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(54) **Title:** A SYSTEM FOR BRIDGING SMS AND IP MESSAGING

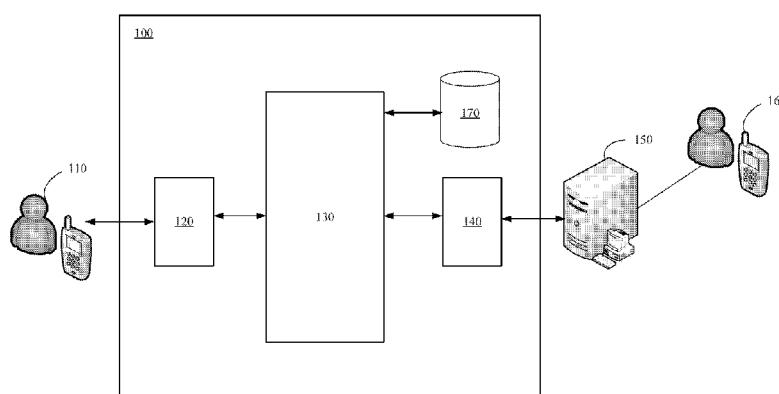


Figure 1

(57) **Abstract:** A system for delivering a message from a source User Equipment associated with a source Mobile Subscriber Integrated Services Digital Network-Number (MSISDN) to a destination User Equipment associated with a destination Mobile Subscriber Integrated Services Digital Network-Number (MSISDN) is disclosed. The message is an Internet Protocol (IP) message or a Short Message Service (SMS) message. The system comprises of a receiver configured for receiving the message from the source User Equipment. An Application Server is provided to be configured for allocating a Virtual Mobile Number for the message, wherein the Virtual Mobile Number comprises a combination of the source MSISDN and the destination MSISDN. A transmitter is provided to be configured for routing the message to the destination User Equipment using the Virtual Mobile Number.



5 **A SYSTEM FOR BRIDGING SMS AND IP MESSAGING**

FIELD OF THE INVENTION

The present disclosure generally relates to the field of communications. More particularly, the present disclosure relates to a system, a method and an application
10 server for sending messages from a source User Equipment to a destination User Equipment.

BACKGROUND

The following background discussion includes information that may be useful
15 in understanding the present invention. It is not an admission that any of the information provided herein is prior art or relevant to the presently claimed invention, or that any publication specifically or implicitly referenced is prior art.

SMS (Short Message Service) is a service for text-based communication that allows short messages to be transmitted between mobile devices using the existing
20 cellular networks. Limitations of SMS include unreliability of messages, limited feature-set, lack of typing notifications/read-receipts, etc. According to a study, up to 5% of the messages are lost in transition. Moreover, SMS messages include only 160 characters of ASCII text. In addition, SMS are extremely expensive with some carriers charging up to \$1310 per megabyte of usage.

25 Moreover, the existing systems do not support blocking or have any means for reporting abuse in the cellular networks. Hence, marketers for SPAM messaging often send abuse SMS to the users. This also leads to high inter-carrier termination charges as the carriers attempt to prevent abuse of their cellular networks.

5 One of the solutions that intend to address the above shortcomings is use of IP based messaging solution. The IP based messaging solution solves the above limitations of SMS and permits mobile users to effectively communicate within different network. However, these messaging solutions work on closed networks that typically require a separate application to be installed on the user equipment, such as
10 “WhatsApp”. The users may interact with the other users that have same application installed on their device. Moreover, the users cannot interact with the other users using the regular Mobile Station International Subscriber Directory Number (MSISDN).

 In IP based SMS messaging system, the SMS messages are transmitted via a
15 network bridge. However, since the carriers of the networks assign a low priority to these SMS messages, a significant time lag may occur between the messages being sent and the messages being received. Furthermore, the SMS messages being sent from one network to the other incurs high costs due to high inter-carrier termination charges between the carriers or may incur technical problems due to incompatible
20 standards between the networks.

 Other IP messaging solutions such as “Blackberry’s Messenger” works on user equipments having blackberry services with IP messaging capabilities between the sender and receiver. Another application that tried to overcome the above shortcomings is “Apple’s iMessage”. The “Apple’s iMessage” attempt to bridge the
25 gap between SMS and IP messaging. However, since the SMS messages are sent directly from the users phone, charge for both, the data and the SMS are applicable in “Apple’s iMessage” application. Hence the “Apple’s iMessage” still do not solve the above problem of high-carrier termination charge.

5 In order to obviate at least one or more of the aforementioned problems, there is a well-felt need to provide a system and method for sending messages from one network to the other network that at least reduces the high cost incurred by the mobile user due to high inter-carrier termination charges between the carriers or network operators.

10

SUMMARY

It is an object of the invention to provide a system and method for sending and receiving messages from a source User Equipment to a destination User Equipment.

15 It is another objective of the invention to reducing the cost involved in sending and receiving messages from one network to the other network.

A system for delivering a message from a source User Equipment associated with a source Mobile Subscriber Integrated Services Digital Network-Number (MSISDN) to a destination User Equipment associated with a destination Mobile Subscriber Integrated Services Digital Network-Number (MSISDN) is disclosed. The message is an Internet Protocol (IP) message or a Short Message Service (SMS) message. The system comprises of a receiver configured for receiving the message from the source User Equipment. An Application Server is provided to be configured for allocating a Virtual Mobile Number for the message, wherein the Virtual Mobile Number comprises a combination of the source MSISDN and the destination MSISDN. A transmitter is provided to be configured for routing the message to the destination User Equipment using the Virtual Mobile Number.

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An Application Server is also disclosed. The Application Server comprises of a MSISDN Routing Module, MSISDN Operator Mapping Module and MSISDN Virtual Mobile Number (VMN) Mapping Module. The MSISDN Routing Module

5 comprises of a first data repository in communication with a first processor, for determining a destination MSISDN being capable of receiving IP or SMS message by examining a table of existing IP enabled destination MSISDN stored in the first data repository. The MSISDN Operator Mapping Module comprises a second data repository in communication with a second processor, for determining a carrier by
10 examining prefix of the destination MSISDN. The MSISDN Virtual Mobile Number (VMN) Mapping Module comprises a third data repository in communication with a third processor, for determining the destination MSISDN associated with a specific Virtual Mobile Number.

A method of delivering a message is also disclosed. The message is an Internet
15 Protocol (IP) message or a Short Message Service (SMS) message. The method comprises the steps of receiving the message from a source User Equipment associated with a source Mobile Subscriber Integrated Services Digital Network-Number (MSISDN) and allocating a Virtual Mobile Number for the message wherein the Virtual Mobile Number comprises a combination of the source MSISDN and a
20 destination Mobile Subscriber Integrated Services Digital Network-Number (MSISDN). The method further comprises of delivering the message to a destination User Equipment associated with the destination MSISDN.

According to another embodiment of the invention, a system for sending a message from an IP enabled User Equipment to a non-IP enabled User Equipment is
25 also disclosed. The system comprises of an application server for routing all traffic between the sender and the receiver such that the mobile user avoid inter-operator termination charges by intelligently routing traffic to the appropriate carriers. The system may even support advanced features such as group messaging with a

- 5 combination of IP and non-IP enabled User Equipment, and allows for fine-grain user control to prevent abuse and SPAM.

BRIEF DESCRIPTION OF FIGURES

To further clarify the above and other advantages and features of the present disclosure, a more particular description of the disclosure will be rendered with reference to specific embodiments thereof, which are illustrated in the appended drawings. It is appreciated that these drawings depict only typical embodiments of the disclosure and are therefore not to be considered limiting in their scope. The disclosure will be described and explained with additional specificity and detail with the accompanying drawings in which:

Figure 1 illustrates a block diagram of a system for delivering a message from a source User Equipment to a destination User Equipment according to an embodiment of the invention;

Figure 2 illustrate an exemplary block diagram of an application server according to an embodiment of the invention;

Figure 3 illustrates a flowchart showing a method for delivering a message from a source User Equipment to a destination User Equipment according to an embodiment of the invention;

Figure 4 illustrates an example of a system for sending a message from a IP enabled source User Equipment to non-IP destination User Equipment according to an embodiment of the invention; and

Figure 5 illustrates a typical hardware configuration of a computer system, which is representative of a hardware environment for practicing the present invention.

5

DETAILED DESCRIPTION

For the purpose of promoting an understanding of the principles of the invention, reference will now be made to the embodiment illustrated in the drawings and specific language will be used to describe the same. It will nevertheless be understood that no limitation of the scope of the invention is thereby intended, such alterations and further modifications in the illustrated system, and such further applications of the principles of the invention as illustrated therein being contemplated as would normally occur to one skilled in the art to which the invention relates.

It will be understood by those skilled in the art that the foregoing general description and the following detailed description are exemplary and explanatory of the invention and are not intended to be restrictive thereof. Throughout the patent specification, a convention employed is that in the appended drawings, like numerals denote like components.

Reference throughout this specification to “an embodiment”, “another embodiment” or similar language means that a particular feature, structure, or characteristic described in connection with the embodiment is included in at least one embodiment of the present invention. Thus, appearances of the phrase “in an embodiment”, “in another embodiment” and similar language throughout this specification may, but do not necessarily, all refer to the same embodiment.

The terms "comprises", "comprising", or any other variations thereof, are intended to cover a non-exclusive inclusion, such that a process or method that comprises a list of steps does not include only those steps but may include other steps not expressly listed or inherent to such process or method. Similarly, one or more devices or sub-systems or elements or structures preceded by "comprises... a" does

5 not, without more constraints, preclude the existence of other devices or other sub-systems or other elements or other structures or additional devices or additional sub-systems or additional elements or additional structures.

Unless otherwise defined, all technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to
10 which this invention belongs. The system, method, Application Server and example provided herein are illustrative only and not intended to be limiting.

According to embodiment of the invention, a system, a method and an application server for sending a message from a source User Equipment to a destination User Equipment is disclosed.

15 Embodiments of the present invention will be described below in detail with reference to the accompanying drawings.

Figure 1 illustrates a system 100 for delivering a message from a source User Equipment 110 to a destination User Equipment 160 in accordance with an embodiment of the invention.

20 The source User Equipment 110 may be associated with a source Mobile Subscriber Integrated Services Digital Network-Number (MSISDN) and similarly the destination User Equipment 160 may be associated with a destination Mobile Subscriber Integrated Services Digital Network-Number (MSISDN).

According to an embodiment, the MSISDN is a number uniquely identifying a
25 subscription in a GSM (Global System for Mobile Communication) or UMTS (Universal Mobile Telecommunications System) mobile network.

According to another embodiment, the User Equipment 110, 160 may be any device used directly by an end-user to communicate such as handheld computers, UMTS mobile phones, GSM mobile phones, etc. According to an embodiment, the

- 5 User Equipment 110, 160 is capable of sending and receiving SMS and may have data communication capabilities.

According to a specific embodiment, the User Equipment is a mobile communication device. The mobile communication device is a wireless phone that operates in a wide service area and is supported by a cellular network. The term
10 "mobile communication device" includes Internet connectable mobile phones and devices with mobile phone capabilities, such as mobile phone-equipped Personal Digital Assistants (PDAs) e.g. Blackberry and iPhone.

According to another embodiment, the source User Equipment 110 may send a message to one or more destination User Equipment 160.

- 15 According to an embodiment, the message is an Internet Protocol (IP) message or a Short Message Service (SMS) message. IP messages are sent from one mobile device to another mobile device on a Data or IP network, provided both mobile devices have the capabilities of receiving the IP message. SMS messages are sent from one mobile device to another mobile device on a Cellular Network.

- 20 The system 100 comprises of a Receiver 120, an Application server 130 and a Transmitter 140. The receiver 120 is configured for receiving the message from the source User Equipment 110 and forwarding the message to the Application Server 130 for processing.

- 25 The Application Server 130 is configured for receiving the message from the receiver 120 and allocating a Virtual Mobile Number for the message, wherein the Virtual Mobile Number comprises a combination of the source MSISDN and the destination MSISDN. The Application Server 130 is further configured to send the message using the Virtual Mobile Number to the transmitter 140.

5 The transmitter 140 is configured for routing the message to the destination User Equipment using the Virtual Mobile Number.

 According to another embodiment, the system 100 further comprising a data repository 170 in communication with the Application Server 130, configured for storing a pool of Virtual Mobile Numbers. The Application Server 130 may be
10 configured to select the Virtual Mobile Number from a pool provide if the selected Virtual Mobile Number (source MSISDN + destination MSISDN) contradicts from the earlier used Virtual Mobile Number.

 According to another embodiment, the Application Server 130 is further configured for selecting a carrier 150 for routing the message to the source MSISDN
15 or the destination MSISDN wherein the source MSISDN or the destination MSISDN is not capable of receiving an IP message. For example, let's consider a scenario, where a source mobile device which is an IP enabled device sends an IP message to destination mobile device which is not IP enabled device. Then, the IP message may be routed through the carrier by the Application Server such that the destination
20 mobile device receives the IP message in the form of an SMS message. Further, the same may be possible in a vice-versa scenario where a mobile device sends a SMS to an IP enabled User Equipment.

 Figure 2 illustrates a block diagram showing the components of Application Server in accordance with an embodiment of the invention. The Application Server
25 130 comprises of a MSISDN Routing Module 210, a MSISDN Operator Mapping Module 240 and a MSISDN Virtual Mobile Number (VMN) Mapping Module 270.

 The MSISDN Routing Module 210 comprises of a first data repository 230 in communication with a first processor 220, for determining a destination MSISDN being capable of receiving IP or SMS message by examining a table of existing IP

5 enabled destination MSISDN stored in the first data repository 230. According to an embodiment, the table may be acquired from one or more network providers issuing MSISDN to mobile users.

The MSISDN Operator Mapping Module 240 comprises a second data repository 260 in communication with a second processor 250, for determining a
10 carrier (not shown) by examining a prefix of the destination MSISDN such that the carrier may be selected based on issuing network provider of the destination MSISDN. Further, the message may be routed to the destination MSISDN based on its issuing network provider in order to avoid inter-carrier charges.

The MSISDN Virtual Mobile Number (VMN) Mapping Module 270
15 comprises a third data repository 290 in communication with a third processor 280, for determining the destination MSISDN associated with a specific Virtual Mobile Number. The module 270 may contain a table of a plurality of destination MSISDN and their allocated VMN to ease in data retrieval process.

According to an embodiment, the first data repository, the second data
20 repository and the third data repository are the same.

According to another embodiment, the first processor, the second processor and the third processor are the same.

Figure 3 illustrates a method 300 of delivering a message in accordance with an embodiment of the invention. According to an embodiment, the message may be
25 an Internet Protocol (IP) message or a Short Message Service (SMS) message.

The method 300 comprises the steps of receiving the message from a source User Equipment associated with a source Mobile Subscriber Integrated Services Digital Network-Number (MSISDN), as shown in step 310.

5 The method further comprises step of allocating, by an Application Server, a Virtual Mobile Number for the message wherein the Virtual Mobile Number comprises a combination of the source MSISDN and a destination Mobile Subscriber Integrated Services Digital Network-Number (MSISDN), as shown in step 320 and delivering the message to a destination User Equipment associated with the
10 destination MSISDN, as shown in step 330.

 According to an embodiment, the step of delivering the message may comprise of routing the message to the destination MSISDN using the Virtual Mobile Number.

 According to another embodiment, the step of delivering the message may
15 further comprise of selecting a carrier for routing the message to the source MSISDN or the destination MSISDN wherein the source MSISDN or the destination MSISDN is not capable of receiving an IP message.

 The steps of the illustrated method described above herein may be implemented or performed with a general-purpose processor, a digital signal
20 processor (DSP), an application specific integrated circuit (ASIC), a field programmable gate array (FPGA) or other programmable logic device, discrete gate or transistor logic, discrete hardware components, or any combination thereof designed to perform the functions described herein. A general-purpose processor may be a microprocessor, but in the alternative, the processor may be any conventional
25 processor, controller, micro controller, or state machine. A processor may also be implemented as a combination of computing devices, e.g., a combination of a DSP and a microprocessor, a plurality of microprocessors, one or more microprocessors in conjunction with a DSP core, or any other such configuration.

5 Figure 4 illustrates a specific example of the system 400 according to an embodiment of the invention. The system 400 comprises of an application server 405 that may be in signal communication with one or more source user equipment (UE) such as 410, 415. The source UE 410, 415 may interact with application server 405 over an IP network or data network 425. According to an embodiment, the source UE
10 410, 415 are IP enabled User Equipment's and are configured to send IP messages to the other User Equipment's.

 The Application Server 405 may further be connected to one or more carrier's 435, 440 on cellular network. The carriers 435 and 440 may be any suitable GSM (Global System for Mobile Communication) or UMTS (Universal Mobile
15 Telecommunications System) compliant carrier configured to route message from one source UE to the destination UE. Each carrier 435, 440 may be connected to one or more user equipments such as carrier 435 is connected to a destination UE 445 and 450 and carrier 440 is connected to a destination UE 455.

 According to an embodiment, an IP message is sent from the source UE410,
20 415 to a destination UE with a specific MSISDN (Mobile Station International Subscriber Directory Number) using a data network (IP) may be routed to the application server 405. The application server 405 determines if the destination UE is IP enabled equipment such as User Equipment 420 or non-IP enabled user Equipment such as 445, 450 and 455. If the destination UE is an IP enabled, then the IP message
25 is routed simply using the IP data network 425 to the destination UE 420. However, if the destination user is a non-IP enabled User Equipment then the application server 405 determines the carrier (operator) 435, 440 for the destination UE445, 450 and 455 to send the IP message as a SMS message to the destination UE (not IP enabled). According to another embodiment, the application server 405 may first determine if

5 the destination UE 445, 450, 455 has subscribed to any country specific anti-spam systems to prevent unwanted messages. Once the application server 405 attains an approval from an anti-spam system in communication with the Application Server and user block list of the destination UE attained from a network provider of the destination UE, an appropriate carrier 435, 440 may be determined. After determining
10 the carrier, the application server 405 further allocates a unique Virtual Mobile Number (VMN) for the message. The VMN may be the combination of source MSISDN and destination MSISDN and may be selected from the best pool appropriate to the determined carrier. This specific process avoid carrier termination charges by choosing an “on network” VMN.

15 The allocated VMN is unique to the destination MSISDN so that multiple source MSISDNs are differentiated correctly on the destination UE. If a unique VMN cannot be allocated from the pool, the application server 102 may reuse the VMN with the oldest message.

Upon allocation of VMN to the message, the message is routed to the
20 destination UE 445, 450, 455 through the carrier 435, 440 using the VMN, i.e., the user of the destination UE will receive the message as an SMS and the MSISDN of the sender's UE will be changed to the VMN such that no inter-carrier charged are levied on the message.

In another scenario, the UE 445, 450, 455, when replying to the received
25 message, as stated above, will be defined as ‘source UE’ and the ‘source UE’ (as described above) will be defined as ‘destination UE’ for this scenario. According to an embodiment, when the UE 445, 450 and 455 replies to the message with allocated VMN, the application server 405 looks up the IP enabled equipment's MSISDN using the allocated VMN and seamlessly delivers the message using IP network since the

5 destination UE is IP enabled. Accordingly, the IP enabled UE may send all messages via a data network or IP network while the non-IP recipient sends/receives using cellular network. The allocation strategy ensures that conversations on the recipient side are maintained in order while also finding the most cost-effective message delivery strategy.

10 The disclosed system and method bridges the gap between networks in a unique way, allowing a mobile user of the system to reap all the benefits of IP messaging even when the recipient of the system is a non-IP user such as a SMS user. The application server route all traffic between the sender and the receiver such that the mobile user avoids inter-operator termination charges by intelligently routing
15 traffic to the appropriate carriers using IP networks. The system may even support advanced features such as group messaging with a combination of IP and non-IP users, and allows for fine-grain user control to prevent abuse and SPAM.

Figure 5 illustrates a typical hardware configuration of a computer system, which is representative of a hardware environment for practicing the present
20 invention. Any of the components such as 100 may include a portion or all of the computer system 1000. The computer system 1000 can include a set of instructions that can be executed to cause the computer system 1000 to perform any one or more of the methods disclosed. The computer system 1000 may operate as a standalone device or may be connected, e.g., using a network, to other computer systems or
25 peripheral devices.

In a networked deployment, the computer system 1000 may operate in the capacity of a server or as a client user computer in a server-client user network environment, or as a peer computer system in a peer-to-peer (or distributed) network environment. The computer system 1000 can also be implemented as or incorporated

5 into various devices, such as a personal computer (PC), a tablet PC, a set-top box (STB), a personal digital assistant (PDA), a mobile device, a palmtop computer, a laptop computer, a desktop computer, a communications device, a wireless telephone, a land-line telephone, a control system, a camera, a scanner, a facsimile machine, a printer, a pager, a personal trusted device, a web appliance, a network router, switch
10 or bridge, or any other machine capable of executing a set of instructions (sequential or otherwise) that specify actions to be taken by that machine. Further, while a single computer system 1000 is illustrated, the term "system" shall also be taken to include any collection of systems or sub-systems that individually or jointly execute a set, or multiple sets, of instructions to perform one or more computer functions.

15 The computer system 1000 may include a processor 1002, e.g., a central processing unit (CPU), a graphics processing unit (GPU), or both. The processor 1002 may be a component in a variety of systems. For example, the processor 1002 may be part of a standard personal computer or a workstation. The processor 1002 may be one or more general processors, digital signal processors, application specific integrated
20 circuits, field programmable gate arrays, servers, networks, digital circuits, analog circuits, combinations thereof, or other now known or later developed devices for analyzing and processing data. The processor 1002 may implement a software program, such as code generated manually (i.e., programmed).

The term "module" may be defined to include a plurality of executable
25 modules. As described herein, the modules are defined to include software, hardware or some combination thereof executable by a processor, such as processor 1002. Software modules may include instructions stored in memory, such as memory 1004, or another memory device, that are executable by the processor 1002 or other processor. Hardware modules may include various devices, components, circuits,

5 gates, circuit boards, and the like that are executable, directed, or otherwise controlled for performance by the processor 1002.

The computer system 1000 may include a memory 1004, such as a memory 1004 that can communicate via a bus 1008. The memory 1004 may be a main memory, a static memory, or a dynamic memory. The memory 1004 may include, but
10 is not limited to computer readable storage media such as various types of volatile and non-volatile storage media, including but not limited to random access memory, read-only memory, programmable read-only memory, electrically programmable read-only memory, electrically erasable read-only memory, flash memory, magnetic tape or disk, optical media and the like. In one example, the memory 1004 includes a cache or
15 random access memory for the processor 1002. In alternative examples, the memory 1004 is separate from the processor 1002, such as a cache memory of a processor, the system memory, or other memory. The memory 1004 may be an external storage device or database for storing data. Examples include a hard drive, compact disc ("CD"), digital video disc ("DVD"), memory card, memory stick, floppy disc,
20 universal serial bus ("USB") memory device, or any other device operative to store data. The memory 1004 is operable to store instructions executable by the processor 1002. The functions, acts or tasks illustrated in the figures or described may be performed by the programmed processor 1002 executing the instructions stored in the memory 1004. The functions, acts or tasks are independent of the particular type of
25 instructions set, storage media, processor or processing strategy and may be performed by software, hardware, integrated circuits, firm-ware, micro-code and the like, operating alone or in combination. Likewise, processing strategies may include multiprocessing, multitasking, parallel processing and the like.

5 As shown, the computer system 1000 may or may not further include a display unit 1010, such as a liquid crystal display (LCD), an organic light emitting diode (OLED), a flat panel display, a solid state display, a cathode ray tube (CRT), a projector, a printer or other now known or later developed display device for outputting determined information. The display 1010 may act as an interface for the
10 user to see the functioning of the processor 1002, or specifically as an interface with the software stored in the memory 1004 or in the drive unit 1016.

 Additionally, the computer system 1000 may include an input device 1012 configured to allow a user to interact with any of the components of system 1000. The input device 1012 may be a number pad, a keyboard, or a cursor control device, such
15 as a mouse, or a joystick, touch screen display, remote control or any other device operative to interact with the computer system 1000.

 The computer system 1000 may also include a disk or optical drive unit 1016. The disk drive unit 1016 may include a computer-readable medium 1022 in which one or more sets of instructions 1024, e.g. software, can be embedded. Further, the
20 instructions 1024 may embody one or more of the methods or logic as described. In a particular example, the instructions 1024 may reside completely, or at least partially, within the memory 1004 or within the processor 1002 during execution by the computer system 1000. The memory 1004 and the processor 1002 also may include computer-readable media as discussed above.

25 The present invention contemplates a computer-readable medium that includes instructions 1024 or receives and executes instructions 1024 responsive to a propagated signal so that a device connected to a network 1026 can communicate voice, video, audio, images or any other data over the network 1026. Further, the instructions 1024 may be transmitted or received over the network 1026 via a

5 communication port or interface 1020 or using a bus 1008. The communication port or interface 1020 may be a part of the processor 1002 or may be a separate component. The communication port 1020 may be created in software or may be a physical connection in hardware. The communication port 1020 may be configured to connect with a network 1026, external media, the display 1010, or any other
10 components in system 1000, or combinations thereof. The connection with the network 1026 may be a physical connection, such as a wired Ethernet connection or may be established wirelessly as discussed later. Likewise, the additional connections with other components of the system 1000 may be physical connections or may be established wirelessly. The network 1026 may alternatively be directly connected to
15 the bus 1008.

The network 1026 may include wired networks, wireless networks, Ethernet AVB networks, or combinations thereof. The wireless network may be a cellular telephone network, an 802.11, 802.16, 802.20, 802.1Q or WiMax network. Further, the network 1026 may be a public network, such as the Internet, a private network,
20 such as an intranet, or combinations thereof, and may utilize a variety of networking protocols now available or later developed including, but not limited to TCP/IP based networking protocols.

While the computer-readable medium is shown to be a single medium, the term "computer-readable medium" may include a single medium or multiple media,
25 such as a centralized or distributed database, and associated caches and servers that store one or more sets of instructions. The term "computer-readable medium" may also include any medium that is capable of storing, encoding or carrying a set of instructions for execution by a processor or that cause a computer system to perform

- 5 any one or more of the methods or operations disclosed. The "computer-readable medium" may be non-transitory, and may be tangible.

In an example, the computer-readable medium can include a solid-state memory such as a memory card or other package that houses one or more nonvolatile read-only memories. Further, the computer-readable medium can be a random access
10 memory or other volatile re-writable memory. Additionally, the computer-readable medium can include a magneto-optical or optical medium, such as a disk or tapes or other storage device to capture carrier wave signals such as a signal communicated over a transmission medium. A digital file attachment to an e-mail or other self-contained information archive or set of archives may be considered a distribution
15 medium that is a tangible storage medium. Accordingly, the disclosure is considered to include any one or more of a computer-readable medium or a distribution medium and other equivalents and successor media, in which data or instructions may be stored.

In an alternative example, dedicated hardware implementations, such as
20 application specific integrated circuits, programmable logic arrays and other hardware devices, can be constructed to implement various parts of the system 1000.

Applications that may include the systems can broadly include a variety of electronic and computer systems. One or more examples described may implement functions using two or more specific interconnected hardware modules or devices
25 with related control and data signals that can be communicated between and through the modules, or as portions of an application-specific integrated circuit. Accordingly, the present system encompasses software, firmware, and hardware implementations.

The system described may be implemented by software programs executable by a computer system. Further, in a non-limited example, implementations can

- 5 include distributed processing, component/object distributed processing, and parallel processing. Alternatively, virtual computer system processing can be constructed to implement various parts of the system.

The system is not limited to operation with any particular standards and protocols. For example, standards for Internet and other packet switched network
10 transmission (e.g., TCP/IP, UDP/IP, HTML, HTTP, etc.) may be used. Such standards are periodically superseded by faster or more efficient equivalents having essentially the same functions. Accordingly, replacement standards and protocols having the same or similar functions as those disclosed are considered equivalents thereof.

Benefits, other advantages, and solutions to problems have been described
15 above with regard to specific embodiments. However, the benefits, advantages, solutions to problems, and any component(s) that may cause any benefit, advantage, or solution to occur or become more pronounced are not to be construed as a critical, required or essential feature.

While specific language has been used to describe the disclosure, any
20 limitations arising on account of the same are not intended. As would be apparent to a person in the art, various working modifications may be made to the method in order to implement the inventive concept as taught herein.

5 We Claim:

1. A system for delivering a message from a source User Equipment associated with a source Mobile Subscriber Integrated Services Digital Network-Number (MSISDN) to a destination User Equipment associated with a destination Mobile Subscriber Integrated Services Digital Network-Number (MSISDN), the message being an
10 Internet Protocol (IP) message or a Short Message Service (SMS) message, the system comprising:

a receiver configured for receiving the message from the source User Equipment;

an Application Server configured for allocating a Virtual Mobile Number for
15 the message, wherein the Virtual Mobile Number comprises a combination of the source MSISDN and the destination MSISDN; and

a transmitter configured for routing the message to the destination User Equipment using the Virtual Mobile Number.

2. The system as claimed in claim 1, further comprising a data repository in
20 communication with the Application Server, configured for storing a pool of Virtual Mobile Numbers.

3. The system as claimed in claim 1, wherein the Application Server further configured for selecting a carrier for routing the message to the source MSISDN or the destination MSISDN.

25 4. The system as claimed in claim 3, wherein the source MSISDN or the destination MSISDN is not capable of receiving an IP message.

5. The system as claimed in claim 1, wherein the source User Equipment and destination User Equipment is a mobile communication device.

5 6. An Application Server, comprising:

 a MSISDN Routing Module comprises a first data repository in communication with a first processor, for determining a destination MSISDN being capable of receiving IP or SMS message by examining a table of existing IP enabled destination MSISDN stored in the first data repository;

10 a MSISDN Operator Mapping Module comprises a second data repository in communication with a second processor, for determining a carrier by examining prefix of the destination MSISDN; and

 a MSISDN Virtual Mobile Number (VMN) Mapping Module comprises a third data repository in communication with a third processor, for determining the
15 destination MSISDN associated with a specific Virtual Mobile Number.

7. The application server as claimed in claim 6, wherein the first data repository, the second data repository and the third data repository are the same.

8. The application server as claimed in claim 6, wherein the first processor, the second processor and the third processor are the same.

20 9. A method of delivering a message, the message being an Internet Protocol (IP) message or a Short Message Service (SMS) message, comprising the steps of:

 receiving the message from a source User Equipment associated with a source Mobile Subscriber Integrated Services Digital Network-Number (MSISDN);

 allocating, by an Application Server, a Virtual Mobile Number for the
25 message wherein the Virtual Mobile Number comprises a combination of the source MSISDN and a destination Mobile Subscriber Integrated Services Digital Network-Number (MSISDN); and

5 delivering the message to a destination User Equipment associated with the destination MSISDN.

10. The method as claimed in claim 9, wherein the step of delivering the message comprising routing the message to the destination MSISDN using the Virtual Mobile Number.

10 11. The method as claimed in claim 9, wherein the step of delivering the message further comprising selecting a carrier for routing the message to the source MSISDN or the destination MSISDN.

12. The method as claimed in claim 11, wherein the source MSISDN or the destination MSISDN is not capable of receiving an IP message.

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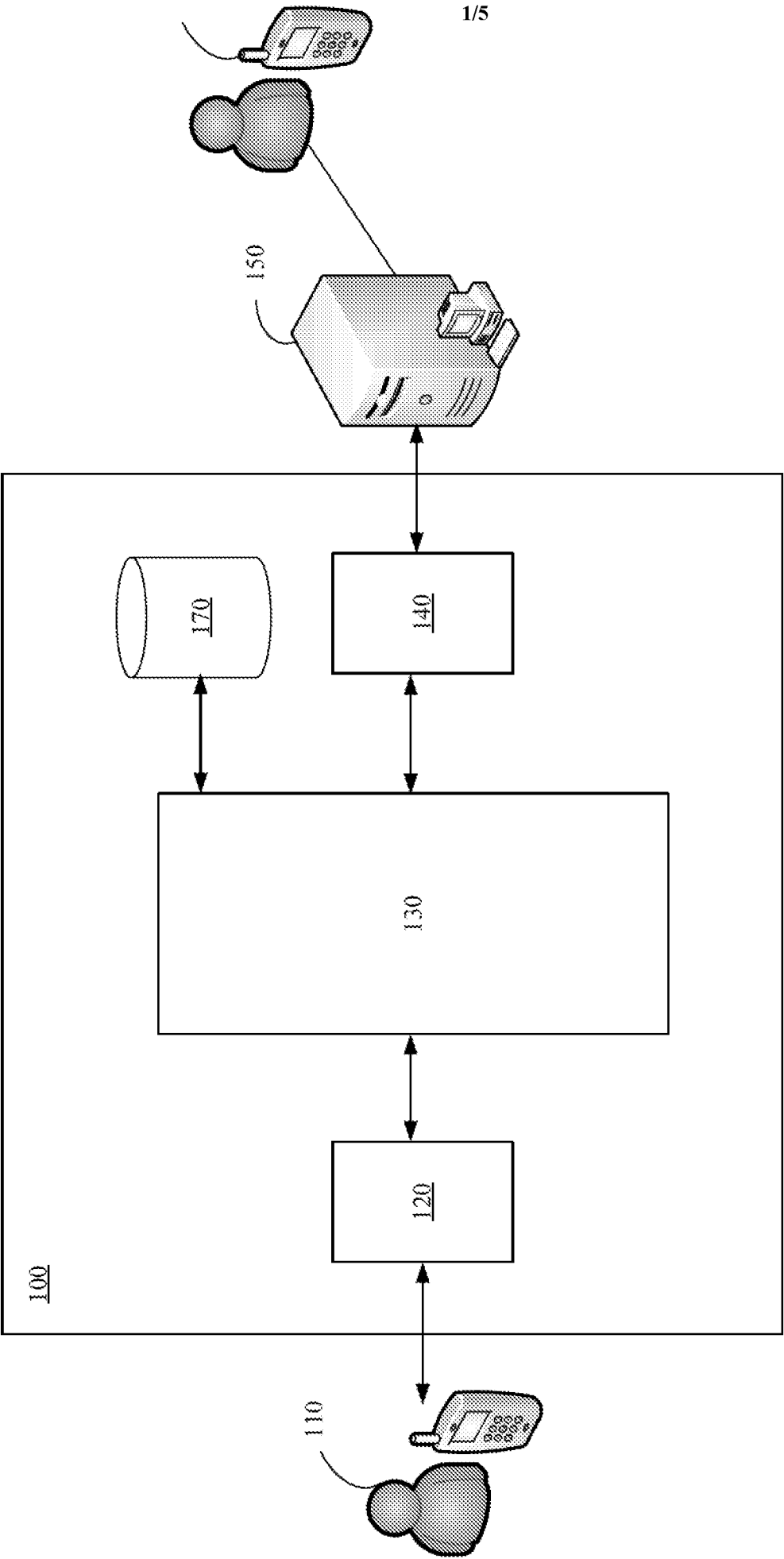


Figure 1

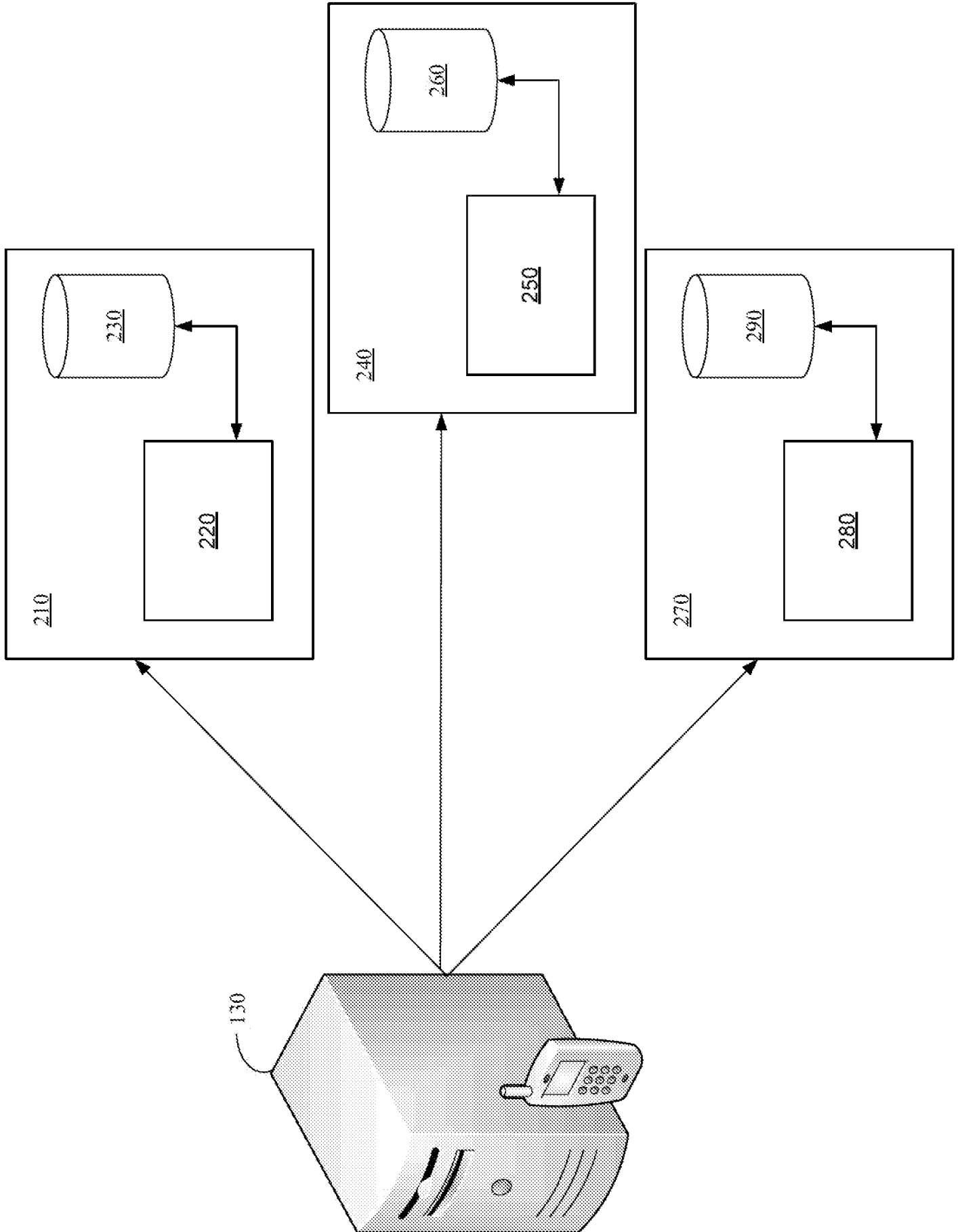


Figure 2

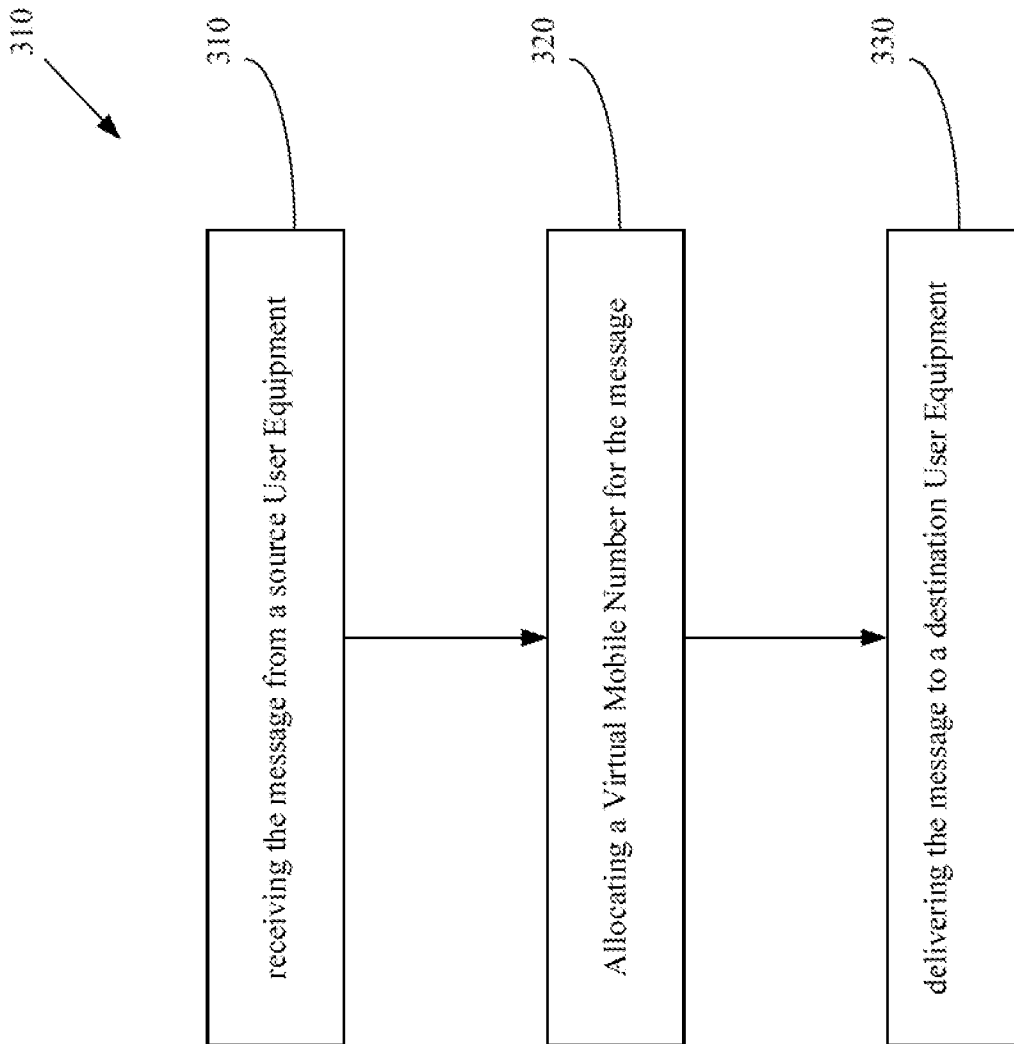


Figure 3

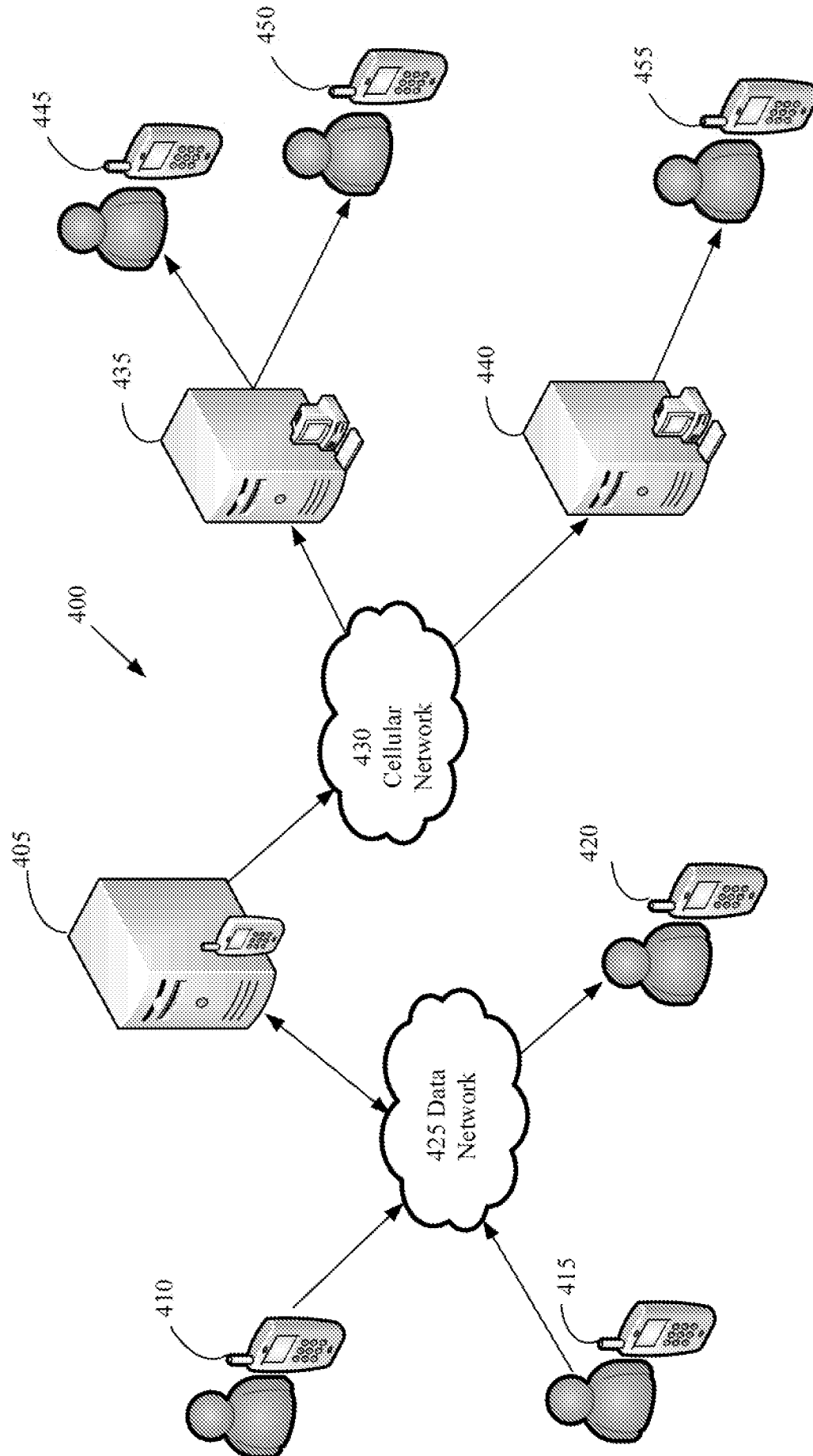


Figure 4

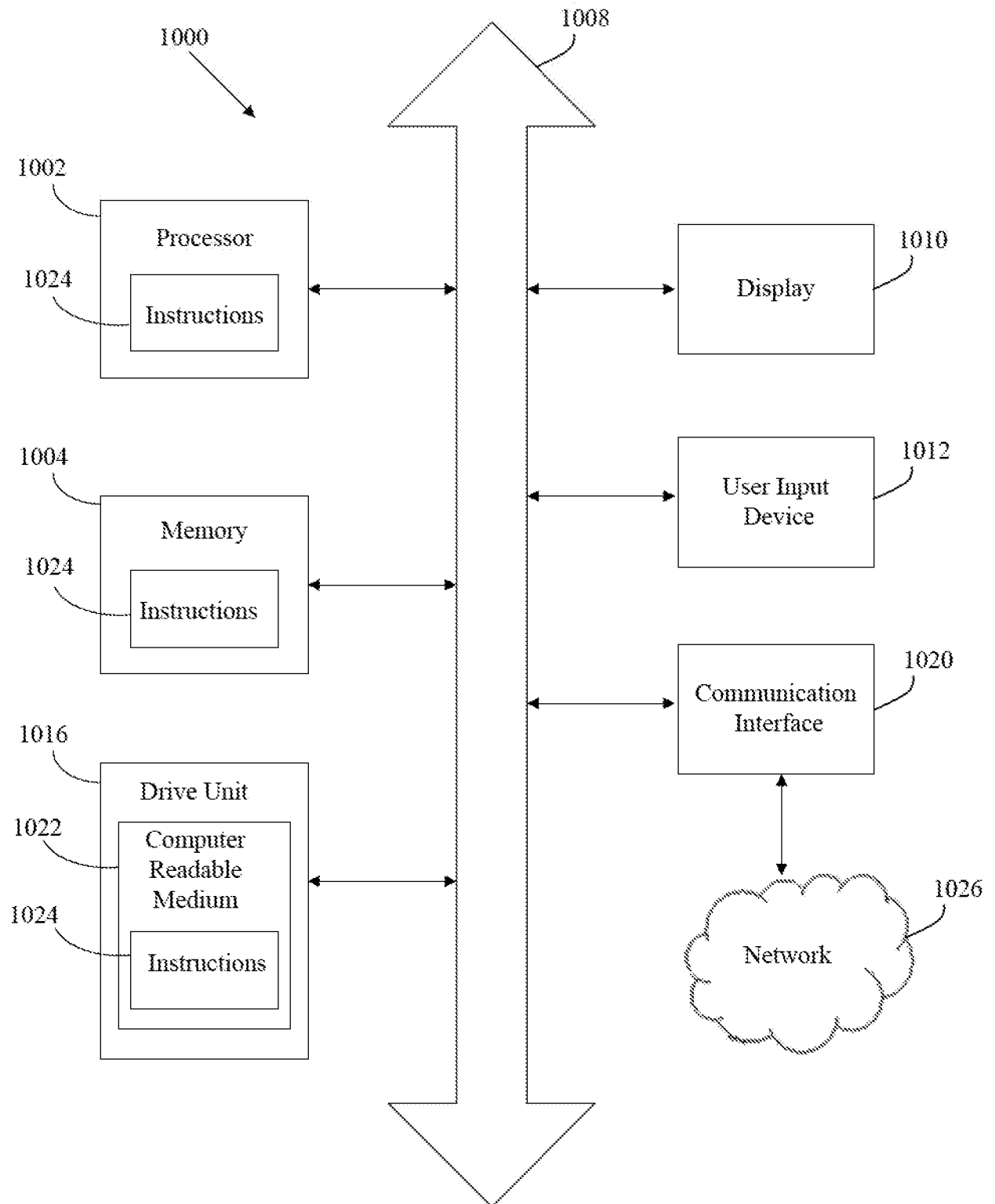


Figure 5