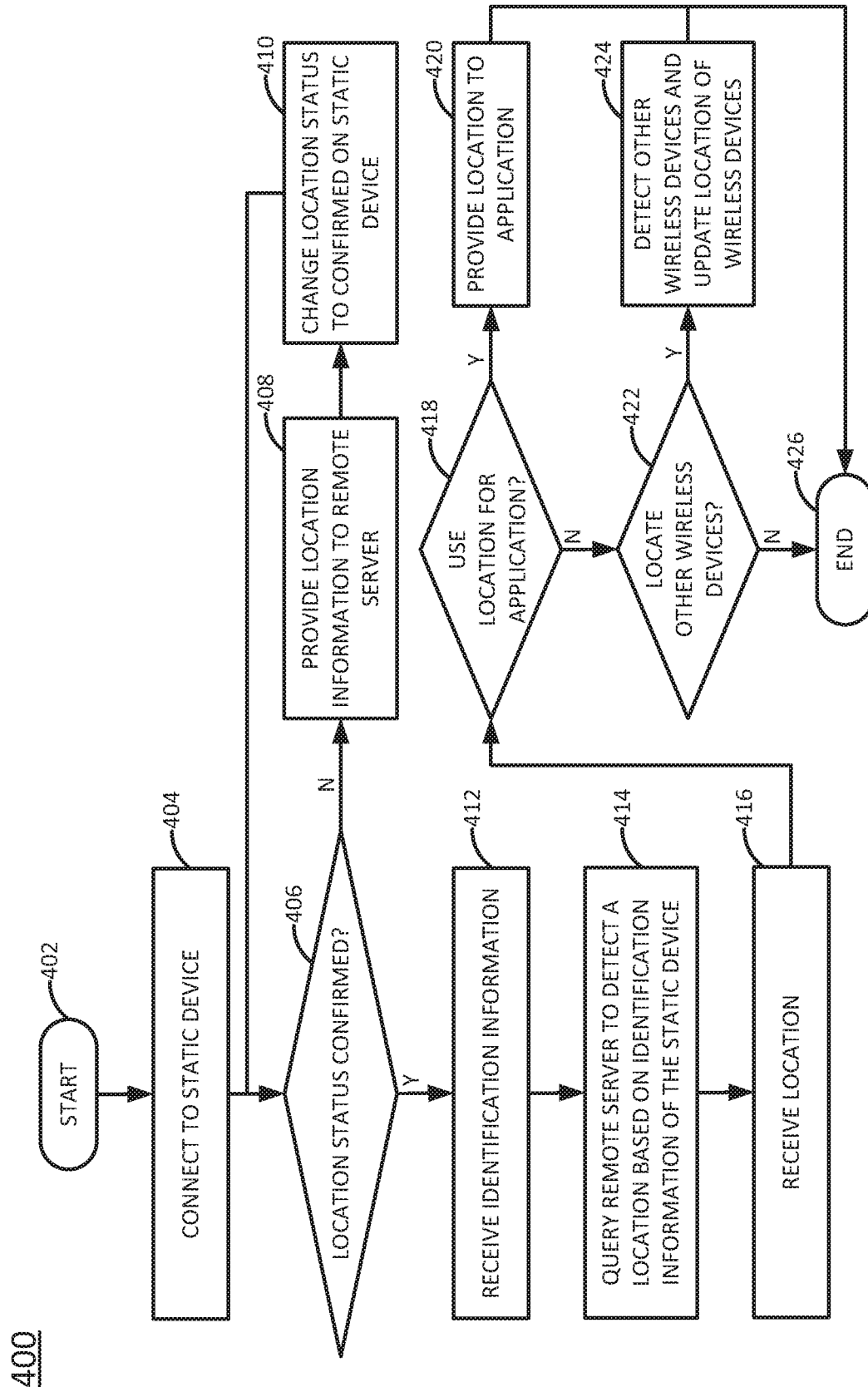


FIG. 4

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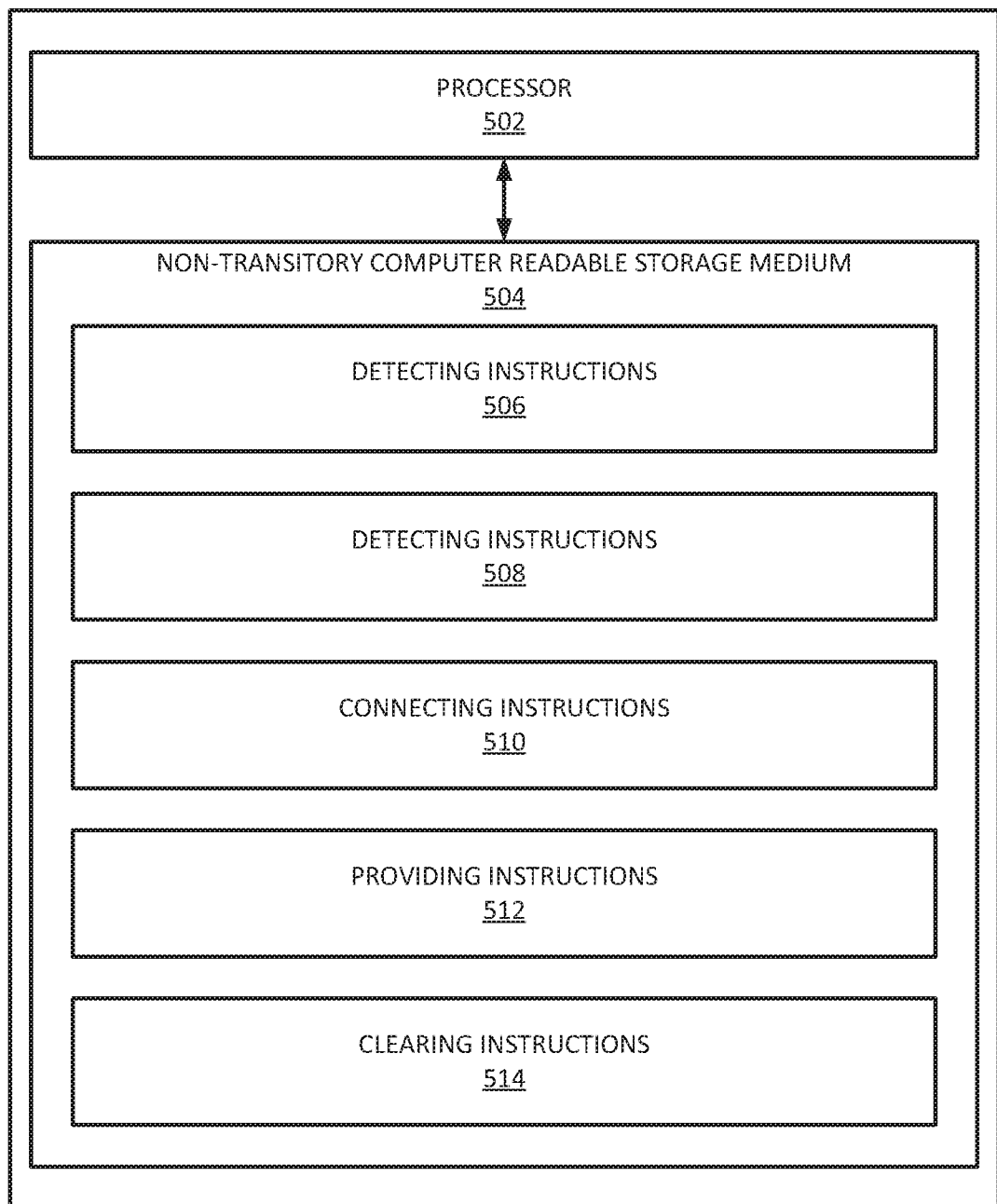
500

FIG. 5

6/6

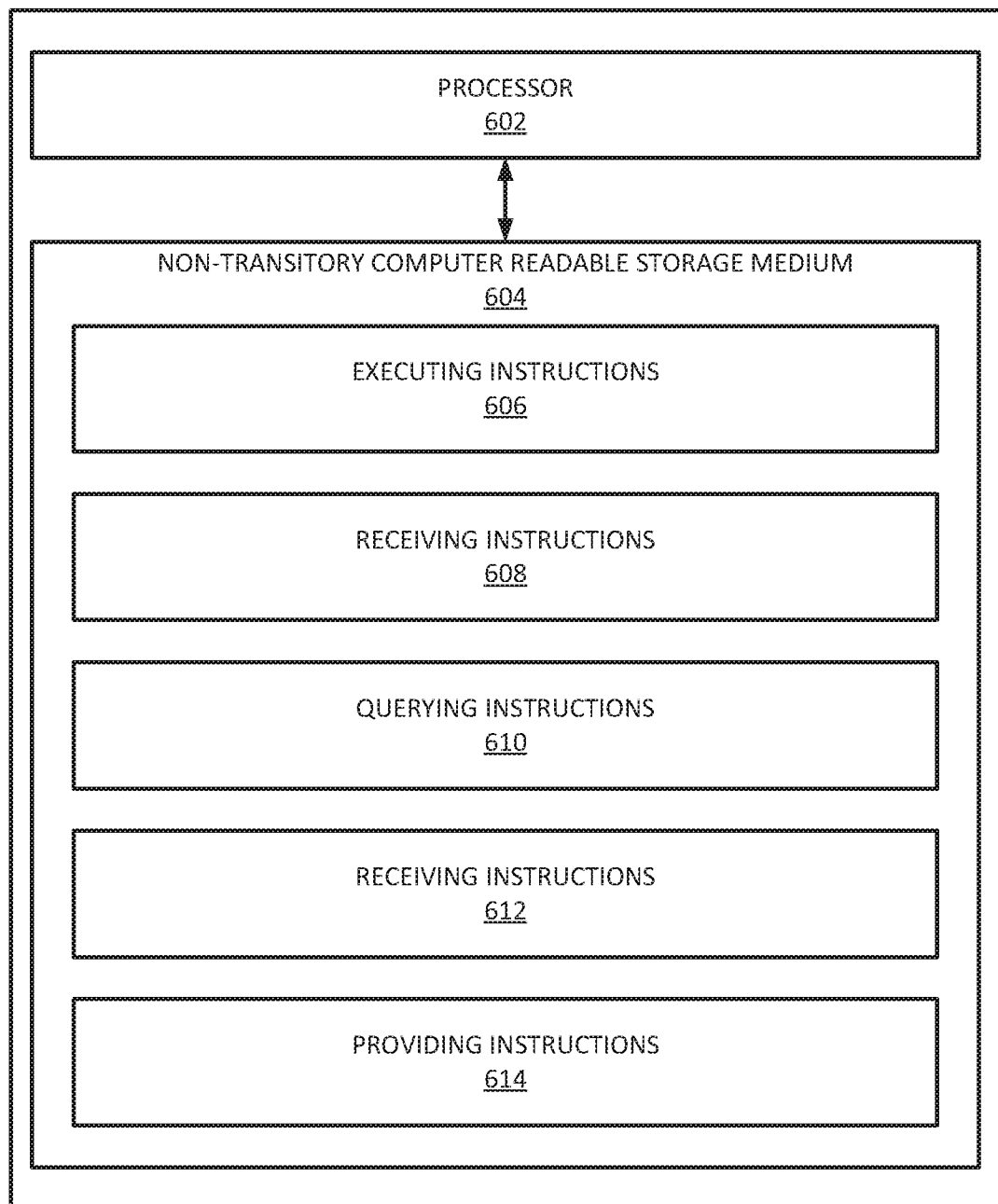
600

FIG. 6

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 2020/046788

A. CLASSIFICATION OF SUBJECT MATTER G06F 15/16 (2006.01) H04M 3/56 (2006.01) According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) G06F 15/16, 19/00 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) PatSearch (RUPTO Internal), USPTO, PAJ, Espacenet, Information Retrieval System of FIPS		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2010/0281161 A1 (UCONTROL, INC) 04.11.2010, abstract, claims 1, 10, figure 2, paragraphs [0004], [0006], [0010], [0036], [0037], [0040], [0041], [0048], [0050], [0052], [0053], [0054], [0057], [0063], [0064], [0067], [0068], [0069], [0075], [0090]	1-7, 9-11, 13, 14
Y		8, 12, 15
Y	US 2018/0039743 A1 (HILL-ROM SERVICES, INC.) 08.02.2018, abstract, paragraphs [0021], [0052], [0057]	8, 12, 15
A	US 8909779 B2 (CLOUD SYSTEMS, INC.) 09.12.2014	1-15
A	US 9973391 B2 (FEDEX CORPORATE SERVICES, INC.) 15.05.2018	1-15
☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.		
* Special categories of cited documents:	“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention “X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone “Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art “&” document member of the same patent family	
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“E” earlier document but published on or after the international filing date		
“L” document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)		
“O” document referring to an oral disclosure, use, exhibition or other means		
“P” document published prior to the international filing date but later than the priority date claimed		
Date of the actual completion of the international search	Date of mailing of the international search report	
18 March 2021 (18.03.2021)	25 March 2021 (25.03.2021)	
Name and mailing address of the ISA/RU: Federal Institute of Industrial Property, Berezhkovskaya nab., 30-1, Moscow, G-59, GSP-3, Russia, 125993 Facsimile No: (8-495) 531-63-18, (8-499) 243-33-37	Authorized officer V. Zakharov Telephone No. 8(495)531-64-81	