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A SYSTEM AND METHOD FOR TARGETED UPDATING OF SOFTWARE ON DEVICES

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TITLE “A SYSTEM AND METHOD FOR TARGETED UPDATING OF SOFTWARE ON DEVICES”

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TECHNICAL FIELD

[0001] The present disclosure generally relates to updating of target devices. More particularly, the present disclosure relates to a system and a method for updating of target devices and validating an updated state of the target devices.

BACKGROUND

[0002] Software update systems allows for updates to a network (e.g., a system of interconnected computers) to be managed by users and software developers. In some instances, a software update system includes a software update manager that allows for security updates to be applied quickly and widely across a network. However, the process of updating software (e.g., firmware, an operating system, and/or the like) across a collection of devices in a network may involve updating each device of a plurality of devices incrementally. The process of updating each device may lead to increase in consumption of network resources. Especially, the updating of each device may become difficult in case of a network comprising a plurality of electronic devices and each device having different configurations. In such an example, significant downtime may be required of a network when installing updates and/or validating whether an update was installed properly. In some instances, significant downtime may be involved because a network may not be amenable to wholesale updates. For example, due to the lack of redundancies of devices to perform a same or similar task and/or due to the risk of network outages associated with applying an unvalidated update across an entire network.

BRIEF DESCRIPTION OF THE DRAWINGS

[0003] Additional advantages and details of the systems and methods are explained in greater detail below with reference to the exemplary embodiments and aspects that are illustrated in the accompanying schematic figures, in which:

[0004] FIGURE 1 shows an exemplary environment for updating target devices, in accordance with some embodiments of the present disclosure;

[0005] FIGURE 2 is a schematic diagram of components of a system for updating target devices, in accordance with some embodiments of the present disclosure;

[0006] FIGURE 3 is a process flowchart of one embodiment or aspect of a method for updating target devices, in accordance with some embodiments of the present disclosure;

[0007] FIGURE 4 shows an exemplary illustration for updating target devices, in accordance with some embodiments of the present disclosure; and

[0008] Figure 5 shows a block diagram of a general-purpose computing system for updating target devices, in accordance with embodiments of the present disclosure.

DETAILED DESCRIPTION

[0009] In the present document, the word "exemplary" is used herein to mean "serving as an example, instance, or illustration." Any embodiment or implementation of the present subject matter described herein as "exemplary" is not necessarily to be construed as preferred or advantageous over other embodiments.

[0010] While the disclosure is susceptible to various modifications and alternative forms, specific embodiment thereof has been shown by way of example in the drawings and will be described in detail below. It should be understood, however that it is not intended to limit the disclosure to the particular forms disclosed, but on the contrary, the disclosure is to cover all modifications, equivalents, and alternatives falling within the scope of the disclosure.

[0011] The terms “comprises”, “comprising”, or any other variations thereof, are intended to cover a non-exclusive inclusion, such that a setup, device or method that comprises a list of components or steps does not include only those components or steps but may include other components or steps not expressly listed or inherent to such setup or device or method. In other words, one or more elements in a system or apparatus proceeded by “comprises… a” does not, without more constraints, preclude the existence of other elements or additional elements in the system or apparatus.

[0012] For purposes of the description hereinafter, the terms “upper,” “lower,” “right,” “left,” “vertical,” “horizontal,” “top,” “bottom,” “lateral,” “longitudinal,” and derivatives thereof shall

relate to the embodiment or aspect as it is oriented in the drawing figures. However, it is to be understood that the systems and methods may assume various alternative variations and step sequences, except where expressly specified to the contrary. It is also to be understood that the specific devices and the method illustrated in the attached drawings, and described in the following specification, are simply exemplary embodiments of the systems and methods. Hence, specific dimensions and other physical characteristics related to the embodiments disclosed herein are not to be considered as limiting. Also, it should be understood that any numerical range recited herein is intended to include all sub-ranges subsumed therein. For example, a range of "1 to 10" is intended to include all sub-ranges between (and including) the recited minimum value of 1 and the recited maximum value of 10, that is, having a minimum value equal to or greater than 1 and a maximum value of equal to or less than 10.

[0013] As used herein, the terms "communication" and "communicate" may refer to the reception, receipt, transmission, transfer, provision, and/or the like of information (e.g., data, signals, messages, instructions, commands, and/or the like). For one unit (e.g., a device, a system, a component of a device or system, combinations thereof, and/or the like) to be in communication with another unit means that the one unit is able to directly or indirectly receive information from and/or send (e.g., transmit) information to the other unit. This may refer to a direct or indirect connection that is wired and/or wireless in nature. Additionally, two units may be in communication with each other even though the information transmitted may be modified, processed, relayed, and/or routed between the first and second unit. For example, a first unit may be in communication with a second unit even though the first unit passively receives information and does not actively send information to the second unit. As another example, a first unit may be in communication with a second unit if at least one intermediary unit (e.g., a third unit located between the first unit and the second unit) processes information received from the first unit and sends the processed information to the second unit. In some non-limiting embodiments, a message may refer to a network packet (e.g., a data packet and/or the like) that includes data.

[0014] As used herein, the term "computing device" may refer to one or more electronic devices that are configured to directly or indirectly communicate with or over one or more networks. In some non-limiting embodiments, a computing device may include a mobile device. A mobile device may include a smartphone, a portable computer, a wearable device (e.g., watches, glasses, lenses, clothing, and/or the like), a personal digital assistant (PDA), and/or other like devices. In some non-limiting embodiments, a computing device may include a server, a desktop computer, and/or the like.

[0015] As used herein, the term "server" may refer to one or more computing devices, such as processors, storage devices, and/or similar computer components that communicate with client devices and/or other computing devices over a network, such as the Internet or private networks and, in some examples, facilitate communication among other servers and/or clients.

[0016] As used herein, the term "system" may refer to one or more computing devices or combinations of computing devices such as, but not limited to, processors, servers, client devices, software applications, and/or other like components. In addition, reference to "a server" or "a processor," as used herein, may refer to a previously-recited server and/or processor that is recited as performing a previous step or function, a different server and/or processor, and/or a combination of servers and/or processors. For example, a first server and/or a first processor that is recited as performing a first step or function may refer to the same or different server and/or a processor recited as performing a second step or function.

[0017] As used herein, the term "transaction processing system" may refer to one or more computer systems operated by or on behalf of a transaction service provider, such as a transaction processing server executing one or more software applications. A transaction processing server may include one or more processors and, in some nonlimiting embodiments, may be operated by or on behalf of a transaction service provider.

[0018] As used herein, the term "merchant system" may refer to one or more server computers, point-of-sale devices, online interfaces, third-party hosted services, and/or the like that are used to complete transactions with one or more financial devices. The term merchant system may also refer to one or more server computers, processors, online interfaces, third-party hosted services, and/or the like that are used to transmit and/or receive communications with issuer institutions, transaction service providers, transaction processing servers, financial device holders, and/or the like.

[0019] As used herein, the term "transaction service provider" may refer to an entity that collects authorization requests from merchants and provides guarantees of payment, in some cases through an agreement between the transaction service provider and an issuer institution. As used herein, the term "recurring transactions" may refer to any series of repeated or patterned transactions between a financial device and a merchant. Recurring transactions are often regular and of a similar

amount but do not need to be identical in cost or identical in purchased goods/services to be recurring.

[0020] As used herein, the term "issuer system" may refer to one or more computer systems operated by or on behalf of an issuer institution, such as a server computer executing one or more software applications. As used herein, the term "issuer institution" may refer to one or more entities, such as a bank, that provides accounts to customers for conducting payment transactions, such as initiating credit and/or debit payments. An issuer system may include one or more authorization servers for authorizing a payment transaction.

[0021] As used herein, the term "acquisition system" may refer to one or more computer systems operated by or on behalf of an acquirer institution, such as a server computer executing one or more software applications. As used herein, the term "acquirer institution" may refer to an entity licensed by the transaction service provider and approved by the transaction service provider to originate transactions using an electronic payment device of the transaction service provider.

[0022] Non-limiting embodiments of the present disclosure provides a system and a method for updating a condition of target devices. The system aids in updating the target devices in large systems. The system transmits messages for updating the target devices. Firstly, the system transmits a change message comprising data associated with updating of the target devices. Secondly, the system transmits a validation test message, after the target devices are updated. Hence, the accuracy and reliability of updates is increased.

[0023] Figure 1 illustrates an exemplary environment (100) for updating the target devices. The environment (100) comprises a control system (102), one or more target devices (104-1, 104-2, …, 104-n) and a network (106). In the present description, the terms system (102) and control system (102) are used interchangeably. In the present description, the one or more target devices (104-1, 104-2, …. 104-n) may be collectively referred as target devices (104) and individually referred as target device (104). The control system (102) may include one or more devices capable of being in communication with the target devices (104). For example, the control system (102) may include one or more computing devices, such as a server, a group of servers, and/or the like. In some non-limiting embodiments, control system (102) may be configured to communicate via a short-range wireless communication connection (e.g., an NFC communication connection, an RFID communication connection, a Bluetooth® communication connection, and/or the like). The control system (102) and the target devices (104) may communicate via the network (106). In non-

limiting embodiments or aspects, target devices (104) are components of a larger target system. In the present description, the target devices (104) refers to electronic devices which run on software, firmware, or both. In non-limiting embodiments or aspects, the target devices (104) are components of a payment service, for example, and without limitation, a merchant system, a transaction processing system, an acquisition system, and/or an issuer system.

[0024] Figure 2 is a diagram of example components of the control system (102). The control system (102) may include a bus (202), a processor (204), a memory (206), a storage component (208), an input component (210), an output component (212), and communication interface (214). The bus (202) may include a component that permits communication among the components of the control system (102). In some non-limiting embodiments, the processor (204) may be implemented in hardware, software, or a combination of hardware and software. For example, the processor (204) may be a central processing unit (CPU), a graphics processing unit (GPU), an accelerated processing unit (APU), and/or the like), a microprocessor, a digital signal processor (DSP), and/or any processing component (e.g., a field-programmable gate array (FPGA), an application-specific integrated circuit (ASIC), and/or the like) that can be programmed to perform a function. The memory (206) may include random access memory (RAM), read-only memory (ROM), and/or another type of dynamic or static storage memory (e.g., flash memory, magnetic memory, optical memory, and/or the like) that stores information and/or instructions for use by the processor (204). The storage component (208) may store information and/or software related to the operation and use of the control system (102). For example, the storage component (208) may include a hard disk (e.g., a magnetic disk, an optical disk, a magneto-optic disk, a solid state disk, and/or the like), a compact disc (CD), a digital versatile disc (DVD), a floppy disk, a cartridge, a magnetic tape, and/or another type of computer-readable medium, along with a corresponding drive. The input component (210) may include a component that permits the control system (102) to receive information, such as via user interface (e.g., a touch screen display, a keyboard, a keypad, a mouse, a button, a switch, a microphone, and/or the like). Additionally, or alternatively, the input component (210) may include a sensor for sensing information (e.g., a global positioning system (GPS) component, an accelerometer, a gyroscope, an actuator, and/or the like). The output component (212) may include a component that provides output information from the control system (102) (e.g., a display, a speaker, one or more light-emitting diodes (LEDs), and/or the like). The communication interface (214) may include a transceiver-like component (e.g., a transceiver, a separate receiver and transmitter, etc.) that enables device to communicate with other devices, such as via a wired connection, a wireless connection, or a combination of wired and wireless connections. The communication interface (214) may permit the control system

(102) to receive information from another device and/or provide information to another device. For example, the communication interface (214) may include an Ethernet interface, an optical interface, a coaxial interface, an infrared interface, a radio frequency (RF) interface, a universal serial bus (USB) interface, a Wi-Fi® interface, a cellular network interface, and/or the like.

[0025] The control system (102) may perform one or more processes described herein. The control system (102) may perform the processes based on the processor (204) executing software instructions stored by a computer-readable medium, such as the memory (206) and/or the storage component (208). A computer-readable medium (e.g., a non-transitory computer-readable medium) is defined herein as a non-transitory memory device. A non-transitory memory device includes memory space located inside of a single physical storage device or memory space spread across multiple physical storage devices.

[0026] Software instructions may be read into the memory (206) and/or the storage component (208) from another computer-readable medium or from another device via the communication interface (214). When executed, software instructions stored in the memory (206) and/or the storage component (208) may cause the processor (204) to perform one or more processes described herein. Additionally, or alternatively, hardwired circuitry may be used in place of, or in combination with software instructions to perform one or more processes described herein. Thus, embodiments described herein are not limited to any specific combination of hardware circuitry and software.

[0027] The number and arrangement of components shown in the Figure 2 are provided as an example. In some non-limiting embodiments, the control system (102) may include additional components, fewer components, different components, or differently arranged components than those shown in Figure 2. Additionally, or alternatively, a set of components (e.g., one or more components) of the control system (102) may perform one or more functions described as being performed by another set of components of the control system (102).

[0028] Figure 3 shows a flow chart illustrating a method for updating the target devices (104), in accordance with some embodiments of the present disclosure. As illustrated in Figure 3, the method (300) may comprise one or more steps. The method (300) may be described in the general context of computer executable instructions. Generally, computer executable instructions can include routines, programs, objects, components, data structures, procedures, modules, and functions, which perform particular functions or implement particular abstract data types.

[0029] The order in which the method (300) is described is not intended to be construed as a limitation, and any number of the described method blocks can be combined in any order to implement the method. Additionally, individual blocks may be deleted from the methods without departing from the scope of the subject matter described herein. Furthermore, the method can be implemented in any suitable hardware, software, firmware, or combination thereof.

[0030] At step (302), transmitting a change message to the target devices (104). The control system (102) may transmit a change message to some or all of target devices 104. In an embodiment, the change message may be transmitted to groups of target devices sequentially. The change message may be transmitted sequentially for group-wise updating of the target devices (104). For example, consider the target devices (104_1, 104_2, 104_3, 104_4, 104_5, and 104_6). The change message may be transmitted to the target devices (104_1, 104_2, and 104_3). Once the updating is completed for the target devices (104_1, 104_2, and 104_3), the change message may be transmitted to the target devices (104_4, 104_5, and 104_6). The change message may include an executable code that changes a condition of a computing device. In non-limiting embodiments or aspects, the change message may include condition change data associated with updating a condition of the target devices (104). In non-limiting embodiments, the condition is a condition associated with a payment service. In non-limiting embodiments or aspects, payment service may include one or more of a merchant system, a transaction processing system, an acquisition system, and/or an issuer system. In non-limiting embodiments or aspects, the condition change data may be associated with software and/or a firmware for the target devices (104). In non-limiting embodiments or aspects, change message is a software update. In non-limiting embodiments or aspects, change message is a firmware update. In non-limiting embodiments or aspects, the control system (102) may validate the change message prior to transmitting the change message to the target devices (104). Validating a change message may include confirming the contents of the change message, for example, by comparing a version number or one or more portions of executable codes to a reference version number or reference code. In non-limiting embodiments or aspects, reference version number and/or reference code is stored on a database that is in communication with the control system (102). In non-limiting embodiments or aspects, change message is validated by a user device (e.g., a user computing device or user system), and is then transmitted to the control system (102). In non-limiting embodiments or aspects, a validated change message may be associated with a job identifier. In non-limiting embodiments or aspects, a job identifier may include data relating to a software or firmware version, a date of implementation, address data of the group of the target devices (104) for which a condition is to be changed, and/or the like.

[0031] In non-limiting embodiments or aspects, the control system (102) may transmit change message to the target devices (104) via the network (106). In non-limiting embodiments or aspects, the change message may include address data (e.g., IP address, MAC address, and/or the like) associated with an address of the target devices (104). In non-limiting embodiments or aspects, the control system (102) may transmit change message to a message queue. In non-limiting embodiments or aspects, address data is associated with an address of message queue. In non-limiting embodiments or aspects, message queue may include one or more channels, and, optionally, each of the one or more channels may be assigned to a group of the target devices (104) (e.g., one channel assigned to target device (104), one channel assigned to a group of the target devices (104), one channel assigned to the target devices (104), and/or the like). In non-limiting embodiments or aspects, the change message may be transmitted to the message queue, and, at a predetermined time, or in response to receipt of a notification message, the message queue may transmit the change message to the target devices (104). In non-limiting embodiments or aspects, the target devices (104) may be configured to query the message queue for the presence of the change message. In non-limiting embodiments or aspects, the target devices (104) may be configured to query a specific channel of the message queue. In non-limiting embodiments or aspects, a specific channel of message the queue may be associated with the target devices (104). In nonlimiting embodiments or aspects, an association between a specific channel of the message queue and the target devices (104) may be a predetermined association.

[0032] At step (304), receiving an update message from the target devices (104), where the update message comprises update data associated with a status of updating the condition of the target devices (104). The update message may include data, for example, and without limitation, one or more identifiers indicative of a status of a condition of the target devices (104). In nonlimiting embodiments or aspects, the update message may include update data associated with a status of updating a condition of the target devices (104). In non-limiting embodiments or aspects, the update data may include a version number or other identifier specific for a condition of the target devices (104).

[0033] In non-limiting embodiments or aspects, the target devices (104) may transmit the update message to the control system (102) via the network (106). In non-limiting embodiments or aspects, the target devices (104) may transmit the update message to a database. In non-limiting embodiments or aspects, the update message may be stored in the database. In non-limiting embodiments or aspects, the database may transmit the update message to the control system (102)

immediately upon receipt of the update message, upon receipt of a predetermined number of update messages, upon receipt of the update messages from a predetermined group of the target devices (104), upon receipt of a query from the control system (102), or any combination thereof.

[0034] At step (306), determining whether the condition of the target devices (104) is updated based on the update data. The control system (102) may determine whether a condition of the target devices (104) is updated. In non-limiting embodiments or aspects, the control system (102) may determine whether the condition is updated based at least in part on the update data. In non-limiting embodiments or aspects, determining whether the condition of the target devices (104) is updated may include comparing update the data to a known value associated with the change message. For example, and without limitation, a change message may be associated with an identifier specific for an updated condition, e.g., "Ver. 11.20.46." A known value of the identifier specific for the updated condition may be stored in memory and/or a database in communication with the control system (102). The update data received from the group of the target devices (104) may include an identifier specific for a condition of the group of the target devices 104, e.g., "Ver. 10.29.71." The control system (102) may compare the identifiers and determine whether the update is successfully implemented, based on the comparison. In non-limiting embodiments or aspects, if the control system (102) determines that the update is not successfully implemented, the control system (102) re-transmits the change message to the group of the target devices (104).

[0035] At step (308), transmitting a validation test message to the target devices (104), the validation test message comprises validation inquiry data associated with determining whether the condition of the target devices is valid. The validation test message may include executable codes that, when executed by a processor, queries the target devices (104) as to a condition of the target devices 104. In non-limiting embodiments or aspects, the validation test message may include validation inquiry data associated with determining whether the condition of the target devices (104) is valid based on determining that the condition of the target devices (104) is updated. In non-limiting embodiments or aspects, the validation inquiry data may include a query requiring the target devices (104) to provide a response. The response is indicative of the condition of the target device. For example, and without limitation, a query may include a prompt to provide a version number or other identifier. In non-limiting embodiments or aspects, a query may include a prompt relating to new functionality not included in previous conditions, such that a target device with Ver. 10.29.71 installed may provide no response or an error message, while a target device with Ver. 11.20.46 installed may provide an appropriate response indicative of an updated condition of the target device. In non-limiting embodiments or aspects, the target devices (104) to

which validation test message is transmitted is the same target device to which the change message was transmitted in step 302. In non-limiting embodiments or aspects, the target device to which the validation test message is transmitted is a different target device.

[0036] In non-limiting embodiments or aspects, the control system (102) may transmit the validation test message to the target devices (104) via the network (106). In non-limiting embodiments or aspects, the control system (102) may transmit the validation test message to a group of the target devices (104) within the target system via the network (106). For example, the control system (102) may determine a group of the target devices (104) (e.g., target device 104, a group of target devices of target devices 104, and/or the like) and the control system (102) may transmit the validation test message to the group of the target devices (104) within the target system via the network (106). In some non-limiting embodiments, the control system (102) may transmit the validation test message to other target devices (another target device) outside of the group of the target devices (104).

[0037] In non-limiting embodiments or aspects, the validation test message may include address data associated with an address of a target device 104. In non-limiting embodiments or aspects, the validation test message may include the address data associated with an address of the message queue. In non-limiting embodiments or aspects, the message queue may include one or more channels and, optionally, each of the one or more channels may be assigned to each target device 104. In non-limiting embodiments or aspects, the control system (102) may transmit the validation test message to the message queue and, at a predetermined time, or in response to receipt of the notification message, the message queue may transmit the validation test message to the target devices (104). In nonlimiting embodiments or aspects, the target devices (104) may be configured to query the message queue for the presence of the validation test message. For example, the target devices (104) may be configured to query a specific channel of the message queue. In non-limiting embodiments or aspects, a specific channel of the message queue may be associated with the target devices (104). In non-limiting embodiments or aspects, an association between a specific channel of the message queue and the target devices (104) may be a predetermined association. In non-limiting embodiments or aspects, the control system (102) may transmit the validation test message to the message queue.

[0038] At step (310), receiving a validation response message comprising validation response data, where the validation response data is indicative of validation of the condition of the target devices. The validation response message may include validation response data associated with a status of

determining whether the condition of the target devices (104) or a group of the target devices (104) is determined to be valid. In non-limiting embodiments or aspects, the control system (102) may compare the validation response data to a known value associated with the validation test message. In non-limiting embodiments or aspects, the known value may be stored in the memory (204) or the database in communication with the control system (102). As described above, the validation test message may prompt the target devices (104) to provide the response, and the response may be included in the validation response message. The control system (102) may compare the response received from the target devices (104) with the known value and determine whether the condition of a target device is valid, based on this comparison.

[0039] In non-limiting embodiments or aspects, the target devices (104) may transmit the validation response message to the control system (102) via the network (106). In nonlimiting embodiments or aspects, the target devices (104) may transmit the validation response message to the database. In non-limiting embodiments or aspects, the validation response message may be stored in the database. In non-limiting embodiments or aspects, the database may transmit the validation response message to the control system (102) immediately upon receipt of the validation response message, upon receipt of the predetermined number of validation response messages, upon receipt of the validation response messages from a predetermined group of the target devices (104), upon receipt of a query from the control system (102), or any combination thereof.

[0040] Figure 4 illustrates an exemplary illustration for updating the target devices (104) (environment under change in Figure 4). A user may transmit a validated change message via a user device (shown as users and client systems in Figure 4).In non-limiting embodiments or aspects, the change message and/or the validation test message may be associated with the job identifier, and, when the user device transmits a query the to control system (102) concerning the condition of the target devices (104), the query may include the job identifier. In non-limiting embodiments or aspects, the control system (102) or the database (401) may utilize the job identifier to identify a target device (104) of interest.

[0041] In non-limiting embodiments or aspects, the user may, for example with the user device, query a status of a condition change of the target devices (104). The user device may be a computing device. In non-limiting embodiments or aspects, the user device may transmit the query to the control system (102), which may transmit data associated with the condition of the target devices (104) to a notification system (402). In non-limiting embodiments or aspects, the notification system (402) may transmit data relating to the condition of the target devices (104) to

the user device. In non-limiting embodiments or aspects, the notification system (402) may transmit data relating to the condition of the target devices (104) via email, text message, SMS message, or the like.

[0042] In non-limiting embodiments or aspects, the control system (102) may transmit the update data, the validation response data, and/or the determination of whether a condition of the target devices (104) is updated and/or is valid, to the notification system (402). In non-limiting embodiments or aspects, the control system (102) may transmit the update data, the validation response data, and/or the determination upon receipt or determination of the same. In non-limiting embodiments or aspects, the notification system may transmit data relating to the condition of the target devices (104) to the user device upon receipt of the same. In non-limiting embodiments or aspects, user device may query the notification system (402) for data relating to a condition of the target devices (104). In non-limiting embodiments or aspects, the control system (102) may transmit query from the user device to the notification system, which stores all data relevant to the condition of the target devices (104). In non-limiting embodiments or aspects, the notification system (402) may transmit a message relating to the condition of the target devices (104) to the user device.

[0043] In non-limiting embodiments or aspects, the control system (102) may query the database as described above as to the condition of the target devices (104). In non-limiting embodiments or aspects, the control system (102) may, in response to receiving the response to the query, transmit data relating to the condition of the target devices (104) to the notification system (402). In non-limiting embodiments or aspects, the user device may transmit the query to the notification system (402) concerning a condition of the target devices (104).

[0044] Figure 5 illustrates a block diagram of an exemplary computer system (500) for implementing embodiments consistent with the present disclosure. In an embodiment, the computer system (500) is used for updating the target devices (104). The computer system (500) may comprise a central processing unit (“CPU” or “processor”) (502). The processor (502) may comprise at least one data processor. The processor (502) may include specialized processing units such as integrated system (bus) controllers, memory management control units, floating point units, graphics processing units, digital signal processing units, etc.

[0045] The processor (502) may be disposed in communication with one or more input/output (I/O) devices (not shown) via I/O interface (501). The I/O interface (501) may employ

communication protocols/methods such as, without limitation, audio, analog, digital, monoaural, RCA, stereo, IEEE-1394, serial bus, universal serial bus (USB), infrared, PS/2, BNC, coaxial, component, composite, digital visual interface (DVI), high-definition multimedia interface (HDMI), RF antennas, S-Video, VGA, IEEE 802.n /b/g/n/x, Bluetooth, cellular (e.g., code-division multiple access (CDMA), high-speed packet access (HSPA+), global system for mobile communications (GSM), long-term evolution (LTE), WiMax, or the like), etc.

[0046] Using the I/O interface (501), the computer system (500) may communicate with one or more I/O devices. For example, the input device (510) may be an antenna, keyboard, mouse, joystick, (infrared) remote control, camera, card reader, fax machine, dongle, biometric reader, microphone, touch screen, touchpad, trackball, stylus, scanner, storage device, transceiver, video device/source, etc. The output device (511) may be a printer, fax machine, video display (e.g., cathode ray tube (CRT), liquid crystal display (LCD), light-emitting diode (LED), plasma, Plasma display panel (PDP), Organic light-emitting diode display (OLED) or the like), audio speaker, etc.

[0047] In some embodiments, the computer system (500) is connected to the remote devices (512) through a communication network (509). The remote devices (512) may provide the user reviews to the computing network (500). The processor (502) may be disposed in communication with the communication network (509) via a network interface (503). The network interface (503) may communicate with the communication network (509). The network interface (503) may employ connection protocols including, without limitation, direct connect, Ethernet (e.g., twisted pair 10/100/1000 Base T), transmission control protocol/internet protocol (TCP/IP), token ring, IEEE 802.11a/b/g/n/x, etc. The communication network (509) may include, without limitation, a direct interconnection, local area network (LAN), wide area network (WAN), wireless network (e.g., using Wireless Application Protocol), the Internet, etc. Using the network interface (503) and the communication network (509), the computer system (500) may communicate with the scene remote devices (512). The network interface (503) may employ connection protocols include, but not limited to, direct connect, Ethernet (e.g., twisted pair 10/100/1000 Base T), transmission control protocol/internet protocol (TCP/IP), token ring, IEEE 802.11a/b/g/n/x, etc.

[0048] The communication network (509) includes, but is not limited to, a direct interconnection, an e-commerce network, a peer to peer (P2P) network, local area network (LAN), wide area network (WAN), wireless network (e.g., using Wireless Application Protocol), the Internet, Wi-Fi and such. The first network and the second network may either be a dedicated network or a shared network, which represents an association of the different types of networks that use a variety of protocols, for example, Hypertext Transfer Protocol (HTTP), Transmission Control

Protocol/Internet Protocol (TCP/IP), Wireless Application Protocol (WAP), etc., to communicate with each other. Further, the first network and the second network may include a variety of network devices, including routers, bridges, servers, computing devices, storage devices, etc.

[0049] In some embodiments, the processor (502) may be disposed in communication with a memory (505) (e.g., RAM, ROM, etc. not shown in Figure 5) via a storage interface (504). The storage interface (504) may connect to memory (505) including, without limitation, memory drives, removable disc drives, etc., employing connection protocols such as serial advanced technology attachment (SATA), Integrated Drive Electronics (IDE), IEEE-1394, Universal Serial Bus (USB), fiber channel, Small Computer Systems Interface (SCSI), etc. The memory drives may further include a drum, magnetic disc drive, magneto-optical drive, optical drive, Redundant Array of Independent Discs (RAID), solid-state memory devices, solid-state drives, etc.

[0050] The memory (505) may store a collection of program or database components, including, without limitation, user interface (506), an operating system (505), web server (508) etc. In some embodiments, computer system (500) may store user/application data, such as, the data, variables, records, etc., as described in this disclosure. Such databases may be implemented as fault-tolerant, relational, scalable, secure databases such as Oracle ® or Sybase®.

[0051] The operating system (505) may facilitate resource management and operation of the computer system (800). Examples of operating systems include, without limitation, APPLE MACINTOSH^{R} OS X, UNIX^{R}, UNIX-like system distributions (E.G., BERKELEY SOFTWARE DISTRIBUTION^{TM} (BSD), FREEBSD^{TM}, NETBSD^{TM}, OPENBSD^{TM}, etc.), LINUX DISTRIBUTIONS^{TM} (E.G., RED HAT^{TM}, UBUNTU^{TM}, KUBUNTU^{TM}, etc.), IBM^{TM} OS/2, MICROSOFT^{TM} WINDOWS^{TM} (XP^{TM}, VISTA^{TM}/7/8, 10 etc.), APPLE^{R} IOS^{TM}, GOOGLE^{R} ANDROID^{TM}, BLACKBERRY^{R} OS, or the like.

[0052] In some embodiments, the computer system (500) may implement a web browser (508) stored program component. The web browser (508) may be a hypertext viewing application, for example MICROSOFT^{R} INTERNET EXPLORER^{TM}, GOOGLE^{R} CHROME^{TM0}, MOZILLA^{R} FIREFOX^{TM}, APPLE^{R} SAFARI^{TM}, etc. Secure web browsing may be provided using Secure Hypertext Transport Protocol (HTTPS), Secure Sockets Layer (SSL), Transport Layer Security (TLS), etc. Web browsers (508) may utilize facilities such as AJAX^{TM}, DHTML^{TM}, ADOBE^{R} FLASH^{TM}, JAVASCRIPT^{TM}, JAVA^{TM}, Application Programming Interfaces (APIs), etc. In some embodiments, the computer system (500) may implement a mail server (not shown in Figure) stored program component. The mail server may be an Internet mail server such as Microsoft

Exchange, or the like. The mail server may utilize facilities such as ASP™, ACTIVEX™, ANSI™ C++/C#, MICROSOFT®, .NET™, CGI SCRIPTS™, JAVA™, JAVASCRIPT™, PERL™, PHP™, PYTHON™, WEBOBJECTS™, etc. The mail server may utilize communication protocols such as Internet Message Access Protocol (IMAP), Messaging Application Programming Interface (MAPI), MICROSOFT® exchange, Post Office Protocol (POP), Simple Mail Transfer Protocol (SMTP), or the like. In some embodiments, the computer system (800) may implement a mail client stored program component. The mail client (not shown in Figure) may be a mail viewing application, such as APPLE® MAIL™, MICROSOFT® ENTOURAGE™, MICROSOFT® OUTLOOK™, MOZILLA® THUNDERBIRD™, etc.

[0053] Furthermore, one or more computer-readable storage media may be utilized in implementing embodiments consistent with the present disclosure. A computer-readable storage medium refers to any type of physical memory on which information or data readable by a processor may be stored. Thus, a computer-readable storage medium may store instructions for execution by one or more processors, including instructions for causing the processor(s) to perform steps or stages consistent with the embodiments described herein. The term “computer-readable medium” should be understood to include tangible items and exclude carrier waves and transient signals, i.e., be non-transitory. Examples include Random Access Memory (RAM), Read-Only Memory (ROM), volatile memory, non-volatile memory, hard drives, CD ROMs, DVDs, flash drives, disks, and any other known physical storage media.

[0054] Finally, the language used in the specification has been principally selected for readability and instructional purposes, and it may not have been selected to delineate or circumscribe the inventive subject matter. Accordingly, the disclosure of the embodiments of the disclosure is intended to be illustrative, but not limiting, of the scope of the disclosure.

[0055] With respect to the use of substantially any plural and/or singular terms herein, those having skill in the art can translate from the plural to the singular and/or from the singular to the plural as is appropriate to the context and/or application. The various singular/plural permutations may be expressly set forth herein for sake of clarity.

A SYSTEM AND METHOD FOR TARGETED UPDATING OF SOFTWARE ON DEVICES

ABSTRACT

The present disclosure relates to a method for updating target devices (104). The method comprises transmitting change message to the target devices (104). The change message comprises address data and condition change data associated with updating a condition of the target devices (104). Further, the method comprises receiving an update message from the target devices (104). The update message comprises update data associated with a status of updating the condition. Furthermore, the method comprises determining whether the condition of the target devices (104) is updated. Moreover, the method comprises transmitting a validation test message to the target devices (104). The validation test message comprises validation inquiry data associated with determining whether the condition of the target devices (104) is valid. Thereafter, the method comprises receiving a validation response message comprising validation response data, where the validation response data is indicative of validation of the condition of the target devices (104).

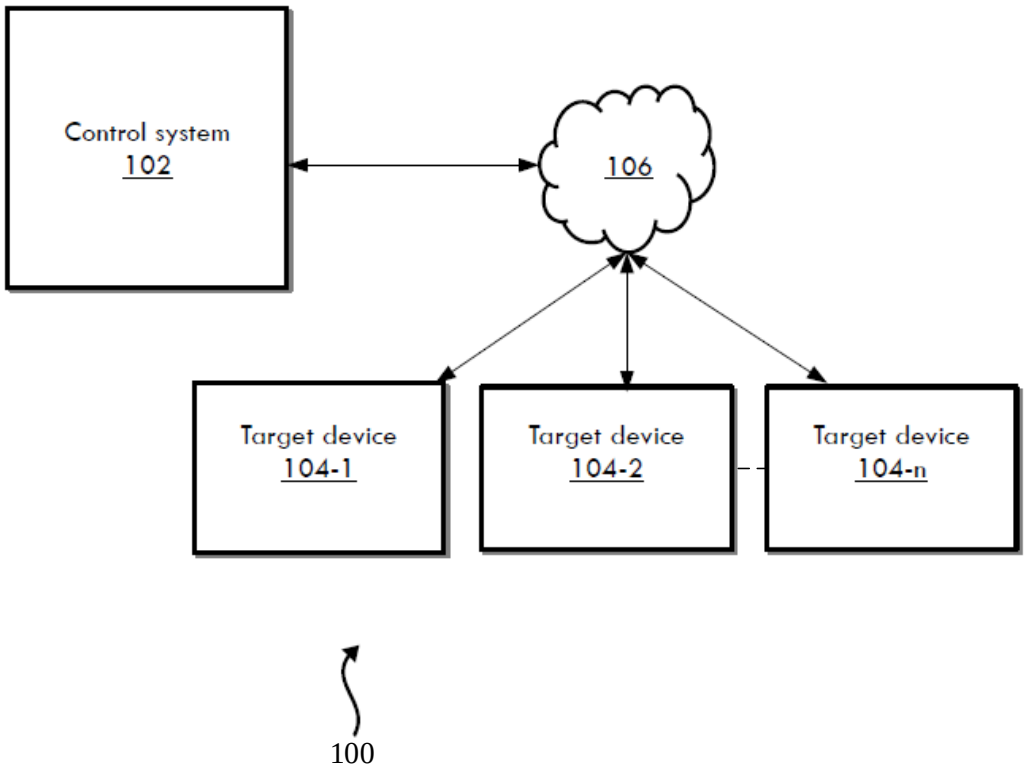
Control system
102
106
Target device
104-1
Target device
104-2
Target device
104-n
100

FIGURE 1

2/5

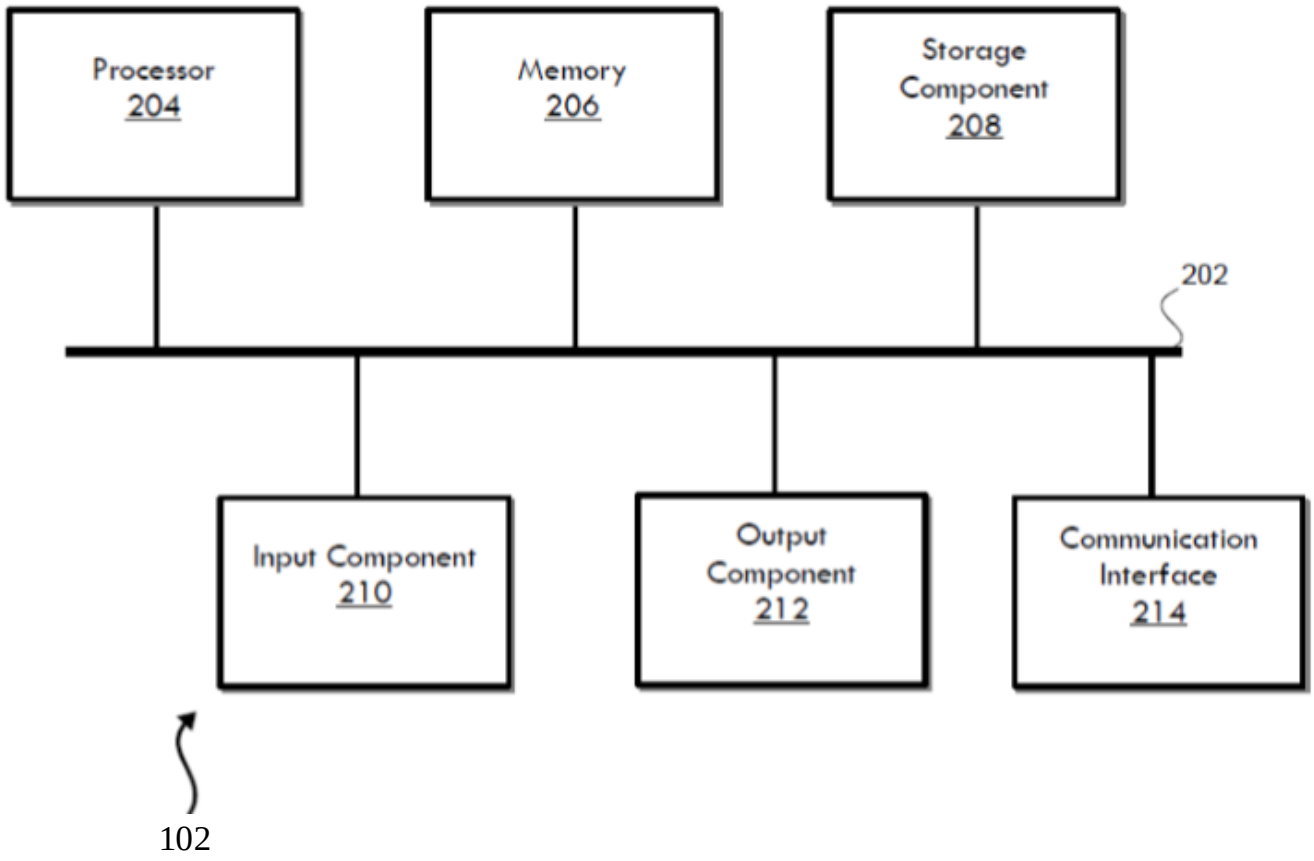
Processor
204
Memory
206
Storage
Component
208
202
Input Component
210
Output
Component
212
Communication
Interface
214
102

FIGURE 2

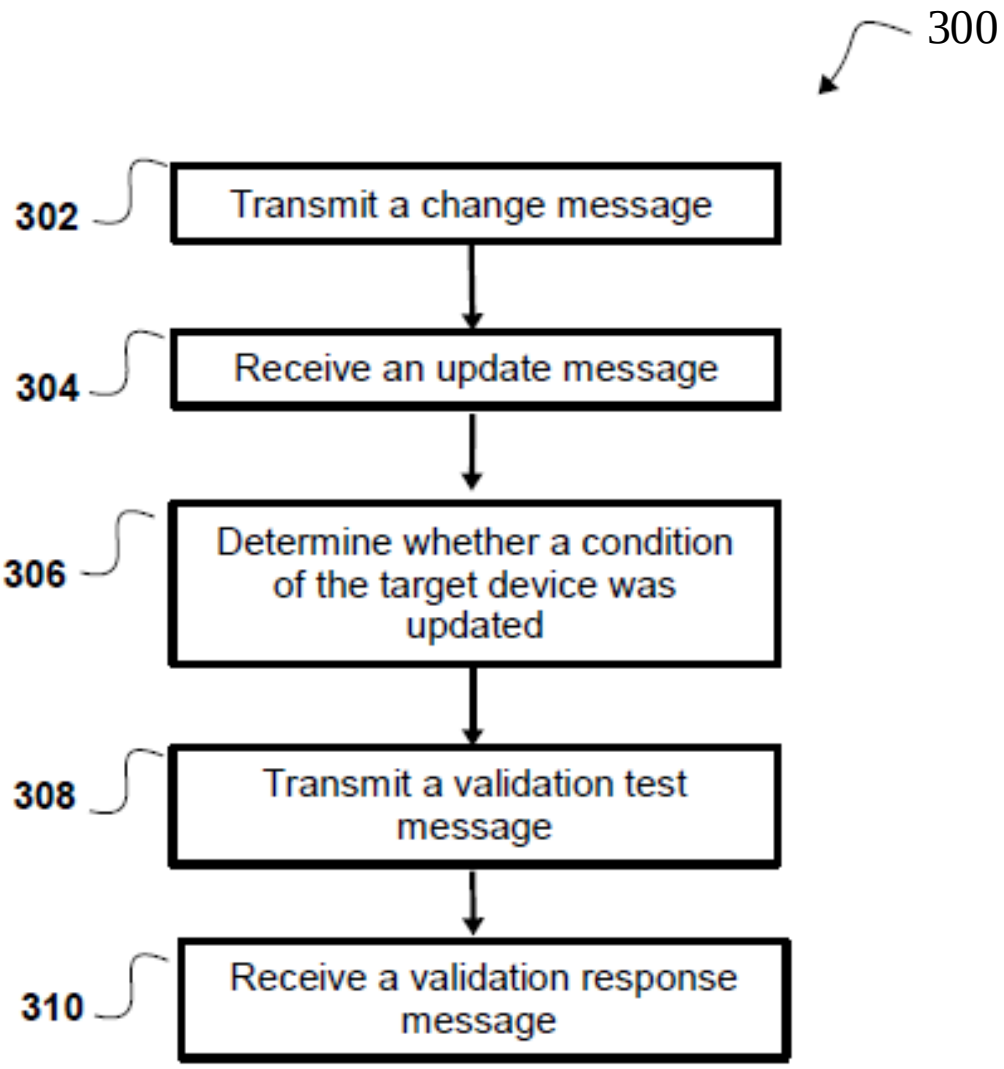
300
302
Transmit a change message
304
Receive an update message
306
Determine whether a condition of the target device was updated
308
Transmit a validation test message
310
Receive a validation response message

FIGURE 3

4/5

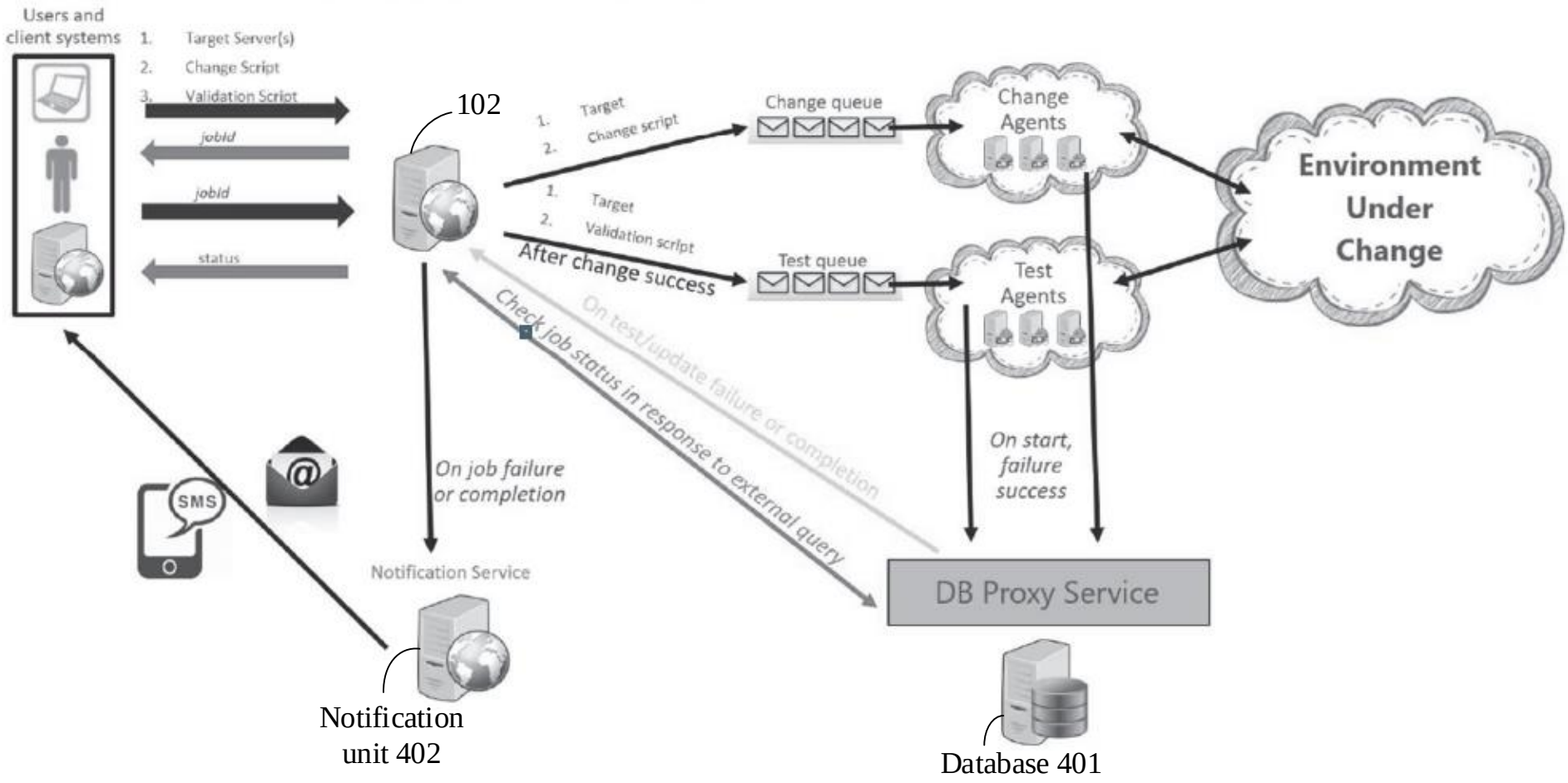
Users and client systems
1. Target Server(s)
2. Change Script
3. Validation Script
jobId
jobId
status
102
1. Target
2. Change script
Change queue
Change Agents
Environment Under Change
1. Target
2. Validation script
After change success
Test queue
Test Agents
On test/update failure or completion
Check job status in response to external query
On job failure or completion
On start, failure success
SMS
Notification Service
DB Proxy Service
Notification unit 402
Database 401

FIGURE 4

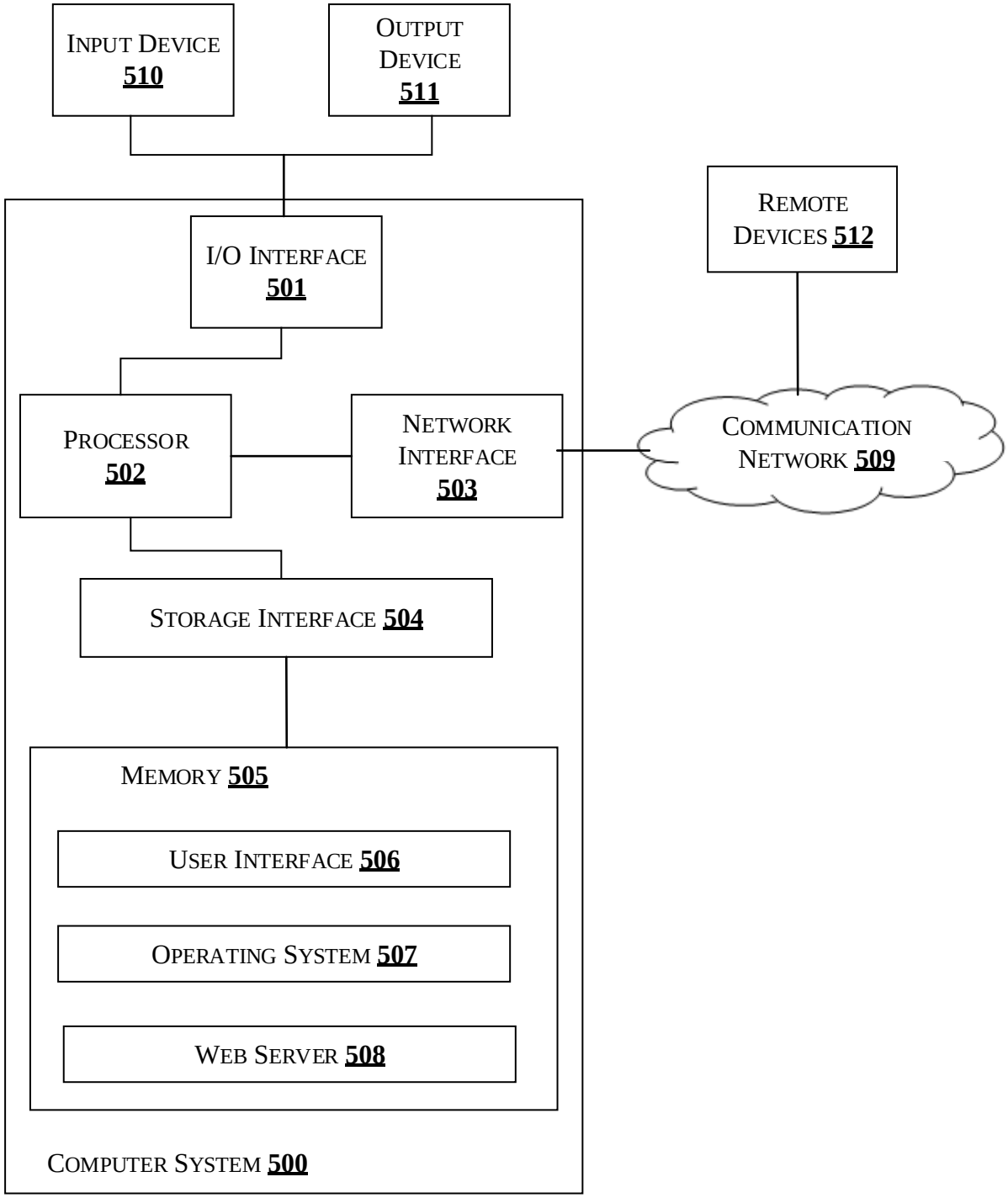
INPUT DEVICE 510
OUTPUT DEVICE 511
REMOTE DEVICES 512
I/O INTERFACE 501
PROCESSOR 502
NETWORK INTERFACE 503
COMMUNICATION NETWORK 509
STORAGE INTERFACE 504
MEMORY 505
USER INTERFACE 506
OPERATING SYSTEM 507
WEB SERVER 508
COMPUTER SYSTEM 500

FIGURE 5