



(51) International Patent Classification:
H04W 88/04 (2009.01)

(21) International Application Number:
PCT/CN2013/081162

(22) International Filing Date:
9 August 2013 (09.08.2013)

(25) Filing Language: English

(26) Publication Language: English

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(81) Designated States (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

— with international search report (Art. 21(3))

(54) Title: DATA RELAY BETWEEN COMMUNICATION DEVICES

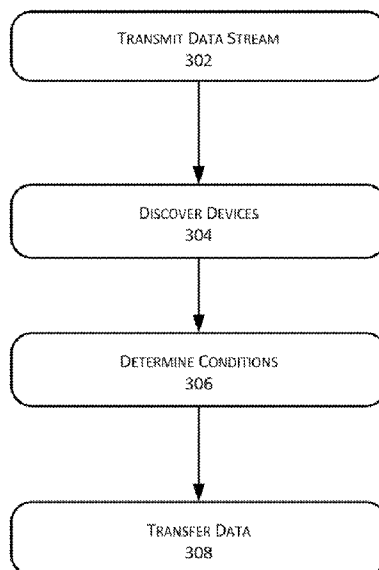


FIG. 3

(57) Abstract: While a user utilizes a communication device to communicate with other devices over a network, certain technical issues may cause the interruption or disconnection of the communication. The communication device may be configured to relay the communication to a secondary device to continue the communication without interrupting the communication.

DATA RELAY BETWEEN COMMUNICATION DEVICES

TECHNICAL FIELD

The technologies described herein pertain generally to data relay between communication devices, one of which may be configured to communicate with other devices over a network.

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BACKGROUND

Unless otherwise indicated herein, the approaches described in this section are not prior art to the claims in this application and are not admitted to be prior art by inclusion in this section.

While a user utilizes a communication device to communicate with other devices over a network, certain technical issues of the communication device, *e.g.*, battery outage may cause the interruption or disconnection of the communication and may further worsen user experience.

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SUMMARY

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Technologies are generally described for accessing USB devices. The various techniques may be implemented in various systems, methods, and/or computer-readable mediums.

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In some examples, various techniques may be implemented as devices. Some devices may include a load balancer, communicatively coupled to a first communication device, configured to transfer a communication data stream between a service provider and the first communication device to a second communication device, in accordance with at least one of a plurality of predetermined conditions regarding at least one of the device or the second communication device; and a storage unit configured to store identification information corresponding to the second communication device.

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In some examples, various techniques may be implemented as methods. Some methods may include transmitting a communication data stream between a service provider and a first communication device; discovering one or more communication devices within a predetermined distance of a first communication device; determining that at least one of a plurality of predetermined conditions is met; and transferring the communication data stream to a second communication device, which is one of the discovered communication devices.

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In some other examples, various techniques may be implemented as executable instructions stored on one or more computer-readable mediums. Some computer-readable mediums may store executable instructions that include determining at least one of a plurality of predetermined conditions

is met, selecting a second communication device within a predetermined distance of a first communication device, and relaying a communication data stream between the first communication device and a calling party to the second communication device.

The foregoing summary is illustrative only and is not intended to be in any way limiting. In addition to the illustrative aspects, embodiments, and features described above, further aspects, embodiments, and features will become apparent by reference to the drawings and the following detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

In the detailed description that follows, embodiments are described as illustrations only since various changes and modifications will become apparent to those skilled in the art from the following detailed description. The use of the same reference numbers in different figures indicates similar or identical items. In the drawings:

FIG. 1 shows an example system in which data relay between communication devices may be implemented, arranged in accordance with at least some embodiments described herein;

FIG. 2 shows an example communication device by which data relay between communication devices may be implemented, arranged in accordance with at least some embodiments described herein;

FIG. 3 shows an example configuration of a processing flow of operations by which data relay between communication devices may be implemented, arranged in accordance with at least some embodiments described herein; and

FIG. 4 shows a block diagram illustrating an example computing device that is arranged for data relay between communication devices, arranged in accordance with at least some embodiments described herein.

DETAILED DESCRIPTION

In the following detailed description, references are made to the accompanying drawings, which form a part of the description. In the drawings, similar symbols typically identify similar components, unless context dictates otherwise. Furthermore, unless otherwise noted, the description of each successive drawing may reference features from one or more of the previous drawings to provide clearer context and a more substantive explanation of the current embodiment. Still, the embodiments described in the detailed description, drawings, and claims are not meant to be limiting. Other

embodiments may be utilized, and other changes may be made, without departing from the spirit or scope of the subject matter presented herein. It will be readily understood that the aspects of the present disclosure, as generally described herein and illustrated in the drawings, may be arranged, substituted, combined, separated, and designed in a wide variety of different configurations, all of which are explicitly contemplated herein.

FIG. 1 shows an example system 100 in which data relay between communication devices may be implemented, arranged in accordance with at least some embodiments described herein. As depicted, example system 100 may include, at least, a communication device 102 that communicates, via a network 103, with a communication device 104 that may be configured to relay the communication to, via a network 105, other communication devices. The other communication devices may include a desktop computer 106, a wireless communication device 108, or a laptop computer 110, which may be located within a threshold distance 112 of communication device 104.

Communication device 102 may refer to a physical device that may be configured to exchange information with other communication devices via network 103. In accordance with some examples, communication device 102 may include telephones, cellphones, smart phones, personal digital assistant (PDA), or portable two-way radio transceivers. In accordance with other examples, communication devices 102 may include computing devices that may be configured to communicate with other wireless communication devices via the Internet. For example, the computing devices may include laptop computers, desktop computers, *etc.*

Network 103 may refer to a communication link that may be configured to support the information exchange between communication device 102 and communication device 104. In accordance with some examples, network 103 may refer to a cellular network that includes multiple cells and respective base stations. In other examples, network 103 may refer to the Internet that provides communication between multiple network terminals. One or more servers (not shown) may be configured to support the communication via the Internet. That is, a real time communication data stream may be established between communication device 102 and a service provider hosted on one of the multiple cells via network 103. Unexpected technical difficulties may cause interruptions or disconnections to the real time communication data stream and may further lower the user experience. For example, power outage on communication device 104 may cause a disconnection of the data stream.

Communication device 104 may refer to a physical device that may be configured to transceive information with communication device 102 and other communication devices via network 105. The other communication devices may be communicatively coupled to communication device 104,

wirelessly or via a wired connection, via network 105 so that the other communication devices remain discoverable to communication device 104. A real time communication data stream may be established between communication device 102 and communication device 104 over network 103. Communication device 104 may be configured to discover the other communication devices, e.g., desktop computer 106, wireless communication device 108, laptop computer 110, *etc.*, within threshold distance 112. The identification information corresponding to the other communication devices may be stored in communication device 104. When unexpected technical difficulties occur, such as a battery power of communication device 104 falls below a preset threshold value or a processor of communication device 104 fails to process data stored on communication device 104, communication device 104 may be configured to transfer the aforementioned information exchange, *e.g.*, the real time communication data stream, to one of the other communication devices. That is, communication device 104 may be configured to relay the real time communication data stream between communication device 102 and one of the other communication devices. In some examples, during relaying the real time communication data stream, components other than a network adapter, such as display module, web camera, speakers, may not be functioning and, thus, may be turned off to save energy. A user of communication device 104 may start to utilize one of the other communication devices to continue the communication with communication device 102 without interrupting the real time communication data stream.

Network 105 may refer to a communication link that may be configured to support the information exchange between communication device 104 and other communication devices, *e.g.*, desktop computer 106, wireless communication device 108, laptop computer 110, *etc.*, within threshold distance 112. Network 105 may be established based on various communication techniques, wireless or via a wired connection, that include Wireless Fidelity (Wi-Fi), Bluetooth, local area network, Near Field Communication (NFC), Radio Frequency Identification (RFID), electromagnetic waves, *etc.*

Desktop computer 106 may refer to a computer in a form intended for regular use at a single location. Desktop computer 106 may be configured to be communicatively coupled to communication device 104 via network 105. In some examples, when communication device 104 experiences technical difficulties and may not be suitable for processing the real time communication data stream, desktop computer 106 may be configured to process the communication data stream. For example, when a user on communication device 102 is conducting a video conference with another user on communication device 104, communication device 104 may transfer the processing of the video conference to desktop computer 106 if the battery power of communication device 104 falls below a preset threshold value, or

the processor of communication device 104 fails to process data. That is, the user on communication device 104 may utilize the input and output devices, *e.g.*, video camera, microphone, speaker, *etc.*, of desktop computer 106 to continue the video conference.

Wireless communication device 108 may refer to a physical device that may be configured to exchange information with communication device 104 wirelessly. Wireless communication device 108 may be implemented as telephones, cellphones, smart phones, personal digital assistant (PDA), or other forms of portable two-way radio transceivers. When communication device 104 experiences technical difficulties and may not be suitable for processing the real time communication data stream, wireless communication device 108 may be configured to process the real time communication data stream initiated between communication device 102 and communication device 104. For example, when the user on communication device 104, *e.g.*, a cellphone, is making phone call with another user on communication device 102, *e.g.*, another cellphone, and the battery of communication device 104 falls below a preset threshold value, or the processor of communication device 104 fails to process data, communication device 104 may transfer the processing of the data stream of the phone call to wireless communication device 108. That is, the user may utilize wireless communication device 108 to continue the phone call without interrupting the real time communication data stream.

Laptop computer 110 may refer to a portable computer that may be configured to exchange information with communication device 104 via network 105. Laptop computer 110 may include hardware components, such as web camera, microphone, speakers, integrated thereon so that the user of communication device 104 may utilize laptop computer 110 when communication device 104 is not suitable to continue processing the communication data stream between communication device 102 and communication device 104.

Threshold distance 112 may refer to a distance preset by communication device 104 so that communication devices within threshold distance 112 may establish a stable and robust connection with communication device 104.

Thus, **FIG. 1** shows an example system 100 that may include communication device 102 that communicates, via network 103, with communication device 104 that may be configured to relay the communication to, via network 105, desktop computer 106, wireless communication device 108, or laptop computer 110.

FIG. 2 shows an example communication device 104 by which data relay between communication devices may be implemented, arranged in accordance with at least some embodiments described herein. As depicted, example communication device 104 may include a load balancer 202, a

storage unit 203, a discovery module 204, a compression/decompression module 206, and a display module 208, each of which may be configured to interact with each other.

Load balancer 202 may refer to a software component, a hardware component, a firmware component, or a combination thereof that may be configured to transfer a real time communication data stream between communication device 102 and communication device 104 to other communication devices in accordance with at least one of a plurality of predetermined conditions that indicate unexpected technical difficulties. The plurality of predetermined conditions may include at least one of a battery power of communication device 104 falling below a preset threshold value, a processor of communication device 104 failing to process data stored thereon, a web camera of communication device 104 failing to capture images, *etc.* In accordance with some examples, load balancer 202 may select one from other communication devices discovered by discovery module 204. For example, when certain technical difficulties occur during a video conference between communication device 102 and communication device 104, *e.g.*, the microphone of communication device 104 stops working, load balancer 202 may select a communication device with a working microphone from the communication devices discovered by discovery module 204 and transfer, or relay, the real time communication data stream of the video conference to the selected communication device so that the user may continue the video conference without interruption.

Storage unit 203 may refer to a hardware component that may be configured to store identification information of the discovered communication devices. Storage unit 203 may be implemented as random access memory (RAM), hard disk, solid state drive (SSD), *etc.*

Discovery module 204 may refer to a software component, a hardware component, a firmware component, or a combination thereof that may be configured to discover other communication devices within threshold distance 112 of communication device 104. In accordance with some examples, discovery module 204 may be configured to discover laptop computers connected to communication device 104 via a Wi-Fi network, desktop computers connected to communication device 104 via a local area network, or a cellphone connected to communication device 104 via a Bluetooth connection within threshold distance 112 of communication device 104. The identification information of the communication devices may be submitted to storage unit 203 and stored thereon.

Compression/decompression module 206 may refer to a software component, a hardware component, a firmware component, or a combination thereof that may be configured to compress raw data collected by input devices of communication device 104 into one or more transferrable data

packets and decompress one or more data packets received from communication device 102 to raw data that may be processed by communication device 104.

Display module 208 may refer to a hardware component that may be configured to display contents received from communication device 102 or generated on communication device 104. For example, display module 208 may be configured to display a video stream of a video conference or an interface of a cellphone. In accordance with some examples, when communication device 104 transfers the real time communication data stream to one of other communication devices, compression/decompression module 206, display module 208, and other components, *e.g.*, web camera, microphone, *etc.*, may not be necessary for transferring. Thus, compression/decompression module 206, display module 208, and other components may be turned off to save power.

Thus, **FIG. 2** shows an example communication device 104 that may include load balancer 202, storage unit 203, discovery module 204, compression/decompression module 206, and display module 208.

FIG. 3 shows an example configuration of a processing flow 300 of operations by which data relay between communication devices may be implemented, arranged in accordance with at least some embodiments described herein. As depicted, processing flow 300 may include sub-processes executed by various components that are part of example systems 100. However, processing flow 300 is not limited to such components, and modification may be made by re-ordering two or more of the sub-processes described here, eliminating at least one of the sub-processes, adding further sub-processes, substituting components, or even having various components assuming sub-processing roles accorded to other components in the following description. Processing flow 300 may include various operation, functions, or actions as illustrated by one or more of blocks 302, 304, 306, and 308. Processing may begin at block 302.

Block 302 (Transmit Data Stream) may refer to communication device 104 transmitting a communication data stream between communication device 102 and communication device 104. In some examples, the communication data stream may be established and maintained via a service provider such as a server over a network or a cell in a cellular network. The communication data stream may include a real time video conference, a phone call, *etc.* Processing may continue from block 302 to block 304.

Block 304 (Discover Devices) may refer to discovery module 204 of communication device 104 discovering one or more communication devices within a predetermined distance, *e.g.*, threshold distance 112, of communication device 104. The one or more communication devices may be

communicatively coupled to communication device 104 in accordance with one or more communication protocols that include Bluetooth, NFC, RFID, Wi-Fi, *etc.* The method to discover the one or more communication devices may vary depending on the type of the communication protocols. For example, in discovering the one or more communication devices coupled to communication device 104 via a Bluetooth connection, communication device 104 may adopt Service Discovery Protocols (SDP) that allows communication device 104 to discover the services that the one or more communication devices support and the parameters to use to connect to the one or more communication devices. Identification information of the one or more communication devices may be stored in storage unit 203. Processing may continue from block 304 to block 306.

Block 306 (Determine Conditions) may refer to load balancer 202 determining that at least one of a plurality of predetermined conditions is met. The plurality of predetermined conditions may include a battery power of communication device 104 falling below a preset threshold value, a processor of communication device 104 failing to process data stored on communication device 104, a web camera of communication device 104 failing to capture pictures, *etc.* Processing may continue from block 306 to block 308.

Block 308 (Transfer Data) may refer to load balancer 202 transferring, *i.e.*, relaying, the communication data stream to one of the one or more discovered communication devices. When one of the aforementioned plurality of predetermined conditions is met, load balancer 202 may be configured to select one from the discovered communication devices and one protocol from a plurality of protocols based on a distance from communication device 104 to the selected communication device to transfer the communication data stream. For example, if the selected communication device is located within 10 meters, load balancer 202 may be configured to select Bluetooth as the protocol in transferring the communication data stream. In some examples, a user of communication device 104 may pre-select, or designate, one from discovered communication device before one of the plurality of predetermined conditions is met. For example, a user of communication device 104, *e.g.*, a first cellphone, may pre-select a second cellphone as a backup communication device since the user may foresee the battery power of the first cellphone may not last long enough for the phone call. When the battery power of the first cellphone drops below a predetermined threshold value, the first cellphone may start to transfer the phone call to the second cellphone. Meanwhile, all other components unnecessary for maintaining the phone call may be turned off. For example, compression/decompression module 206 and display module 208 may be turned off to save power.

Thus, **FIG. 3** shows an example configuration of a processing flow 300 of operations including transmitting a communication data stream between a service provider and communication device 104, discovering one or more communication devices within a predetermined distance of communication device 104, determining that at least one of a plurality of predetermined conditions is met, and
5 transferring the communication data stream to the second communication device, which is one of the discovered communication devices.

FIG. 4 shows a block diagram illustrating an example computing device that is arranged for data relay between communication devices, arranged in accordance with at least some embodiments described herein.

10 **FIG. 4** is a block diagram illustrating an example computing device 400 that is arranged for data relay in accordance with the present disclosure. In a very basic configuration 402, computing device 400 typically includes one or more processors 404 and a system memory 406. A memory bus 408 may be used for communicating between processor 404 and system memory 406.

Depending on the desired configuration, processor 404 may be of any type including but not
15 limited to a microprocessor (μ P), a microcontroller (μ C), a digital signal processor (DSP), or any combination thereof. Processor 404 may include one or more levels of caching, such as a level one cache 410 and a level two cache 412, a processor core 414, and registers 416. An example processor core 414 may include an arithmetic logic unit (ALU), a floating point unit (FPU), a digital signal processing core (DSP Core), or any combination thereof. An example memory controller 418 may also be used with
20 processor 404, or in some implementations memory controller 418 may be an internal part of processor 404.

Depending on the desired configuration, system memory 406 may be of any type including but not limited to volatile memory (such as RAM), non-volatile memory (such as ROM, flash memory, etc.) or any combination thereof. System memory 406 may include an operating system 420, one or more
25 applications 422, and program data 424. Application 422 may include a data relay method 426 that is arranged to perform the operations as described herein including those described with respect to processing flow 300 of **FIG. 3**. Program data 424 may include data relay information 428 that may be useful for configuring data relay algorithm as is described herein. In some embodiments, application 422 may be arranged to operate with program data 424 on operating system 420 such that
30 implementations of data relay communication devices may be provided as described herein. This described basic configuration 402 is illustrated in **FIG. 4** by those components within the inner dashed line.

Computing device 400 may have additional features or functionality, and additional interfaces to facilitate communications between basic configuration 402 and any required devices and interfaces. For example, a bus/interface controller 430 may be used to facilitate communications between basic configuration 402 and one or more data storage devices 432 via a storage interface bus 434. Data storage devices 432 may be removable storage devices 436, non-removable storage devices 438, or a combination thereof. Examples of removable storage and non-removable storage devices include magnetic disk devices such as flexible disk drives and hard-disk drives (HDD), optical disk drives such as compact disk (CD) drives or digital versatile disk (DVD) drives, solid state drives (SSD), and tape drives to name a few. Example computer storage media may include volatile and nonvolatile, removable and non-removable media implemented in any method or technology for storage of information, such as computer readable instructions, data structures, program modules, or other data.

System memory 406, removable storage devices 436 and non-removable storage devices 438 are examples of computer storage media. Computer storage media includes, but is not limited to, RAM, ROM, EEPROM, flash memory or other memory technology, CD-ROM, digital versatile disks (DVD) or other optical storage, magnetic cassettes, magnetic tape, magnetic disk storage or other magnetic storage devices, or any other medium which may be used to store the desired information and which may be accessed by computing device 400. Any such computer storage media may be part of computing device 400.

Computing device 400 may also include an interface bus 440 for facilitating communication from various interface devices (e.g., output devices 442, peripheral interfaces 444, and communication devices 446) to basic configuration 402 via bus/interface controller 430. Example output devices 442 include a graphics processing unit 448 and an audio processing unit 450, which may be configured to communicate to various external devices such as a display or speakers via one or more A/V ports 452. Example peripheral interfaces 444 include a serial interface controller 454 or a parallel interface controller 456, which may be configured to communicate with external devices such as input devices (e.g., keyboard, mouse, pen, voice input device, touch input device, etc.) or other peripheral devices (e.g., printer, scanner, etc.) via one or more I/O ports 458. An example communication device 446 includes a network controller 460, which may be arranged to facilitate communications with one or more other computing devices 462 over a network communication link via one or more communication ports 464.

The network communication link may be one example of a communication media. Communication media may typically be embodied by computer readable instructions, data structures,

program modules, or other data in a modulated data signal, such as a carrier wave or other transport mechanism, and may include any information delivery media. A “modulated data signal” may be a signal that has one or more of its characteristics set or changed in such a manner as to encode information in the signal. By way of example, and not limitation, communication media may include
5 wired media such as a wired network or direct-wired connection, and wireless media such as acoustic, radio frequency (RF), microwave, infrared (IR) and other wireless media. The term computer readable media as used herein may include both storage media and communication media.

Computing device 400 may be implemented as a portion of a small-form factor portable (or mobile) electronic device such as a cell phone, a personal data assistant (PDA), a personal media player
10 device, a wireless web-watch device, a personal headset device, an application specific device, or a hybrid device that include any of the above functions. Computing device 400 may also be implemented as a personal computer including both laptop computer and non-laptop computer configurations.

WE CLAIM:

1. A device, comprising:

a load balancer, communicatively coupled to a first communication device, configured to transfer a communication data stream between a service provider and the first communication device to a second communication device, in accordance with at least one of a plurality of predetermined conditions regarding at least one of the device or the second communication device; and

a storage unit configured to store identification information corresponding to the second communication device.

2. The device of Claim 1, further comprising a discovery module configured to discover one or more other communication devices, including the second communication device, within a predetermined distance of the first communication device.

3. The device of Claim 2, wherein the load balancer is further configured to select the second communication device from the one or more discovered communication devices.

4. The device of Claim 2, wherein the load balancer is further configured to transfer the communication data stream in accordance with one of a plurality of communication protocols based on a distance to the second communication device.

5. The device of Claim 4, wherein the plurality of communication protocols include Near Field Communication (NFC), Radio Frequency Identification (RFID), and Wireless Fidelity (Wi-Fi).

6. The device of Claim 1, wherein the second communication device is predetermined by a user of the device.

7. The device of Claim 1, wherein the plurality of predetermined conditions include at least one of a battery power of the first communication device falling below a preset threshold value, or a processor of the first communication device failing to process data stored on the first communication device.

8. A method, comprising:

transmitting a communication data stream between a service provider and a first communication device;

5 discovering one or more communication devices within a predetermined distance of a first communication device;

determining that at least one of a plurality of predetermined conditions is met; and

transferring the communication data stream to a second communication device, which is one of the discovered communication devices.

10 9. The method of Claim 8, comprising selecting the second communication device from the one or more communication devices.

10. The method of Claim 8, wherein the transferring comprises selecting one protocol from a plurality of communication protocols based on a distance from the first communication device to the
15 second communication device.

11. The method of Claim 10, wherein the plurality of communication protocols include Near Field Communication (NFC), Radio Frequency Identification (RFID), and Wireless Fidelity (WIFI).

20 12. The method of Claim 8, wherein the plurality of predetermined conditions include a battery power of the first communication device falling below a preset threshold, or a processor of the first communication device failing to process data stored on the first communication device.

25 13. The method of Claim 8, wherein the second communication device is predetermined by a user.

14. A computer-readable medium storing instructions that, when executed, cause one or more processors to perform operations comprising:

determining at least one of a plurality of predetermined conditions is met;

30 selecting a second communication device within a predetermined distance of a first communication device; and

relaying a communication data stream between the first communication device and a calling party to the second communication device.

15. The computer-readable medium of Claim 14, wherein the plurality of predetermined conditions include:

a battery power of the first communication device falling below a preset threshold, and

a processor of the first communication device failing to process data stored on the first communication device

16. The computer-readable medium of Claim 14 further comprising selecting the second communication device from one or more communication devices within the predetermined distance of the first communication device.

17. The computer-readable medium of Claim 14, wherein the relaying comprises selecting one from a plurality of communication protocols based on the distance.

18. The computer-readable medium of Claim 17, wherein the plurality of communication protocols include Near Field Communication (NFC), Radio Frequency Identification (RFID), and Wireless Fidelity (WIFI).

19. The computer-readable medium of Claim 14, wherein the second communication device is predetermined by a user.

20. A system, comprising:

a first communication device communicating with a calling party;

one or more communication devices located within a distance of the first communication device;

a second communication device selected from the one or more communication devices; and

a load balancer configured to transfer a communication data stream between the first communication device and the calling party to the second communication device when at least one of a plurality of conditions is met,

wherein the plurality of conditions include a battery power of the first communication device falling below a preset threshold and a processor of the first communication device failing to process data stored on the first communication device.

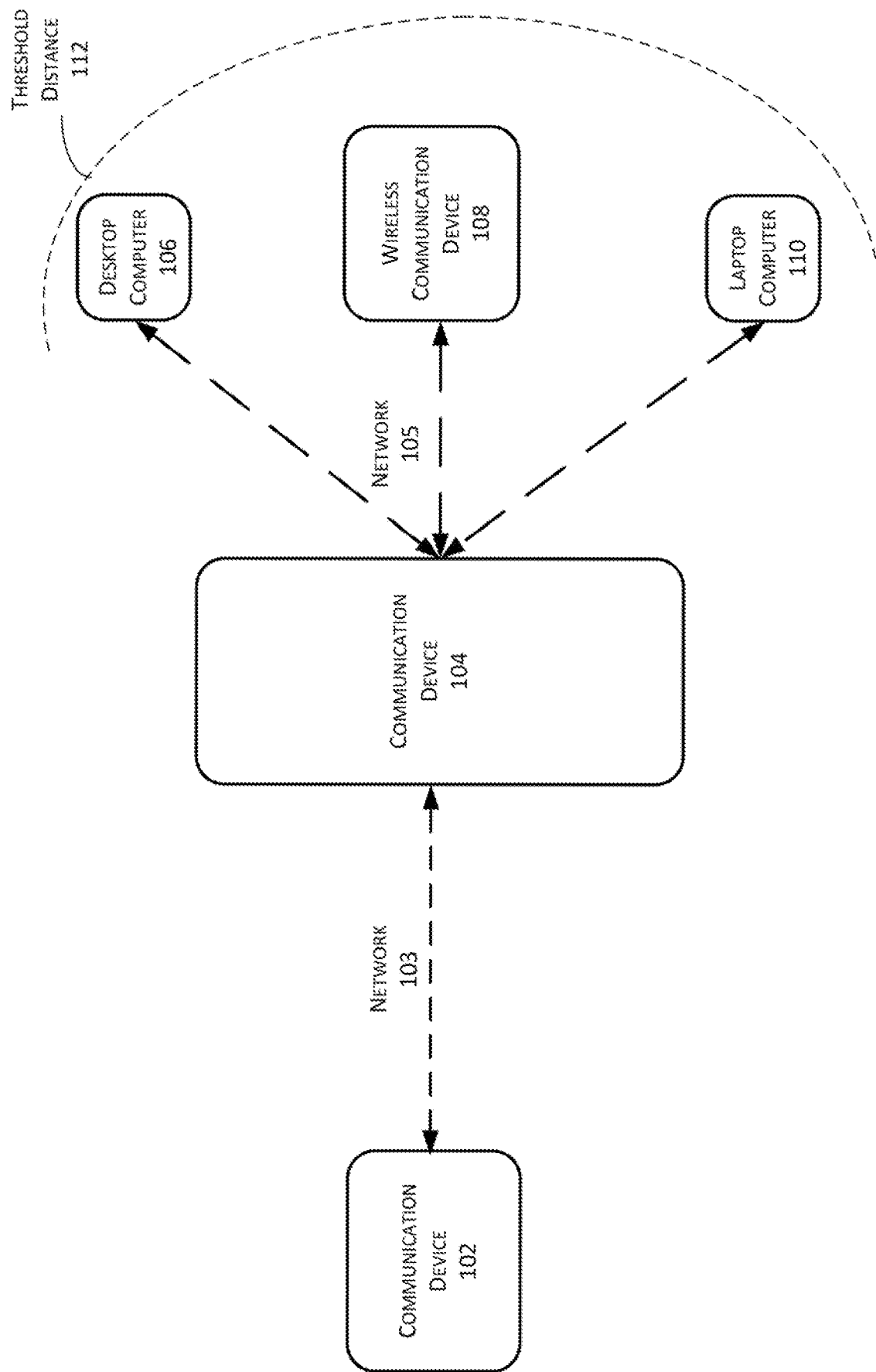
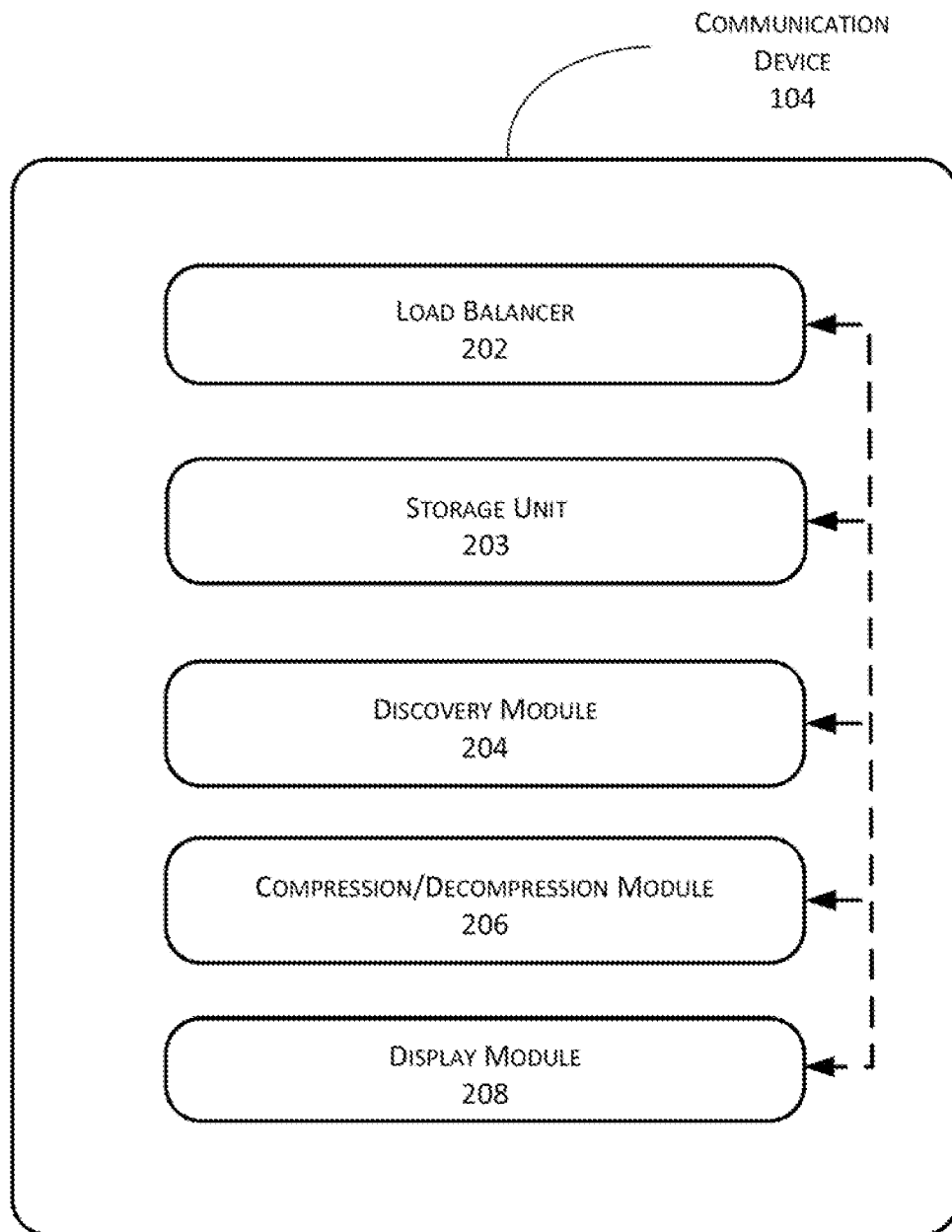
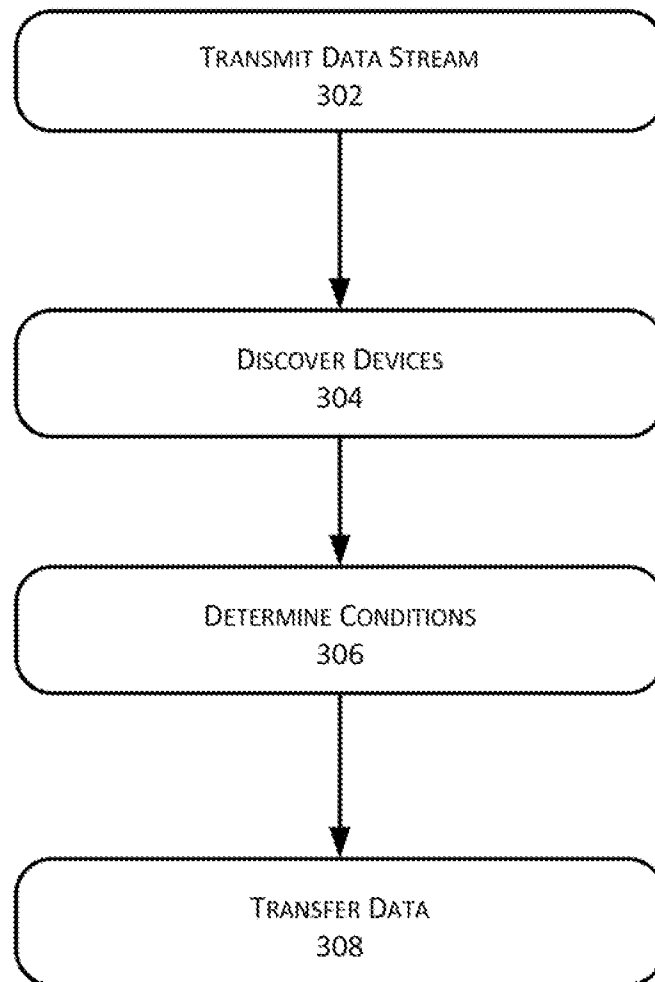


FIG. 1

200**FIG. 2**

300**FIG. 3**

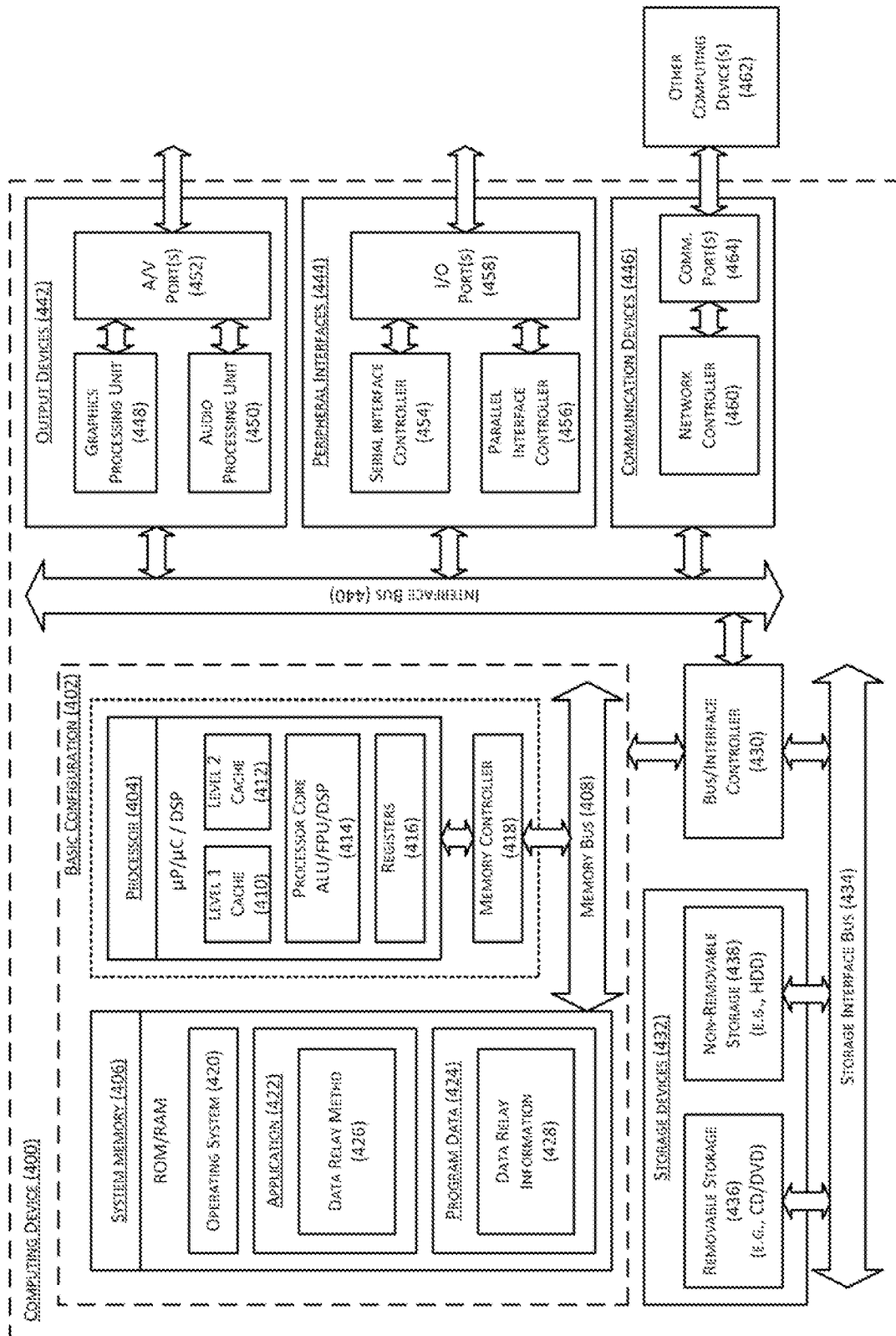


FIG. 4

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2013/081162

A. CLASSIFICATION OF SUBJECT MATTER

H04W 88/04 (2009.01) i

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)

H04L; H04W; H04Q

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)

CNPAT, CNKI, WPI, EPODOC, GOOGLE, ISI: terminal, device, communication, wireless, relay, transfer, processor, data, battery, power

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1819099A1 (NTT DOCOMO, INC.) 15 August 2007 (2007-08-15) description, paragraphs [0021]-[0061], and figures 1-4	1-20
A	EP 2395810A1 (NTT DOCOMO, INC.) 14 December 2011 (2011-12-14) the whole document	1-20
A	WO 2012069924A1 (RESEARCH IN MOTION LIMITED ET AL.) 31 May 2012 (2012-05-31) the whole document	1-20
A	CN 102714876A (NTT DOCOMO, INC.) 03 October 2012 (2012-10-03) the whole document	1-20

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

“A”	document defining the general state of the art which is not considered to be of particular relevance	“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
“E”	earlier application or patent but published on or after the international filing date	“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
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Date of the actual completion of the international search

21 April 2014

Date of mailing of the international search report

28 May 2014

Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/CN2013/081162

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