(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
12 November 2015 (12.11.2015)

WIPO | PCT

(10) International Publication Number
WO 2015/170928 A1

(51) International Patent Classification:
H04N 7/14 (2006.01)

(21) International Application Number:
PCT/KR2015/004637

(22) International Filing Date:
8 May 2015 (08.05.2015)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
10-2014-0054716 8 May 2014 (08.05.2014) KR
10-2015-0053794 16 April 2015 (16.04.2015) KR

(71) Applicant: **SAMSUNG ELECTRONICS CO., LTD.** [KR/KR]; 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do 16677 (KR).

(72) Inventors: **OH, Gyu-Bong**; #710-302, Salgugol 7-danji APT., 1526, Bongyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do 443-736 (KR). **JUNG, Kyung-Hun**; #19-615, Eunma APT., 212, Samseong-ro, Gangnam-gu, Seoul 135-969 (KR). **JIN, Jong-Hyun**; #112-503, Baekhyeon-maeul 1-danji Prugio Grandbleu APT., 123, Dongpangyo-, ro, Bundang-gu, Seongnam-si, Gyeonggi-do 463-881 (KR). **YU, Han-Il**; #103-1004, Cheongsolmaeul Yeong-nam APT., 8, Seongnam-daero 171beon-gil, Bundang-gu, Seongnam-si, Gyeonggi-do 463-719 (KR). **CHA, Soon-Hyun**; #106-1909, Gyeongnam honorsville APT., 8, Gyeongsu-daero 1219beon-gil, Manan-gu, Anyang-si, Gyeonggi-do 430-721 (KR). **YUN, Jae-Seung**; #4207-1302, Gwanggyo Sangnok Xi APT., 62, Gwanggyomaeul-ro, Suji-gu, Yongin-si, Gyeonggi-do 448-130 (KR).

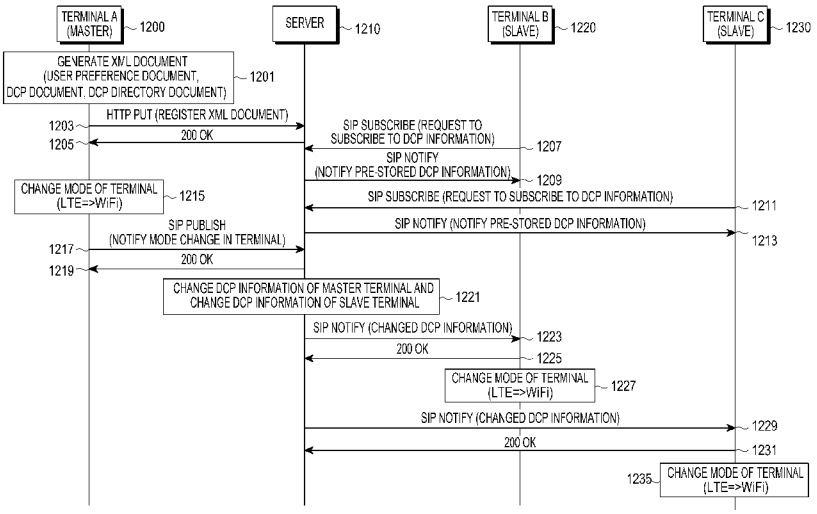
(74) Agents: **LEE, Keon-Joo** et al.; Mihwa Bldg., 16 Dae-hak-ro 9-gil, Chongro-gu, Seoul 110-524 (KR).

(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, IR, IS, JP, KE, KG, KN, KP, KZ, LA, LC, LK, LR, LS, 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, ST, 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).

[Continued on next page]

(54) Title: APPARATUS AND METHOD FOR CHANGING MODE OF DEVICE



(57) Abstract: The present disclosure relates to a sensor network, Machine Type Communication (MTC), Machine-to-Machine (M2M) communication, and technology for Internet of Things (IoT). The present disclosure may be applied to intelligent services based on the above technologies, such as smart home, smart building, smart city, smart car, connected car, health care, digital education, smart retail, security and safety services. Methods and apparatuses are provided for changing a mode of a device by a server. The server receives, from a master device, at least one of a user preference document including information related to whether mode synchronization is activated between devices, a device context profile (DCP) document including a rule applied per mode, and a DCP directory document including information related to a profile activated in the DCP document. The at least one of the user preference document, the DCP document, and the DCP directory document is registered. When information related to changing a mode of the master device is received, the at least one of the user preference document, the DCP document, and the DCP directory document is changed based on the changed mode of the master device. The at least one of the changed user preference document, the changed DCP document, and the changed DCP directory document is transmitted to at least one slave device.

WO 2015/170928 A1

Published:

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

Description

Title of Invention: APPARATUS AND METHOD FOR CHANGING MODE OF DEVICE

Technical Field

[1] The present disclosure relates generally to video call systems, and more particularly, to apparatuses and methods for controlling multi-view images in video call systems, and for collectively changing modes of devices carried by a user.

Background Art

[2] The development of data transmission technology between portable terminals has enabled video calling through which a portable terminal user may make a face-to-face call with another party. Video calling may apply to video conference systems to allow easy conferencing among users in remote sites. Video calling may also be integrated with a number of techniques, such as, for example, the "dual video call" technique in which the user's face and captured objects can be shown to the other party on the same screen, thereby offering the user more diversified and convenient video call services.

[3] A video call basically involves one or more pictures-in-picture (PIPs) in addition to the image transmitted in real-time from the terminal or server. However, a method does not exist for moving the PIP on the screen or turning on/off an individual PIP on the phone.

[4] The Internet is evolving from the human-centered connection network by which humans create and consume information to the Internet of things (IoT) network by which information is communicated and processed between things or other distributed components. The Internet of everything (IoE) technology is an example of a combination of big data processing technology and IoT technology through, for example, a connection with a cloud server.

[5] To implement the IoT, technology elements, such as, for example, a sensing technology, wired/wireless communication and network infra, service interface technology, and a security technology, are required. Inter-object connection technologies include, for example, the sensor network, machine-to-machine (M2M), or machine-type communication (MTC).

[6] The IoT environment may offer intelligent Internet technology (IT) services that collect and analyze the data generated by the things connected with one another. The IoT may have various applications, such as, for example, the smart home, smart building, smart city, smart car or connected car, smart grid, health-care, or smart appliance industry, or state-of-art medical services, through conversion or integration of existing IT technologies and various industries.

[7] The user may own various devices including an IoT device, a wearable device, or an electric-health (e-health) device, and may be served with various convenient services through such devices.

Disclosure of Invention

Technical Problem

[8] However, when the user carrying a plurality of devices moves from a network that is currently providing a service to another network, for example upon moving from a long term evolution (LTE) network to a wireless fidelity (Wi-Fi) network, the user is required to individually change network modes on each of the devices.

[9] Since the user is required individually change network modes for each device, it is nearly impossible to adjust the LTE data usage per device.

[10] Further, the user is required to make these individual mode changes for each of the devices even when the devices are changed into an airplane mode, a sleep mode, or a roaming mode.

Solution to Problem

[11] The present invention has been made to address at least the above problems and/or disadvantages and to provide at least the advantages described below. Accordingly, an aspect of the present invention provides a method and an apparatus for controlling a multi-view image in a video call system.

[12] Another aspect of the present invention provides a method and an apparatus for controlling a PIP included in a multi-view image in a video call system.

[13] Another aspect of the present invention provides a method and an apparatus for moving, on the screen, a PIP included in a multi-view image in a video call system.

[14] Another aspect of the present invention provides a method and an apparatus for individually turning on/off a PIP included in a multi-view image in a video call system.

[15] Another aspect of the present invention provides a method and an apparatus for adjusting the size of a PIP included in a multi-view image in a video call system.

[16] Another aspect of the present invention provides a method and an apparatus for changing modes of devices.

[17] Another aspect of the present invention provides a method and an apparatus for collectively changing modes of at least two slave devices.

[18] According to an embodiment of the present invention, a terminal is provided for controlling a multi-view image in an image communication system. The terminal includes a receiving unit configured to receive, from an opposing terminal, a first message comprising information related to a number of cameras in the opposing terminal and information related to a number of images that may be displayed by the opposing terminal among images provided by the terminal, and to receive, from the opposing

terminal a second message comprising a camera identifier field indicating a unique number of a camera of the cameras in the opposing terminal and a request field requesting to control an image taken by the camera indicated by the camera identifier field. The terminal also includes a controller configured to control the image taken by the camera indicated by the camera identifier field based on values of the camera identifier field and the request field.

[19] According to another embodiment of the present invention, a terminal is provided for controlling a multi-view image in an image communication system. The terminal includes a transmitting unit configured to transmit a first message and a second message, the first message comprising information related to a number of cameras in the terminal and information related to a number of images that may be displayed by the terminal among images provided by an opposing terminal, the second message comprising a camera identifier field and a request field. The terminal also includes a controller configured to set the camera identifier field to indicate a unique number of a camera of the cameras in the terminal and to set the request field to request to control an image taken by the camera indicated by the camera identifier field, based on a predetermined event, when the predetermined event occurs.

[20] According to another embodiment of the present invention, a method is provided for changing a mode of a device by a server. The server receives, from a master device, at least one of a user preference document including information related to whether mode synchronization is activated between devices, a device context profile (DCP) document including a rule applied per mode, and a DCP directory document including information related to a profile activated in the DCP document. The at least one of the user preference document, the DCP document, and the DCP directory document is registered. When information related to changing a mode of the master device is received, the at least one of the user preference document, the DCP document, and the DCP directory document is changed based on the changed mode of the master device. The at least one of the changed user preference document, the changed DCP document, and the changed DCP directory document is transmitted to at least one slave device.

[21] According to another embodiment of the present invention, a method for changing a mode of a slave device by a master device. A server generates at least one of a user preference document including information related to whether mode synchronization is activated between devices, a DCP document including a rule applied per mode, and a DCP directory document including information related to a profile activated in the DCP document. The at least one of the user preference document, the DCP document, and the DCP directory document is registered in the server. When a mode of the master device is changed, the at least one of the user preference document, the DCP document, and the DCP directory document, which is changed based on the changed

mode of the master device, is transmitted to at least one slave device through the server.

[22] According to another embodiment of the present invention, a server is provided for changing a mode of a device. The server includes a receiving unit configured to receive, from a master device, and at least one of a user preference document including information related to whether mode synchronization is activated between devices, a DCP document including a rule applied per mode, and a DCP directory document including information related to a profile activated in the DCP document. The server also includes a storage configured to register the at least one of the user preference document, the DCP document, and the DCP directory document. The server additionally includes a controller configured to, when information related to changing a mode of the master device is received, change the at least one of the registered user preference document, the DCP document, and the DCP directory document based on the changed mode of the master device. The server further includes a transmitting unit configured to transmit the at least one of the changed user preference document, the changed DCP document, and the changed DCP directory document to at least one slave device.

[23] According to another embodiment of the present invention, a master device is provided for changing a mode of a slave device. The master device includes a controller configured to generate and register, in a server, at least one of a user preference document including information related to whether mode synchronization is activated between devices, a DCP document including a rule applied per mode, and a DCP directory document including information related to a profile activated in the DCP document. The master device also includes a transmitting unit configured to, when a mode of the master device is changed, transmit the at least one of the user preference document, the DCP document, and the DCP directory document, which is changed based on the changed mode of the master device to at least one slave device through the server.

[24] According to another embodiment of the present invention, a method is provided for changing a mode by a slave device. A DCP information subscribe request is transmitted to a server requesting at least one of a user preference document including information related to whether mode synchronization is activated between devices, a DCP document including a rule applied per mode, and a DCP directory document including information related to a profile activated in the DCP document. The at least one of the user preference document, the DCP document, and the DCP directory document is received from the server. Upon receiving, from the server, at least one of a changed user preference document, a changed DCP document, and a changed DCP directory document, changed based on a mode change in a master device, a mode of

the slave device is changed based on the at least one of the changed user preference document, the changed DCP document, and the changed DCP document.

[25] According to another embodiment of the present invention, a slave device is provided for changing a mode based on a master device. The slave device includes a transmitting unit configured to transmit, to a server, a DCP information subscribe request requesting at least one of a user preference document including information related to whether mode synchronization is activated between devices, a DCP document including a rule applied per mode, and a DCP directory document including information related to a profile activated in the DCP document. The slave device also includes a receiving unit configured to receive, from the server, the at least one of the user preference document, the DCP document, and the DCP directory document. The slave device further includes a controller configured to, upon receiving, from the server, at least one of a changed user preference document, a changed DCP document, and a changed DCP directory document, changed based on a mode change in a master device, changing a mode of the slave device based on the at least one of the changed user preference document, the changed DCP document, and the changed DCP directory document.

Brief Description of Drawings

[26] The above and other aspects, features, and advantages of the present invention will be more apparent from the following detailed description when taken in conjunction with the accompanying drawings, in which:

[27] FIG. 1 is a diagram illustrating Internet protocol multimedia subsystem sessions negotiated between terminals in a video call system;

[28] FIG. 2 is a diagram illustrating a format of a control message transmitted for controlling a multi-view video call in a video call system;

[29] FIG. 3 is a diagram illustrating a terminal relocating a PIP included in a multi-view image in a video call system, according to an embodiment of the present invention;

[30] FIGS. 4a and 4b are diagrams illustrating a terminal changing the size of a PIP included in a multi-view image in a video call system, according to another embodiment of the present invention;

[31] FIGS. 5a and 5b are diagrams illustrating a terminal individually turning on/off a PIP included in a multi-view image in a video call system, according to another embodiment of the present invention;

[32] FIG. 6 is a flowchart illustrating an operation in which a transmitting terminal controls a PIP included in a multi-view image provided to a receiving terminal in a video call system, according to an embodiment of the present invention;

[33] FIG. 7 is a flowchart illustrating an operation in which a receiving terminal transmits,

to a transmitting terminal, a message for controlling a PIP included in a multi-view image in a video call system, according to an embodiment of the present invention;

[34] FIG. 8 is a diagram illustrating a user setting a network mode of a device group in a communication system, according to another embodiment of the present invention;

[35] FIG. 9 is a diagram illustrating a user setting an airplane mode of a device group in a communication system, according to another embodiment of the present invention;

[36] FIG. 10 is a diagram illustrating a user setting a sleep mode of a device group in a communication system, according to another embodiment of the present invention;

[37] FIG. 11 is a diagram illustrating a user setting a manner mode of a device group in a communication system, according to another embodiment of the present invention;

[38] FIG. 12 is a signal flowchart illustrating a procedure in which a master device changes modes of a slave device in a communication system, according to another embodiment of the present invention;

[39] FIG. 13 is a flowchart illustrating an operation in which a master device changes modes of a slave device in a communication system, according to another embodiment of the present invention;

[40] FIG. 14 is a flowchart illustrating an operation in which a slave device changes modes in a communication system, according to another embodiment of the present invention;

[41] FIG. 15 is a flowchart illustrating an operation in which a server changes modes of a slave device in a communication system, according to another embodiment of the present invention;

[42] FIG. 16 is a diagram illustrating a user preference document constituting an extensible markup language (XML) document for configuring a terminal context;

[43] FIGS. 17a-17d is a diagram illustrating a DCP document constituting an XML document for configuring a terminal context;

[44] FIG. 18 is a diagram illustrating an example of a DCP directory constituting an XML document for configuring a terminal context of a device group;

[45] FIGS. 19a-19d are diagrams illustrating a DCP directory document constituting an XML document for configuring a terminal context of a device group;

[46] FIG. 20 is a block diagram illustrating an internal configuration of a device (e.g., a terminal) changing modes in a communication system, according to another embodiment of the present invention; and

[47] FIG. 21 is a block diagram illustrating an internal configuration of a server changing modes of a device in a communication system, according to another embodiment of the present invention.

Best Mode for Carrying out the Invention

[48] Embodiments of the present invention are described in detail with reference to the accompanying drawings. The same or similar components may be designated by the same or similar reference numerals although they are illustrated in different drawings. Detailed descriptions of constructions or processes known in the art may be omitted to avoid obscuring the subject matter of the present invention.

[49] FIG. 1 is a diagram illustrating Internet protocol multimedia subsystem sessions negotiated between terminals in a video call system.

[50] In connection with FIG. 1, IMS sessions are negotiated between a transmitting terminal, i.e., terminal A 100, connected to operator A's Internet protocol multimedia subsystem (IMS) 120, and a receiving terminal, i.e., terminal B 110, connected to operator B's IMS 130.

[51] Terminal A 100 transmits a session description protocol (SDP) offer message for IMS session negotiation to terminal B 110 through operator A's IMS 120. Terminal B 110 receives the SDP offer message through operator B's IMS 130 and transmits an SDP response message to terminal A 100. Terminal A 100 receives the SDP response message through operator A's IMS 120.

[52] Operator A's IMS 120 includes an application server (AS) 121 for managing additional services, a proxy-call session control function (P-CSCF) 125 for exchanging session initiation protocol (SIP)/SDP messages with each terminal, and a serving-CSCF (S-CSCF) 123 for managing all operations related to the IMS. Operator B's IMS 130 includes a home subscriber server (HSS)/subscription locator function (SLF) 131 for managing subscribers' information, an AS 133 for managing additional services, an interrogating-CSCF (I-CSCF) 135 for managing moves of SDP/SIP messages, an S-CSCF 137 for managing all operations related to the IMS, and a P-CSCF 139 for exchanging SIP/SDP messages.

[53] Terminal A 100 and terminal B 110 establish a media path using the entities included in the respective IMSs 120 and 130, and exchange the SDP offer message and SDP response message through an established media path 150. Specifically, terminal A 100 transfers the SDP offer message to the P-CSCF 125 through a packet switched (PS) domain 127 and a random access network (RAN) 129, and the P-CSCF 125 delivers the SDP offer message to the S-CSCF 123. The S-CSCF 123 transfers the SDP offer message to the AS 121 and the I-CSCF 135 included in operator B's IMS 130. The I-CSCF 135 transfers the SDP offer message to the HSS/SLF 131 and the S-CSCF 137, and the S-CSCF 137 transfers the SDP offer message to the AS 133 and the P-CSCF 139. Terminal B 110 receives the SDP offer message transferred from the P-CSCF 139 through a PS domain 141 and a RAN 143.

[54] Terminal B 110 having received the SDP offer message then transfers an SDP response message corresponding to the SDP offer message to the P-CSCF 139 through

the PS domain 141 and the RAN 143, and the P-CSCF 139 transfers the SDP response message to the S-CSCF 137. The S-CSCF 137 transfers the SDP response message to the AS 133 and the I-CSCF 135, and the I-CSCF 135 transfers the SDP response message to the HSS/SLF 131 and the S-CSCF 123 included in operator A's IMS 120. The S-CSCF 123 transfers the SDP response message to the AS 121 and the P-CSCF 125, and terminal A receives the SDP response message transferred from the P-CSCF 125 through the PS domain 127 and the RAN 129.

[55] An example of the SDP offer message transmitted from terminal A 100 to terminal B 110 for IMS session negotiation is shown in Table 1 below. In Table 1, an example of an SDP offer message transmitted for a multi-view video call is shown, and the term "multi-view" means configuring and displaying two or more images respectively taken by cameras on the same screen.

[56] Table 1

[Table 1]

SDP offer
m=video 49154 RTP/AVPF 99 b=AS:512 b=RS:0 b=RR:2500 a=rtpmap:99 H264/90000 a=fmtp:99 packetization-mode=0; profile-level-id=42e00c a=imageattr:99 send [x=320,y=240] [x=640,y=480] recv [x=320,y=240] [x=640,y=480] **a=MVC:99 send 3 recv**

[57] In Table 1, the SDP offer message indicates that terminal A 100 supports the H.264 video codec and proposes to transmit packets including related images and real-time transmission protocol (RTP)/UDP/IP headers at a bit rate of 512 kbps and to transmit a real-time transmission control protocol (RTCP) receiver report (RR) at 2500 bps. Further, the SDP offer message proposes to use one resolution of 640x480 and 320x240. In particular, the last line of the SDP offer message indicates that terminal A 100 has three cameras and is able to provide three images respectively taken by the cameras to terminal B 110.

[58] An example of an SDP response message transmitted from terminal B 110 to terminal A 100 in response to the SDP offer message is as shown in Table 2 below.

[59] Table 2

[Table 2]

SDP answer
m=video 49154 RTP/AVPF 99
b=AS:512
b=RS:0
b=RR:2500
a=rtpmap:99 H264/90000
a=fmtp:99 packetization-mode=0; profile-level-id=42e00c
a=imageattr:99 send [x=640,y=480] recv [x=640,y=480]
a=MVC:99 send 2 recv 3

[60] In Table 2, the SDP response message indicates that terminal B 110 selects the bit rate, 512 kbps, proposed by terminal A 100 and selects 640x480 of the resolutions proposed by terminal A 100. Further, the last line of the SDP response message indicates that terminal B 110 may provide two images to terminal A 100 using two cameras and may display three images provided from terminal A 100. The SDP response message of Table 2 is provided as an example, and depending on the selection of terminal B 110, the SDP response message may indicate that a bit rate smaller than the bit rate, 512kbps, proposed by terminal A 100 is selected and 320x240 of the resolutions proposed by terminal A 100 is selected. Further, the last line of the SDP response message may be set to "recv 2" to indicate that only two of the three images provided from terminal A 100 may be displayed, or the last line of the SDP response message may be set to "recv 1" to indicate that only one of the three images provided from terminal A 100 may be displayed.

[61] As such, terminal A 100 and terminal B 110 exchange the SDP offer message and the SDP response message between each other and negotiate the number of images each may display and the number of images each may provide to its opposing terminal.

[62] FIG. 2 is a diagram illustrating a format of a control message transmitted for controlling a multi-view video call in a video call system.

[63] Referring to FIG. 2, a multiview video call (MVC) control message 200 is transmitted in an RTCP packet. The MVC control message 200 includes a two-bit version (V) field 201, a one-bit padding bit (P) field 203, a five-bit subtype field 205, a one-byte packet type (PT) field 207, a two-byte length 209, a four-byte synchronization source (SSRC) of packet source field 211, a four-byte SSRC of media source field 213, a three-bit request field 215, a three-bit camera identifier (CAM ID) field 217, and a 26-bit control field 219.

[64] The V field 210 indicates the version of the RTP, the P field 203 indicates the padding bit, the subtype field indicates the type of MVC control message 200, the PT

field 207 indicates the type of the MVC control message 200, the length field 209 indicates the length of the MVC control message 200, the SSRC of packet source field 211 indicates which sends the packet source, and the SSRC of media source field 213 indicates which receives a media source.

[65] The request field 215 transmits a command for controlling a PIP included in the multi-view image displayed on a terminal in the MVC to an opposing terminal. The request field 215 may transmit various requests, depending on its set values, as shown Table 3 below.

[66] Table 3

[Table 3]

Request field values	Description
000	Request to turn off image taken by camera indicated by CAM ID field
001	Request to turn on image taken by camera indicated by CAM ID field
010	Request to move image taken by camera indicated by CAM ID field
011	Request to change the size of image taken by camera indicated by CAM ID field
100	Request to set image taken by camera indicated by CAM ID field as background screen
101-110	Reserved
111	Indicate that the request by opposing terminal for image taken by camera has been performed

[67] FIG. 3 is a diagram illustrating a terminal relocating a PIP included in a multi-view image in a video call system, according to an embodiment of the present invention.

[68] Referring to FIG. 3, it is assumed that the user of the terminal performs an MVC with the opposing terminal, and that the opposing terminal has two cameras. Accordingly, a multi-view image that is transmitted from the opposing terminal while the MVC is performed includes an image (denoted as 1/2) taken by a first camera of the opposing terminal, which is a background screen, and an image (denoted as 2/2) taken by a second camera of the opposing terminal, which is a PIP. It is also assumed that the left and upper coordinates (X1,Y1) of the image (2/2) at first position 301 are (200,200). The coordinate X1 indicates the horizontal-axis coordinate of the screen displayed to the user of the terminal, and the coordinate Y1 indicates the vertical coordinate of the screen.

[69] The user of the terminal may freely move the image (2/2) taken by the second camera anywhere in the screen. For example, when the user intends to relocate the image from the first position 301 to a second position 302, the user may do so by dragging the image to the second position 302. Although it is described that the user moves the image to the second position 302 by performing a dragging operation, any other operation may also be applied to relocate the image from the first position 301 to the second position 302.

[70] If the above-described event occurs, the terminal generates vector values for the direction along which the image moves. For example, assuming that the left and upper coordinates (X2,Y2) for the image (2/2) moved to the second position 302 are (10,800), the terminal generates values (-190,600) of a vector (X2-X1,Y2-Y1) using the left and upper coordinates (X2,Y2) for the image (2/2) moved to the second position 302 and the left and upper coordinates (X1,Y1) for the image (2/2) at the first position 301.

[71] The terminal sets each of the request field, CAM ID field, and control field of the MVC control message, and transmits to the opposing terminal in order to control the PIP included in the multi-view image according to the event. That is, the terminal sets the request field to '010' requesting movement of the PIP image, sets the CAM ID field to '010' indicating the camera that captures the moved image, i.e., the second camera, and sets the X field and Y field, respectively, of the control field to the vector values, (-190,600), of the moved image. The X field and the Y field each have 13 bits, and the first bit of the 13 bits indicates the sign (+,-) of the vector value, and the remaining twelve bits indicate the absolute value of the vector value.

[72] Upon receiving the MVC control message configured as above, the opposing terminal identifies the request field, CAM ID field, and control field values, and moves the image taken by the second camera, as indicated by the CAM ID field value, '010,' to the second position 302 according to the vector values (-190,600) indicated by the control field.

[73] The opposing terminal then sets each of the request field and control field included in the MVC control message, and transmits the same to the terminal. That is, the opposing terminal sets the request field to '111' indicating that the request from the terminal for the camera image has been performed, and sets the X field and Y field of the control field to the vector values, (-190,600), respectively, of the moved image.

[74] FIGS. 4a and 4b are diagrams illustrating a terminal changing the size of a PIP included in a multi-view image in a video call system, according to another embodiment of the present invention.

[75] Referring to FIGS. 4a and 4b, it is assumed that the user of the terminal performs an MVC with the opposing terminal, and that the opposing terminal has three cameras.

Accordingly, as shown in FIG. 4a, a multi-view image that is transmitted from the opposing terminal while the MVC is performed includes an image (denoted as 1/3) taken by a first camera of the opposing terminal, which is a background screen, an image (denoted as 2/3) taken by a second camera of the opposing terminal, which is a PIP, and an image (denoted as 3/3) taken by a third camera of the opposing terminal. It is also assumed that the left and upper coordinates (X1,Y1) of an image 401 denoted as 2/3 are (200,200), and the size of the image 401 is 200x200 pixels. The coordinate X1 indicates the horizontal-axis coordinate of the screen displayed to the user of the terminal, and the coordinate Y1 indicates the vertical coordinate of the screen.

[76] The user of the terminal may freely adjust the size of the image 401 (2/3) and the size of image 403 (3/3) included in the displayed screen. For example, when the user intends to magnify the size the image 401 denoted as 2/3, the user may increase the size of the image 401 to the size of image 402 denoted as 2/3 in FIG. 4b by simultaneously touching two fingers to the image 401 and then expanding the interval between the fingers. Although an embodiment is described in which the user magnifies the size of the image 401 by simultaneously touching two fingers and then expanding the interval between the fingers, any other methods may be applied to magnify or shrink the image 401. For example, the user may increase or reduce the size of the image 401 by dragging one of the other vertexes that serve as a reference in the image 401.

[77] If the above-described event occurs, the terminal determines, for each of the horizontal direction and the vertical direction, a ratio of the distance between the two fingers at a first time when the two fingers are simultaneously touched to the distance between the two fingers at a second time after the interval between the two fingers is adjusted. It is assumed that the ratio in distance between the first time and the second time for each of the horizontal direction and the vertical direction is 1:2, meaning that the size of the image is magnified two times for each of the horizontal direction and the vertical direction.

[78] The terminal sets each of the request field, CAM ID field, and control field of the MVC control message, and transmits to the opposing terminal in order to control the PIP included in the multi-view image. That is, the terminal sets the request field to '011', requesting to change the size of the PIP, sets the CAM ID field to '010', indicating the camera that is capturing the size-changed image, i.e., the second camera, and sets the width field and height field of the Control field to values indicating a ratio at which the image is magnified in the horizontal direction and vertical direction. Specifically, the width field and the height field each are configured with 13 bits, and the width field value and the height field value are each set to 2.

[79] When receiving the MVC control message configured as described above, the

opposing terminal identifies the CAM ID field and control field values. The opposing terminal magnifies the image taken by the second camera indicated with the CAM ID field value, '010,' i.e., the image 401 of FIG. 4a, twice for each of the horizontal direction and vertical direction with respect to the coordinates (200,200).

[80] The opposing terminal then sets each of the request field and control field included in the MVC control message, and transmits the same to the terminal. That is, the opposing terminal sets the request field to '111' indicating that the request from the terminal for the camera image has been performed, and sets each of the width field and height field of the control field to 2.

[81] FIGS. 5a and 5b are diagrams illustrating a terminal individually turning on/off a PIP included in a multi-view image in a video call system, according to an embodiment of the present invention.

[82] Referring to FIGS. 5a and 5b, it is assumed that the user of the terminal performs an MVC with the opposing terminal, and that the opposing terminal has three cameras. Accordingly, as shown in FIG. 5a, a multi-view image that is transmitted from the opposing terminal while the MVC is performed includes an image (denoted as 1/3) taken by a first camera of the opposing terminal, which is a background screen, an image (denoted as 2/3) taken by a second camera of the opposing terminal, which is a PIP, and an image (denoted as 3/3) taken by a third camera of the opposing terminal.

[83] The user of the terminal may individually turn on/off the images 501 and 503 included in the displayed screen. For example, when the user intends to turn off the image 501, denoted as 2/3, i.e., intends to remove the image 501 from the displayed screen, the user may do so by touching the image 501 two consecutive times, as shown in FIG. 5b. Although an embodiment is described in which the user removes the image 501 from the displayed screen by touching the image 501 two consecutive times, as an example, any other operation may be applied to turn off the image 501.

[84] If the above-described event occurs, the terminal sets each of the request field and CAM ID field of the MVC control message, and transmits to the opposing terminal in order to control the PIP included in the multi-view image according to the event. That is, the terminal sets the request field to '000', requesting to turn off the PIP on the displayed screen, and sets the CAM ID field to '010', indicating the camera that captures the PIP image to be turned off, i.e., the second camera. In this case, all the bits constituting the control field included in the MVC control message are set to 0.

[85] Upon receiving the MVC control message configured as described above, the opposing terminal identifies the request field and CAM ID field and removes the image taken by the second camera, as indicated by the CAM ID field value, '010,' from the displayed screen.

[86] The opposing terminal sets the request field included in the MVC control message to

'111', indicating that the request from the terminal for the camera image has been performed, and transmits the request field-set MVC control message to the terminal.

[87] According to another embodiment of the present invention, if an event occurs requesting to turn on an image that is not currently displayed on the screen among the images taken from the cameras of the opposing terminal, the terminal sets each of the request field and CAM ID field included in the MVC control message depending on the event, and transmits the same to the opposing terminal. That is, the terminal sets the request field to '001', requesting to turn on the image, and the CAM ID field to a value indicating the camera that captures the image. All bits constituting the control field included in the MVC control message are set to 0.

[88] Upon receiving the MVC control message configured as described above, the opposing terminal identifies the request field and CAM ID field and includes the image taken by the camera indicated with the CAM ID field value in the currently displayed screen. The opposing terminal sets the request field included in the MVC control message to '111', indicating that the request from the terminal for the camera image has been performed, and transmits the request field-set MVC control message to the terminal.

[89] According to another embodiment of the present invention, if an event occurs requesting to set any one of the images taken from the cameras of the opposing terminal as the background screen, the terminal sets each of the request field and CAM ID field included in the MVC control message depending on the event, and transmits the same to the opposing terminal. That is, the terminal sets the request field to '100', requesting to set the image as the background screen, and the CAM ID field to a value indicating the camera that captures the image. All bits constituting the control field included in the MVC control message are set to 0.

[90] Upon receiving the MVC control message configured as described above, the opposing terminal identifies the request field and CAM ID field, and sets the image taken by the camera indicated with the CAM ID field value as the background screen. The opposing terminal sets the request field included in the MVC control message to '111', indicating that the request from the terminal for the camera image has been performed, and transmits the Request field-set MVC control message to the terminal.

[91] FIG. 6 is a flowchart illustrating an operation in which a transmitting terminal controls a PIP included in a multi-view image provided to a receiving terminal in a video call system, according to an embodiment of the present disclosure.

[92] Referring to FIG. 6, a transmitting terminal transmits an SDP offer message for IMS session negotiation to a receiving terminal, in step 602. The SDP offer message includes information related to the number of cameras included in the transmitting terminal.

[93] The transmitting terminal receives an SDP response message from the receiving terminal, in step 604. The SDP response message includes information related to the number of cameras included in the receiving terminal and information related to the number of images, which may be displayed by the receiving terminal, among images provided from the transmitting terminal.

[94] The transmitting terminal receives an MVC control message from the receiving terminal, in step 606. The transmitting terminal controls the image taken by the camera indicated with the CAM ID field value based on the request field and CAM ID field values included in the MVC control message, in step 608. As described above with respect to FIGS. 3, 4a, 4b, 5a, and 5b, the transmitting terminal may turn on/off the image taken by the camera indicated with the CAM ID field value, move the image on the screen, magnify or shrink the image, or set the image as the background screen depending on the request field value.

[95] The transmitting terminal transmits, to the receiving terminal, an MVC control message with the request field set to the value indicating that the request from the receiving terminal for the image taken by the camera indicated with the CAM ID field value has been performed, in step 610.

[96] FIG. 7 is a flowchart illustrating an operation in which a receiving terminal transmits, to a transmitting terminal, a message for controlling a PIP included in a multi-view image in a video call system, according to an embodiment of the present invention.

[97] Referring to FIG. 7, a receiving terminal, receives an SDP offer message for IMS session negotiation from a transmitting terminal, in step 702. The SDP offer message includes information related to the number of cameras included in the transmitting terminal.

[98] The receiving terminal transmits an SDP response message to the transmitting terminal, in step 704. The SDP response message includes information related to the number of cameras included in the receiving terminal and information related to the number of images, which may be displayed by the receiving terminal, among images provided from the transmitting terminal.

[99] The receiving terminal identifies whether a predetermined event occurs, in step 706. When the predetermined event does not occur, the receiving terminal repeats step 706.

[100] When the predetermined event occurs, the receiving terminal sets the Request field and CAM ID field values of the MVC control message based on the event that has occurred, in step 708. The predetermined event may be any one of, e.g., an event requesting to turn on/off a particular image, an event requesting to relocate a particular image, an event requesting to change the size of a particular image, and an event requesting to set a particular image as background screen.

[101] The receiving terminal transmits the MVC control message in which the request field

and CAM ID field values are set, to the transmitting terminal, in step 710.

[102] The receiving terminal receives, from the transmitting terminal, an MVC control message, which includes the request field set to the value indicating that the request from the receiving terminal for the image taken by the camera indicated with the CAM ID field value has been performed, in step 712.

[103] FIG. 8 is a diagram illustrating a user setting a network mode of a device group in a communication system, according to another embodiment of the present invention.

[104] Referring to FIG. 8, it is assumed that the user has a plurality of devices, a predetermined one among the devices owned by the user is a master device, and the other devices are slave devices. Although this embodiment illustrates that a terminal is the master device, any of the user's devices may serve as the master device.

[105] It is also assumed that the master device stores DCP information set as a default profile for each mode so that a service for configuring modes is possible between initial terminals. The DCI information set as a default profile is provided from the service provider.

[106] When the network mode is changed from LTE mode to Wi-Fi mode, in step 802, a terminal (master device) 800 adds information related to the change in the network mode to the user's profile information or presence information, and transmits the same to a server 810. The information related to the change in the network mode may be, e.g., Wi-Fi mode yes/no information indicating whether the terminal 800 is in the Wi-Fi mode.

[107] When the user's profile information or presence information is received from the terminal 800, the server 810 identifies that the network mode of the terminal 800 changes to the Wi-Fi mode and identifies the user preference on the network setting between the terminal 800 and a predetermined device group A. The user preference indicates whether mode synchronization between the master device and the slave device is activated and is stored in the XML document management (XDM) server. In FIG. 8 it is assumed that the device synchronization between the terminal 800 and device group A is activated, and that Wi-Fi mode synchronization between the terminal 800 and device group A is also activated.

[108] The server 810 identifies the DCP information of device group A and changes the network modes of all devices included in device group A to the Wi-Fi mode. Accordingly, the network modes of all devices in device group A are changed to Wi-Fi mode, in step (814), and LTE data usage may be saved. Further, since all of the devices in device group A are collectively changed to the Wi-Fi mode by the server 810, there is no need for individual manipulation for configuring the mode of each of the devices. For example, the user may change the network mode of a smartwatch to the Wi-Fi mode without separate manipulation of the smartwatch, according to an embodiment of

the present invention.

[109] Likewise, when the network mode of the terminal 800 is changed from the Wi-Fi mode to the LTE mode, the terminal 800 adds information related to the change in the network mode to the user's profile information or presence information, and transmits the same to the server 810. Thereafter, the server 810 identifies that the network mode of the terminal 800 is changed to the LTE mode and identifies the user preference on the network configuration between the terminal 800 and device group A. Further, upon identifying that synchronization of network settings is activated between the terminal 800 and device group A, the server 810 identifies the DCP information of device group A and changes the network modes of all the devices in device group A to the LTE mode.

[110] FIG. 9 is a diagram illustrating a user setting an airplane mode for a device group in a communication system, according to an embodiment of the present invention.

[111] Referring to FIG. 9, it is assumed that the user has a plurality of devices, a predetermined one of the devices owned by the user is a master device, and the other devices are slave devices. Although a terminal is the master device in this embodiment, any of the user's devices may serve as the master device.

[112] It is also assumed that the master device stores DCP information set as a default profile for each mode so that a service for configuring modes is possible between terminals. The DCI information set as default profile is provided from the service provider.

[113] When the operation mode is changed to airplane mode, in step 902, a terminal (master device) 900 adds information related to the change in the operation mode to the user's profile information or presence information and transmits the same to a server 910. The information related to the change in the operation mode may be, e.g., airplane mode yes/no information indicating whether the terminal 900 is in airplane mode.

[114] When the user's profile information or presence information is received from the terminal 900, the server 910 identifies that the operation mode of the terminal 900 changes to the airplane mode, and identifies the user preference on the airplane mode setting between the terminal 900 and a predetermined device group B. The user preference indicates whether mode synchronization between the master device and the slave device is activated, and is stored in the XDM server. It is assumed that the device synchronization between the terminal 900 and device group B is activated, and that airplane mode synchronization between the terminal 900 and device group B is also activated.

[115] The server 910 identifies the DCP information of device group B and changes the network modes of all devices included in device group B to the airplane mode. Ac-

cordingly, the operation modes of all devices in device group B are changed to the airplane mode, in step 914, and all devices owned by the user may be prevented from being battery-discharged on the user's position. Further, since all devices in device group B are collectively changed to the airplane mode by the server 910, there is no need for individual manipulation for configuring the mode of each device.

[116] Likewise, when the operation mode of the terminal 900 is changed from the airplane mode to a basic mode, i.e., the service communication mode, the terminal 900 adds information related to the change in the operation mode to the user's profile information or presence information, and transmits the same to the server 910. Thereafter, the server 910 identifies that the operation mode of the terminal 900 changes to the basic mode, and identifies the user preference on the operation mode setting between the terminal 900 and device group B. Further, upon identifying that synchronization about the airplane mode setting is activated between the terminal 900 and device group B, the server 910 identifies the DCP information of device group B, and changes the operation modes of all the devices in device group B to the basic mode.

[117] FIG. 10 is a diagram illustrating a user setting a sleep mode of a device group in a communication system, according to another embodiment of the present invention.

[118] Referring to Fig. 10, it is assumed that the user has a plurality of devices, a predetermined one of the devices owned by the user is a master device, and the other devices are slave devices. Although a terminal is described as the master device in this embodiment, any of the user's devices may serve as the master device.

[119] It is also assumed that the master device stores DCP information set as a default profile for each mode so that a service for configuring modes is possible between initial terminals. The DCI information set as default profile is provided from the service provider.

[120] When the operation mode is changed to a sleep mode, in step 1002, the terminal (master device) 1000 adds information related to the change in the operation mode to the user's profile information or presence information, and transmits the same to a server 1010. The information related to the change in the operation mode may be, e.g., sleep mode yes/no information indicating whether the terminal 1000 is in the sleep mode.

[121] When the user's profile information or presence information is received from the terminal 1000, the server 1010 identifies that the operation mode of the terminal 1000 changes to the sleep mode and identifies the user preference on the sleep mode setting between the terminal 1000 and a predetermined device group C. The user preference indicates whether mode synchronization between the master device and the slave device is activated, and is stored in the XDM server. It is assumed that the device synchronization between the terminal 1000 and device group C is activated, and that the

sleep mode synchronization between the terminal 1000 and device group C is also activated.

[122] The server 1010 identifies the DCP information of device group C, and changes the operation modes of all devices in device group C to the sleep mode. Accordingly, the operation modes of all devices in device group C are changed to the sleep mode, in step 1014. For example, assuming that the devices included in device group C are an air conditioner, a light, and an audio system, the operation mode of the air conditioner changes to a sleep breeze mode, the light changes to a sleep light mode, and the audio system changes to a sleep music mode. Therefore, energy consumption may be saved. Further, since all devices in device group C are collectively changed to the sleep mode by the server 1010, there is no need for individual manipulation for configuring the mode of each device.

[123] Likewise, when the operation mode of the terminal 1000 is changed from the sleep mode to the basic mode, i.e., the service communication mode, the terminal 1000 adds information related to the change in the operation mode to the user's profile information or presence information, and transmits the same to the server 1010. Thereafter, the server 1010 identifies that the operation mode of the terminal 1000 changes to the basic mode, and identifies the user preference on the sleep mode setting between the terminal 1000 and device group C. Further, upon identifying that sleep mode synchronization is activated between the terminal 1000 and device group C, the server 1010 identifies the DCP information of device group C and changes the operation modes of all devices in device group C to the basic mode.

[124] FIG. 11 is a diagram illustrating a user setting a manner mode of a device group in a communication system, according to another embodiment of the present invention.

[125] Referring to FIG. 11, it is assumed that the user has a plurality of devices, a predetermined one among the devices owned by the user is a master device, and the other devices are slave devices. Although a terminal is described as the master device in this embodiment, any of the user's devices may serve as the master device.

[126] It is also assumed that the master device stores DCP information set as a default profile for each mode so that a service for configuring modes is possible between initial terminals. The DCI information set as default profile is provided from the service provider.

[127] When the operation mode is changed to manner mode, in step 1102, a terminal (master device) 1100 adds information related to the change in the operation mode to the user's profile information or presence information, and transmits the same to a server 1110. The information related to the change in the operation mode may be, e.g., manner mode yes/no information indicating whether the terminal 1100 is in the manner mode.

[128] When the user's profile information or presence information is received from the terminal 1100, the server 1110 identifies that the operation mode of the terminal 1100 changes to the manner mode, and identifies the user preference on the manner mode setting between the terminal 1100 and a predetermined device group D. The user preference indicates whether mode synchronization between the master device and the slave device is activated, and is stored in the XDM server. It is assumed that the device synchronization between the terminal 1100 and device group D is activated, and that manner mode synchronization between the terminal 1100 and device group D is also activated.

[129] The server 1110 identifies the DCP information of device group D and changes the network modes of all devices included in device group D to the manner mode. Accordingly, all devices in device group D are changed to manner mode, in step 1114. Since all devices in device group D are collectively changed to manner mode by the server 1110, the user need not perform individual manipulation for configuring the mode of each device.

[130] Likewise, when the operation mode of the terminal 1100 is changed from the manner mode to the ringer mode or the silent mode, the terminal 1100 adds information related to the change in the operation mode to the user's profile information or presence information, and transmits the same to the server 1110. Thereafter, the server 1110 identifies that the operation mode of the terminal 1100 changes to the ringer mode or the silent mode, and identifies the user preference on the operation mode setting between the terminal 1100 and device group D. Further, upon identifying that synchronization about the manner mode setting is activated between the terminal 1100 and device group D, the server identifies the DCP information of device group D and changes the operation modes of all devices in device group D to the ringer mode or the silent mode.

[131] FIG. 12 is a signal flowchart illustrating a procedure in which a master device changes modes of a slave device in a communication system, according to another embodiment of the present invention.

[132] Referring to FIG. 12, the communication system includes a terminal A (master device) 1200, a server 1210, a terminal B (slave device) 1220, and a terminal C (slave device) 1230.

[133] Terminal A 1200 generates an XML document for configuring a terminal context, in step 1201. The XML document includes, e.g., a user preference document, a DCP document, and a DCP directory document for configuring the terminal context.

[134] The user preference document includes information related to whether mode synchronization is established between the master device and the slave devices. The DCP document includes rules respectively applying to terminal modes, e.g., a rule applying

to Wi-Fi mode, a rule applying to airplane mode, a rule applying to sleep mode, a rule applying to manner mode, and a rule applying to roaming mode. The DCP directory document includes information related to the profile activated in the DCP document, e.g., per-terminal DCP information, a wearable device list, a home device list, a master device list, DCP information operating in the master device, DCP information according to a change in mode of the master device (e.g., a rule corresponding to a relevant mode), DCP information operating in the slave devices, and DCP information separately applied among the slave devices.

[135] Terminal A 1200 transmits an HTTP PUT message, requesting to register the XML document, to the server 1210, in step 1203. The server 1210 registers the XML document, and in response to the HTTP PUT message, transmits a 200 OK message to terminal A 1200, in step 1205.

[136] Terminal B 1220 transmits an SIP SUBSCRIBE message for subscribing to DCP information to the server 1210, in step 1207. The DCP information refers to, for example, the user preference document, the DCP document, and the DCP directory document. The SIP SUBSCRIBE message transmitted includes information requesting to subscribe to DCP information. Terminal B 1220 may receive varied DCP information by transmitting the SIP SUBSCRIBE message including the information requesting to subscribe to the DCP information. The server 1210 notifies terminal B 1220 of pre-stored DCP information by transmitting an SIP NOTIFY message in response to the SIP SUBSCRIBE message, in step 1209. Although the DCP information is described as being obtained through steps 1207 and 1209 in this embodiment, the DCP information may be obtained by periodically reading the DCP information (XCAP GET) by terminal B 1220.

[137] Terminal C 1230 transmits an SIP SUBSCRIBE message for subscribing to DCP information to the server 1210, in step 1211. The SIP SUBSCRIBE message includes information requesting to subscribe to DCP information. Terminal C 1230 may receive varied DCP information by transmitting the SIP SUBSCRIBE message including the information requesting to subscribe to the DCP information. The server 1210 notifies terminal C 1230 of the pre-stored DCP information by transmitting an SIP NOTIFY message in response to the SIP SUBSCRIBE message, in step 1213. Although the DCP information is described herein as being obtained through steps 1211 and 1213, the DCP information may be obtained by periodically reading the DCP information (XCAP GET) by terminal C 1230.

[138] If the network mode is changed from LTE mode to Wi-Fi mode, in step 1215, terminal A 1200 transmits an SIP PUBLISH message to the server 1210 to notify of the terminal mode change, in step 1217. The mode change in terminal A 1200 may be directly made by the user or may be made automatically by the terminal. Further, the

SIP PUBLISH message may be transmitted depending on whether the mode synchronization between terminal A 1200 and the relevant slave device has been established. That is, the SIP PUBLISH message may be transmitted when the mode synchronization has been established. Further, the server 1210 transmits a 200 OK message to terminal A 1200 in response to the SIP PUBLISH message, in step 1219.

[139] The server 1210 changes the DCP information of the master device based on the mode change in terminal A 1200, and changes the DCP information of the slave device, in step 1221.

[140] Thereafter, the server 1210 notifies terminal B 1220 of the changed DCP information by transmitting an SIP NOTIFY message, in step 1223. Terminal B 1220 transmits an OK message to the server 1210 in response to the SIP NOTIFY message, in step 1225, and changes the network mode from the LTE mode to the Wi-Fi mode based on the changed DCP information, in step 1227.

[141] Further, the server 1210 notifies terminal C 1230 of the changed DCP information by transmitting an SIP NOTIFY message, in step 1229. Terminal C 1230 transmits an OK message to the server 1210 in response to the SIP NOTIFY message, in step 1231, and changes the network mode from the LTE mode to the Wi-Fi mode based on the changed DCP information, in step 1235.

[142] FIG. 13 is a flowchart illustrating an operation in which a master device changes modes of a slave device in a communication system, according to an embodiment of the present invention.

[143] Referring to FIG. 13, the master device generates an XML document, in step 1302. The XML document includes at least one of a user preference document, a DCP document, and a DCP directory document for configuring the terminal context. Further, the user preference document includes information related to whether synchronization is established between the master device and the slave device, the DCP document includes rules respectively applied to modes, and the DCP directory document includes information related to the profile activated in the DCP document.

[144] The master device registers the XML document, i.e., at least one of the user preference document, the DCP document, and the DCP directory document, in the server, in step 1304.

[145] The master device examines whether its mode change is detected, in step 1306. When the mode change is not detected, the master device repeats step 1306. When the mode change is detected, the master device determines whether mode synchronization with the slave device is established, in step 1308. When mode synchronization with the slave device is not established, the master device returns step 1306 to repeat the examining operation.

[146] When mode synchronization with the slave device is established, the master device

notifies the server of the changes, in step 1310.

[147] FIG. 14 is a flowchart illustrating an operation in which a slave device changes modes in a communication system, according to an embodiment of the present invention.

[148] Referring to FIG. 14, the slave device transmits, to the server, a DCP information subscribe request indicating whether to subscribe to at least one of a user preference document, a DCP document, and a DCP directory document, in step 1402. The reason for transmitting the DCP information subscribe request is to allow the slave device to receive a change in DCI information, e.g., at least one of the user preference document, DCP document, and DCP directory document. The slave device receives pre-stored DCP information from the server, in step 1404. The pre-stored DCP information means DCP information currently stored in the server, e.g., DCP information set as default profile for each mode provided from the service provider.

[149] The slave device determines whether changed DCP information based on a mode change in the master device is received from the server, in step 1406. When no changed DCP information is received, the slave device repeats step 1406.

[150] When changed DCP information is received, the slave device changes its mode based on the changed DCP information, in step 1406.

[151] FIG. 15 is a flowchart illustrating an operation in which a server changes modes of a slave device in a communication system, according to another embodiment of the present invention.

[152] Referring to FIG. 15, the server receives an XML document from the master device and registers the XML document, in step 1502. The XML document includes at least one of a user preference document, a DCP document, and a DCP directory document for configuring the terminal context. Further, the user preference document includes information related to whether synchronization is established between the master device and the slave device, the DCP document includes rules respectively applied to modes, and the DCP directory document includes information related to the profile activated in the DCP document.

[153] The server determines whether a DCP information subscribe request is received from the slave device, in step 1504. When the DCP information subscribe request is not received from the slaved device, the server repeats step 1504. When the DCP information subscriber request is received, the server determines whether the received DCP information subscribe request indicates that DCP information, e.g., at least one of a user preference document, a DCP document, and a DCP directory document, is received.

[154] When the received DCP information subscribe request indicates that no DCP information is received, the server returns to step 1504.

[155] When the received DCP information subscribe request indicates that the DCP information is received, the server transmits pre-stored DCP information to the slave device, in step 1508.

[156] The server determines whether mode change-related information is received from the master device, in step 1511. When no mode change-related information is received, the server repeats step 1511. When the mode change-related information is received, the server changes the DCP information of the master device and the slave device, in step 1513.

[157] The server transmits the changed DCP information to the slave device, in step 1515.

[158] FIG. 16 is a user preference document constituting an XML document for configuring a terminal context, according to an embodiment of the present invention.

[159] Referring to FIG. 16, the user preference document indicates whether mode synchronization is activated between devices, and the element, <mode-sync>, for mode synchronization in the user preference document is configured as follows. Specifically, the user preference document includes information indicating whether <mode-sync> is activated, e.g., the 'state' attribute indicating an operation state (on/off), and further includes <wifi-sync> indicating whether Wi-Fi mode synchronization is established, <airplane-sync> indicating whether airplane mode synchronization is activated, <sleep-sync> indicating whether sleep mode synchronization is activated, <manner-sync> indicating whether manner mode synchronization is activated, and <roaming-sync> indicating whether roaming mode synchronization is activated.

[160] Further, in the user preference document shown, <mode-sync state="on"> indicates that mode synchronization between the devices is activated, <wifi-sync> true </wifi-sync> indicates that Wi-Fi mode synchronization between the devices is activated, <airplane-sync> true </airplane-sync> indicates that airplane mode synchronization between the devices is activated, <sleep-sync> true </sleep-sync> indicates that sleep mode synchronization is activated between the devices, <manner-sync> true </manner-sync> indicates that manner mode synchronization is activated between devices, and <roaming-sync> true </roaming-sync> indicates that roaming mode synchronization is activated between the devices.

[161] FIGS. 17a-17d is a DCP document constituting an XML document for configuring a terminal context.

[162] The DCP document includes rules respectively applied to terminal modes, and FIGS. 17a-17d shows rules respectively applied to LTE mode, Wi-Fi mode, airplane mode, and sleep mode. When 'sip:ronald.underwood@example.com' is provided as an SIP URI for user identification, the DCP document is defined with a per-mode 'rule' in the [RFC4745] 'ruleset' document, and the DCP document defines actions under conditions.

[163] FIG. 17a shows an LTE profile that is a rule applied to the LTE mode, and when 'id'attribute (id="f3g44r1") is defined and a condition is an LTE connection, notification of the user's subscribed services, call/data usage/remaining balance update, is defined to be delivered to the device group.

[164] Further, notification of Message, e.g., short message service (SMS), multimedia messaging service (MMS), or Join message, is also defined to be transferred to the device group, and notification of third party services, e.g., social networking service (SNS) or email services is defined to be blocked. Other necessary actions, e.g., automatic update of various applications (Apps), may be defined as well.

[165] FIG. 17b shows aWi-Fi profile that is a rule applied to Wi-Fi mode, and when 'id'attribute (id="ythk764") is defined and a condition is a Wi-Fi connection, notification of the user's subscribed services is defined to be delivered to the device group. Further, notification of message and third party services is defined to be delivered as well. Other necessary actions may be defined as well.

[166] FIG. 17c shows an airplane mode profile that is a rule applied to airplane mode, and when 'id'attribute (id="11t2t45") is defined and a condition is airplane mode, notification of the user's subscribed services is defined to be blocked. Further, notification of message and third party services is defined to be blocked, and the data connection is defined to be deactivated. Other necessary actions may be defined as well.

[167] FIG. 17d shows a sleep mode profile that is a rule applied to sleep mode, and when 'id'attribute (id="ythk764") is defined and a condition is sleep mode, notification of the user's subscribed services is defined to be blocked. Further, notification of message and third party services is defined to be blocked as well. Further, the terminal and tablet PC are defined to activate the maximum power saving mode, and the air conditioner and light are defined to activate the sleep mode. Other necessary actions may be defined as well.

[168] The roaming profile applied to the roaming mode, when 'id'attribute(id="ythk764") is defined and a condition is a Wi-Fi connection, is defined to deliver notification for the user's subscribed services to the device group. Further, notification of message and third party services is defined to be delivered as well. Other necessary actions may be defined as well.

[169] FIG. 18 is a DCP directory constituting an XML document for configuring a terminal context of a device group, according to an embodiment of the present invention.

[170] Referring to FIG. 18, the application server changes the profiles of the slave devices included in the group to the LTE profile, Wi-Fi profile, roaming profile, airplane profile, and sleep mode profile, when the profile of the master device is changed.

[171] FIGS. 19a-19d are DCP directory documents constituting an XML document for configuring a terminal context of a device group, according to an embodiment of the

present invention.

[172] Referring to FIGS. 19a-19d, <dcp-set> denotes a set of DCP information. FIGS. 19a-19d show the DCP information of each of the LTE mode, the Wi-Fi mode, the roaming mode, the airplane mode, and the sleep mode.

[173] <dp-set> denotes a set of the devices related to the device profiles. FIGS. 19A-19D show a wearable device list, a home device list, and a master device list.

[174] <active-dcp> denotes a set of DCP information activated in the device, and <master-dcp> denotes the DCP information activated in the master device.

[175] <ruleset> denotes a set of device context profile rules according to changes in the terminal's mode, i.e., a set of rules corresponding to changed modes. For example, if the master device changes to roaming mode, the profile of the slave device changes to the roaming profile and operates.

[176] <slave-device-dcp-set> denotes a set of DCP information activated in the slave device. For example, when the master device changes to airplane mode (ghi6k), the slave device, wearable device (aaa111), also changes to airplane mode.

[177] <active-device-dcp-set> denotes a set of terminals separately applied with a device context profile among the terminals.

[178] The structure of the DCP directory document described above in connection with FIGS. 19a-19d may be standardized and implemented in a form that is partially modified for necessity and expandability.

[179] Further, methods according to embodiments of the present invention may also be applicable to cases where data is shared between devices. An example where data is shared between devices may be when a tethering service is performed between the master device and the wearable device. That is, basic rules related to the network mode and operation modes described above may be configured and may be then changed by the user.

[180] Further, when the above-described DCP information, i.e., the rules respectively applied to the modes, is stored in the server, and even when there is a limited or no input method through a device, data sharing per data group is possible through comprehensive application. In other words, using the tethering service as an example, if the master terminal activates the tethering service by generating a tethering profile, a particular device group may access the master device through the tethering service to communicate data services.

[181] Further, in the case of device-based services, and not server-based services, settings need to be made per device, which is burdensome, and if service rules/settings collide with each other, these need to be adjusted. Such may be addressed through the DCP information.

[182] FIG. 20 is a block diagram illustrating an internal configuration of a device (e.g., a

terminal) changing modes in a communication system, according to an embodiment of the present invention.

[183] Referring to FIG. 20, a terminal 2000 includes a transmitting unit 2010, a receiving unit 2020, a controller 2030, and a storage 2040. The configuration illustrated in FIG. 20 may apply to both the master device and slave device.

[184] The controller 2030 controls the overall operation of the terminal 2000. In particular, the controller 2030 performs controls to conduct the overall operation related to changing terminal modes, according to an embodiment of the present invention. The overall operation related to changing the terminal modes is the same as those described above in connection with FIGS. 12 to 14.

[185] The transmitting unit 2010 transmits various messages under the control of the controller 2030. The various messages transmitted from the transmitting unit 2010 are the same as those described above in connection with FIGS. 12 to 14.

[186] The receiving unit 2020 receives various messages under the control of the controller 2030. The various messages received by the receiving unit 2020 are the same as those described above in connection with FIGS. 12 to 14.

[187] FIG. 21 is a block diagram illustrating an internal configuration of a server changing modes of a device in a communication system, according to an embodiment of the present invention.

[188] Referring to FIG. 21, a server 2100 includes a transmitting unit 2110, a receiving unit 2120, a controller 2130, and a storage 2140.

[189] The controller 2130 controls the overall operation of the server 2100. In particular, the controller 2130 performs controls to conduct the overall operation related to changing modes of the device, according to an embodiment of the present invention. The overall operation related to changing the modes of device is the same as those described above in connection with FIGS. 12 and 15.

[190] The transmitting unit 2110 transmits various messages under the control of the controller 2130. The various messages transmitted from the transmitting unit 2110 are the same as those described above in connection with FIGS. 12 and 15.

[191] The receiving unit 2120 receives various messages under the control of the controller 2130. The various messages received by the receiving unit 2120 are the same as those described above in connection with FIGS. 12 and 15.

[192] The methods for controlling a multi-view image, according to embodiments of the present invention, may be implemented in hardware, software, or a combination of hardware and software. Such software may be stored in a volatile or non-volatile storage device such as a read-only memory (ROM) or other storage devices, a memory, such as a random access memory (RAM), a memory chip, a device or an integrated circuit, or a storage medium, such as, e.g., a compact disc (CD), a digital

versatile disc (DVD), a magnetic disk, or a magnetic tape, which allows for optical or magnetic recording while simultaneously being read out by a machine (e.g., a computer). The methods for changing a mode of a device, according to an embodiment of the present invention, may be implemented by a computer or portable terminal including a controller and a memory, and the memory may be an example of a storage medium that may be read out by a machine appropriate to store a program or programs including instructions for realizing embodiments of the present invention.

[193] Accordingly, embodiments of the present invention encompass a program containing codes for implementing the device or method set forth herein and a machine (e.g., computer)-readable storage medium storing the program. The program may be electronically transferred via any media, such as, for example, communication signals transmitted through a wired or wireless connection, and the present invention includes equivalents thereof.

[194] The apparatuses for controlling a multi-view image, according to embodiments of the present invention, may receive the program from a program providing device wiredly or wirelessly connected thereto, and may store the same. The program providing device may include a memory for storing a program including instructions to enable a device mode changing apparatus to perform a device mode changing method and for storing information necessary for the device mode changing method, may include a communication unit for performing wired or wireless communication with the device mode changing apparatus, and may include a controller for transmitting the program to the communication device automatically or at the request of the device mode changing apparatus.

[195] While the invention has been shown and described with reference to certain embodiments thereof, it will be understood by those skilled in the art that various changes in form and detail may be made therein without departing from the spirit and scope of the invention as defined by the appended claims.

Claims

[Claim 1] A terminal for controlling a multi-view image in an image communication system, the terminal comprising:
a receiving unit configured to receive, from an opposing terminal, a first message comprising information related to a number of cameras in the opposing terminal and information related to a number of images that may be displayed by the opposing terminal among images provided by the terminal, and to receive, from the opposing terminal a second message comprising a camera identifier field indicating a unique number of a camera of the cameras in the opposing terminal and a request field requesting to control an image taken by the camera indicated by the camera identifier field; and
a controller configured to control the image taken by the camera indicated by the camera identifier field based on values of the camera identifier field and the request field.

[Claim 2] The terminal of claim 1, wherein the request field is set to any one a value requesting to turn on/off the image taken by the camera indicated by the camera identifier field, a value requesting to relocate the image taken by the camera indicated by the camera identifier field, a value requesting to change the size of the image taken by the camera indicated by the camera identifier field, and a value requesting to set the image taken by the camera indicated by the camera identifier field to a background screen.

[Claim 3] The terminal of claim 2, wherein, when the request field is set to the value requesting to relocate the image taken by the camera indicated by the camera identifier field,a control field included in the second message is set to a vector value related to relocation of the image, wherein the control field comprises a first field including 13 bits and a second field including 13 bits, wherein a first bit of the first field indicates a sign of the vector value on a horizontal axis, and remaining bits of the first field indicate an absolute value of the vector value on the horizontal axis, and wherein a first bit of the second field indicates a sign of the vector value on a vertical axis, and remaining bits of the second field indicate an absolute value of the vector value on the vertical axis.

[Claim 4] The terminal of claim 2, wherein, when the request field is set to the value requesting to change the size of the image taken by the camera

indicated by the camera identifier field, a control field included in the second message is set to a value indicating a magnification or shrinkage ratio related to size change of the image,

wherein the control field comprises a first field including 13 bits and a second field including 13 bits, and wherein the 13 bits of the first field indicate a ratio at which the image taken by the camera indicated by the camera identifier field is magnified or shrunken in a horizontal direction, and the 13 bits of the second field indicate a ratio at which the image taken by the camera indicated by the camera identifier field is magnified or shrunken in a vertical direction.

[Claim 5] The terminal of claim 2, wherein, when the request field is set to the value requesting to turn on/off the image taken by the camera indicated by the camera identifier field or the value requesting to set the image taken by the camera indicated by the camera identifier field to a background screen, all bits of a control field included in the second message are set to 0.

[Claim 6] A terminal for controlling a multi-view image in an image communication system, the terminal comprising:

a transmitting unit configured to transmit a first message and a second message, the first message comprising information related to a number of cameras in the terminal and information related to a number of images that may be displayed by the terminal among images provided by an opposing terminal, the second message comprising a camera identifier field and a request field; and

a controller configured to set the camera identifier field to indicate a unique number of a camera of the cameras in the terminal and to set the request field to request to control an image taken by the camera indicated by the camera identifier field, based on a predetermined event, when the predetermined event occurs.

[Claim 7] The terminal of claim 6, wherein, when the predetermined event is an event requesting to turn on/off the image taken by the camera indicated by the camera identifier field, the request field is set to a value requesting to turn on/off the image.

[Claim 8] The terminal of claim 6, wherein, when the predetermined event is an event requesting to relocate the image taken by the camera indicated by the camera identifier field, the request field is set to a value requesting to relocate the image, and a control field included in the second message is set to a vector value related to relocation of the image,

wherein the control field includes a first field including 13 bits and a second field including 13 bits, wherein a first bit of the first field indicates a sign of the vector value on a horizontal axis, and the remaining bits of the first field indicate an absolute value of the vector value on the horizontal axis, and wherein a first bit of the second field indicates a sign of the vector value on a vertical axis, and the remaining bits of the second field indicate an absolute value of the vector value on the vertical axis.

[Claim 9] The terminal of claim 6, wherein, when the predetermined event is an event requesting to change a size of the image taken by the camera indicated by the camera identifier field, the request field is set to a value requesting to change the size of the image, and a control field included in the second message is set to a magnification or shrinkage ratio related to size change of the image,
wherein the control field includes a first field including 13 bits and a second field including 13 bits, wherein a first bit of the first field indicates a sign of the vector value on a horizontal axis, and the remaining bits of the first field indicate an absolute value of the vector value on the horizontal axis, and wherein a first bit of the second field indicates a sign of the vector value on a vertical axis, and the remaining bits of the second field indicate an absolute value of the vector value on the vertical axis.

[Claim 10] The terminal of claim 6, wherein, when the predetermined event is an event requesting to set the image taken by the camera indicated by the camera identifier field to a background screen, the request field is set to a value requesting to set the image to the background screen.

[Claim 11] A server for changing a mode of a device, the server comprising:
a receiving unit configured to receive, from a master device, and at least one of a user preference document including information related to whether mode synchronization is activated between devices, a device context profile (DCP) document including a rule applied per mode, and a DCP directory document including information related to a profile activated in the DCP document;
a storage configured to register the at least one of the user preference document, the DCP document, and the DCP directory document;
a controller configured to, when information related to changing a mode of the master device is received, change the at least one of the registered user preference document, the DCP document, and the DCP

directory document based on the changed mode of the master device; and

a transmitting unit configured to transmit the at least one of the changed user preference document, the changed DCP document, and the changed DCP directory document to at least one slave device.

[Claim 12] The server of claim 11, wherein, when a DCP information subscribe request requesting at least one of the user preference document, the DCP document, and the DCP directory document is received from the at least one slave device, the transmitting unit is further configured to transmit the at least one of the pre-registered user preference document, the DCP document, and the DCP directory document to the at least one slave device.

[Claim 13] A master device for changing a mode of a slave device, the master device comprising:

a controller configured to generate and register, in a server, at least one of a user preference document including information related to whether mode synchronization is activated between devices, a device context profile (DCP) document including a rule applied per mode, and a DCP directory document including information related to a profile activated in the DCP document; and

a transmitting unit configured to, when a mode of the master device is changed, transmit the at least one of the user preference document, the DCP document, and the DCP directory document, which is changed based on the changed mode of the master device to at least one slave device through the server.

[Claim 14] A slave device for changing a mode based on a master device, the slave device comprising:

a transmitting unit configured to transmit, to a server, a device context profile (DCP) information subscribe request requesting at least one of a user preference document including information related to whether mode synchronization is activated between devices, a DCP document including a rule applied per mode, and a DCP directory document including information related to a profile activated in the DCP document;

a receiving unit configured to receive, from the server, the at least one of the user preference document, the DCP document, and the DCP directory document; and

a controller configured to, upon receiving, from the server, at least one

of a changed user preference document, a changed DCP document, and a changed DCP directory document, changed based on a mode change in a master device, changing a mode of the slave device based on the at least one of the changed user preference document, the changed DCP document, and the changed DCP directory document.

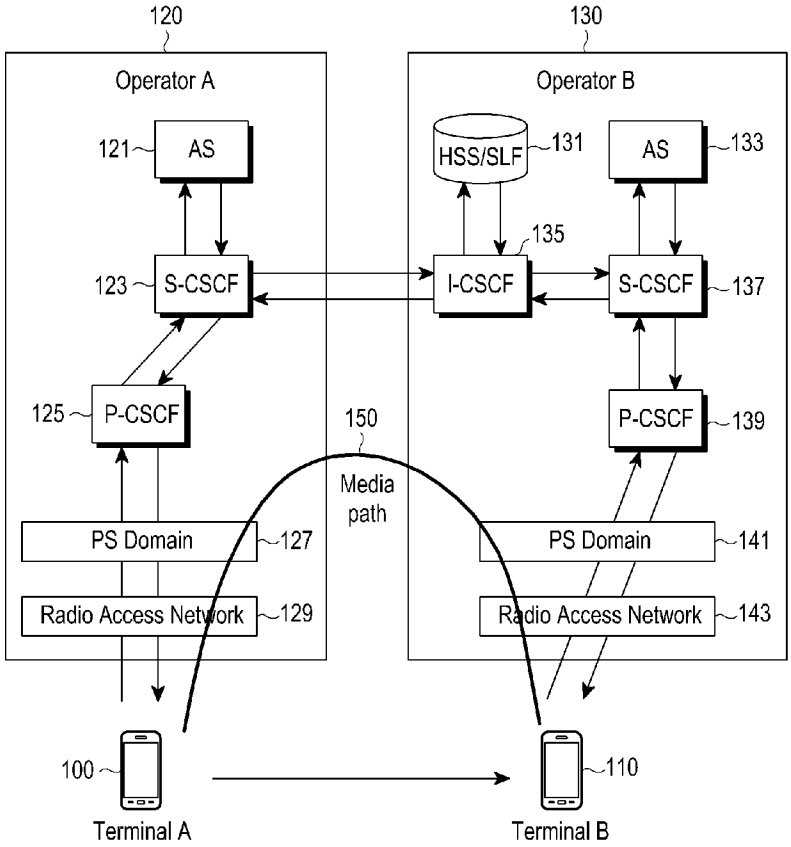
[Claim 15] The server of claim 11, the master device of claim 13, or the slave device of claim 14, wherein the user preference document comprises at least one of information indicating whether Wi-Fi mode synchronization is activated, information indicating whether airplane mode synchronization is activated, information indicating whether sleep mode synchronization is activated, information indicating whether manner mode synchronization is activated, and information indicating whether roaming mode synchronization is activated, between the master device and the slave device.

[Claim 16] The server of claim 11, the master device of claim 13, or the slave device of claim 14, wherein the DCP document comprises at least one of a rule applied to a Wi-Fi mode, a rule applied to an airplane mode, a rule applied to a sleep mode, a rule applied to a manner mode, and a rule applied to a roaming mode.

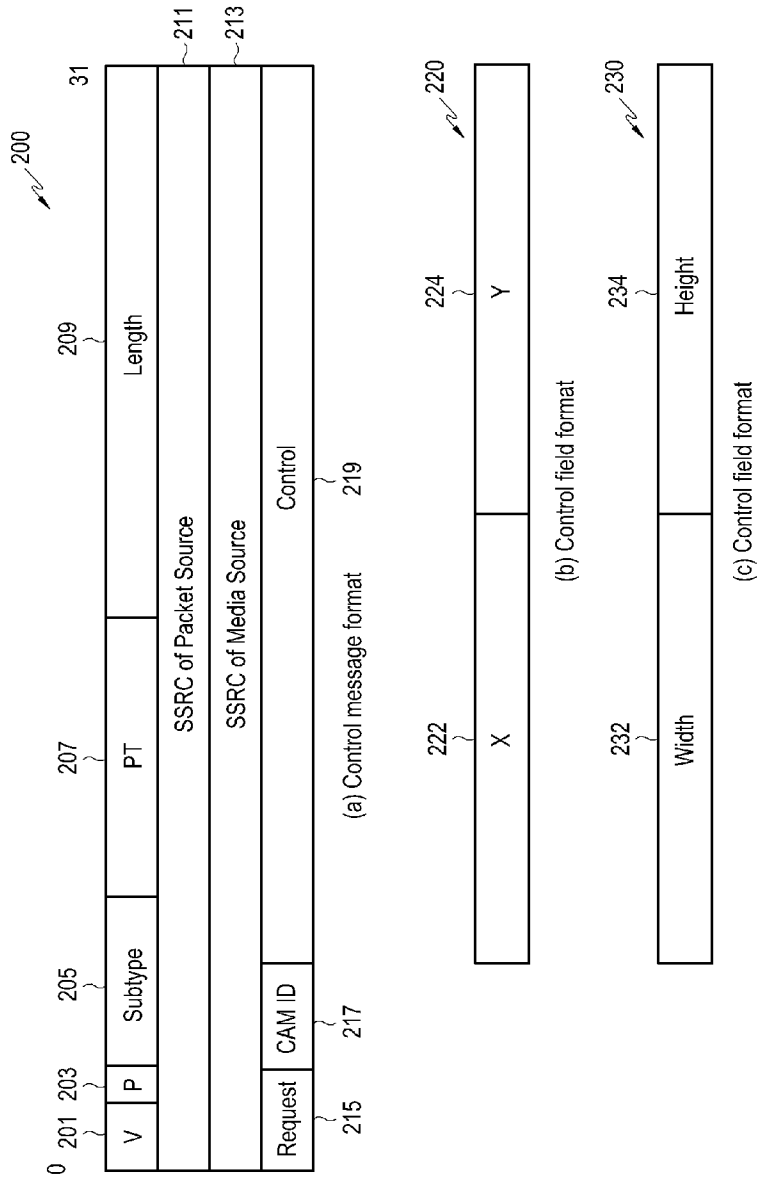
[Claim 17] The server of claim 11, the master device of claim 13, or the slave device of claim 14, wherein the DCP directory document comprises at least one of per-device DCP information, a device list, DCP information operating in the master device, DCP information based on the mode change in the master device, DCP information operating in the at least one slave device, and DCP information separately applied to some slave devices.

[Claim 18] A method adapted to perform the apparatus of one of claims 1 to 17.

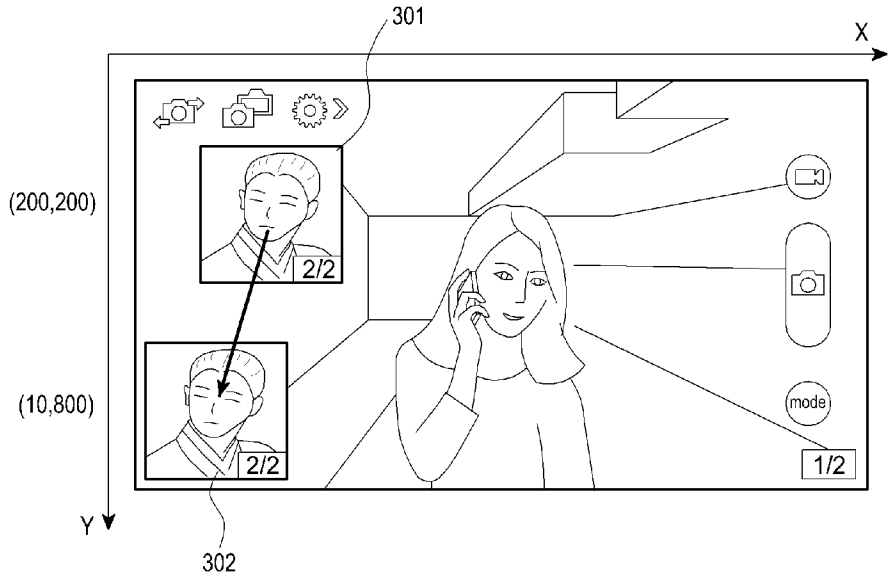
[Fig. 1]


120
130
Operator A
Operator B
121
AS
HSS/SLF
131
AS
133
135
123
S-CSCF
I-CSCF
S-CSCF
137
125
P-CSCF
150
Media path
P-CSCF
139
PS Domain
127
PS Domain
141
Radio Access Network
129
Radio Access Network
143
100
110
Terminal A
Terminal B

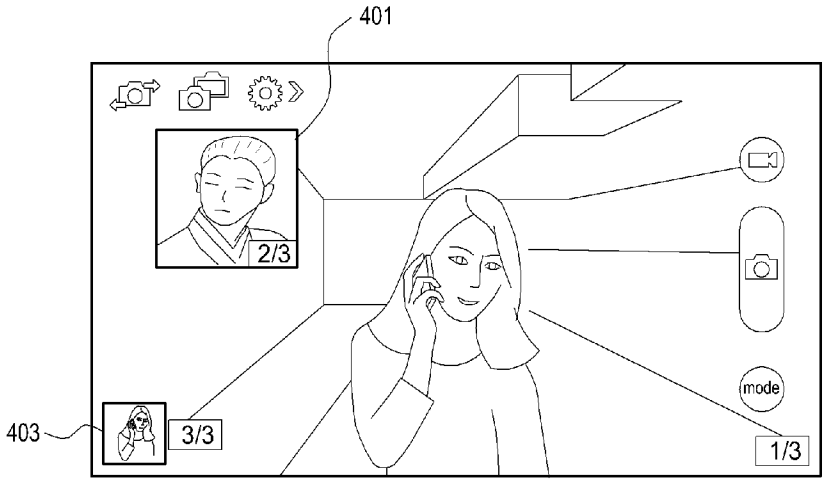
[Fig. 2]


200
31
211
213
209
207
205
203
201
0
V
P
Subtype
PT
Length
SSRC of Packet Source
SSRC of Media Source
Control
CAM ID
Request
215
217
219
(a) Control message format
220
224
Y
222
X
(b) Control field format
230
234
Height
232
Width
(c) Control field format

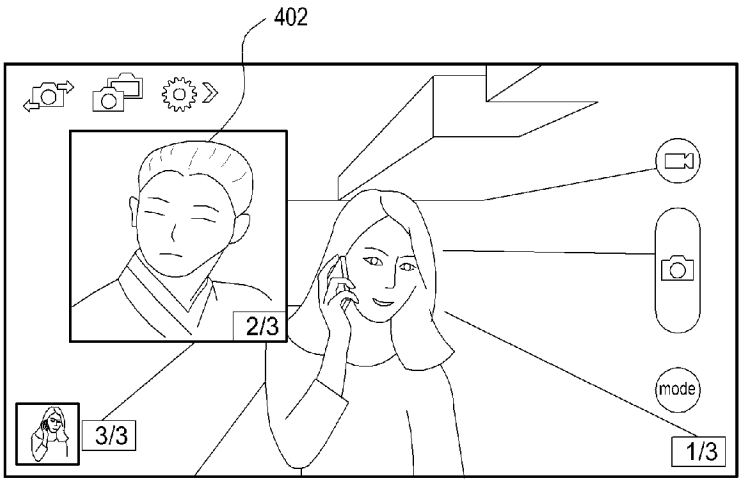
[Fig. 3]


301
X
(200,200)
(10,800)
Y
302
2/2
2/2
mode
1/2

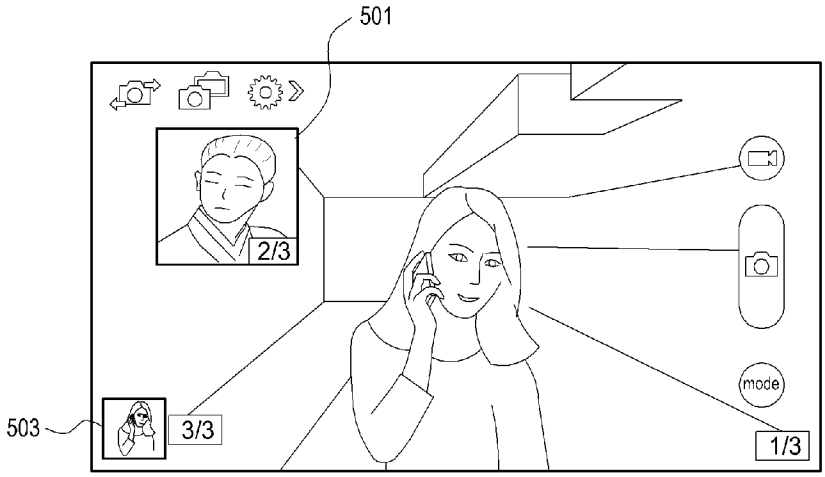
[Fig. 4a]



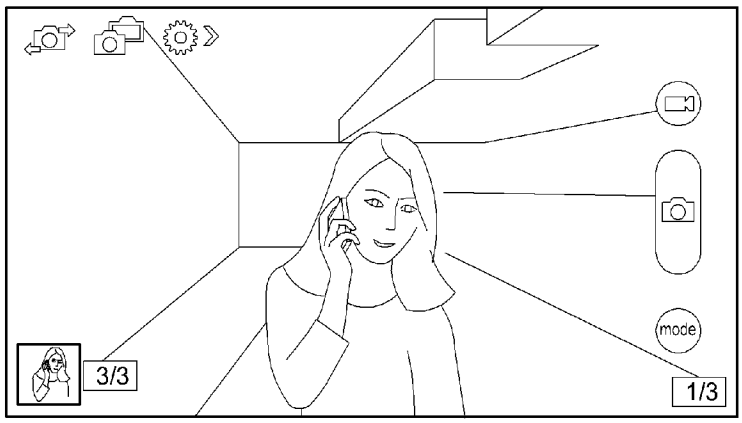
[Fig. 4b]



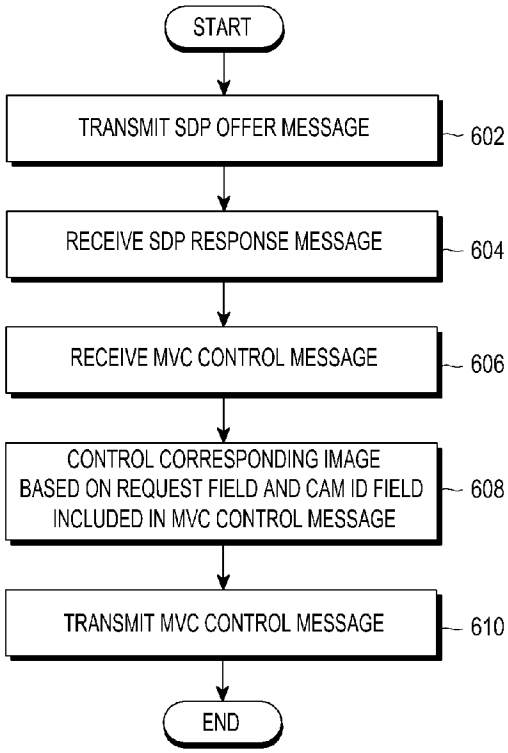
[Fig. 5a]



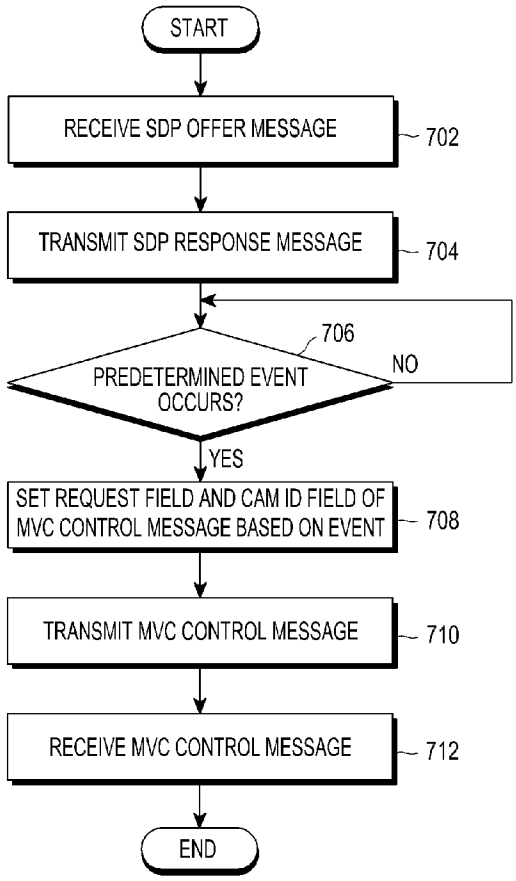
[Fig. 5b]


mode
3/3
1/3

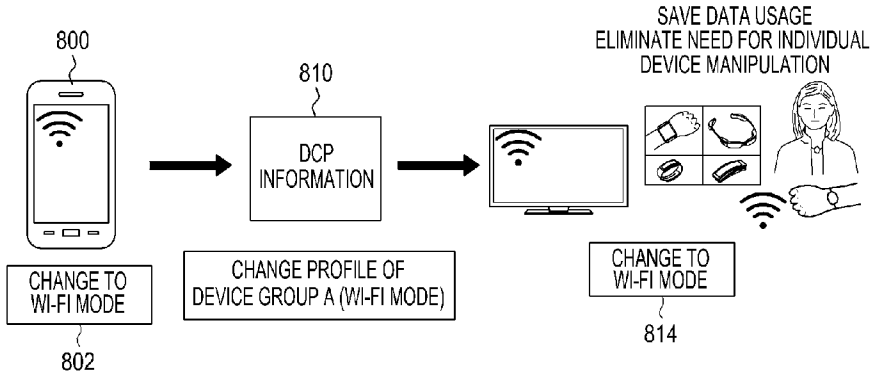
[Fig. 6]


START
TRANSMIT SDP OFFER MESSAGE
602
RECEIVE SDP RESPONSE MESSAGE
604
RECEIVE MVC CONTROL MESSAGE
606
CONTROL CORRESPONDING IMAGE BASED ON REQUEST FIELD AND CAM ID FIELD INCLUDED IN MVC CONTROL MESSAGE
608
TRANSMIT MVC CONTROL MESSAGE
610
END

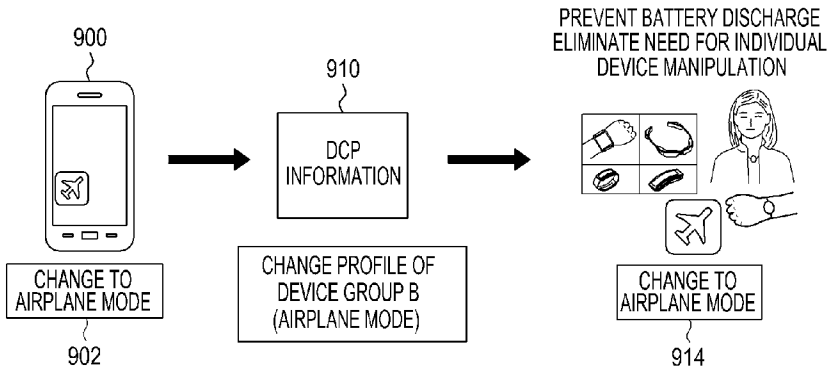
[Fig. 7]



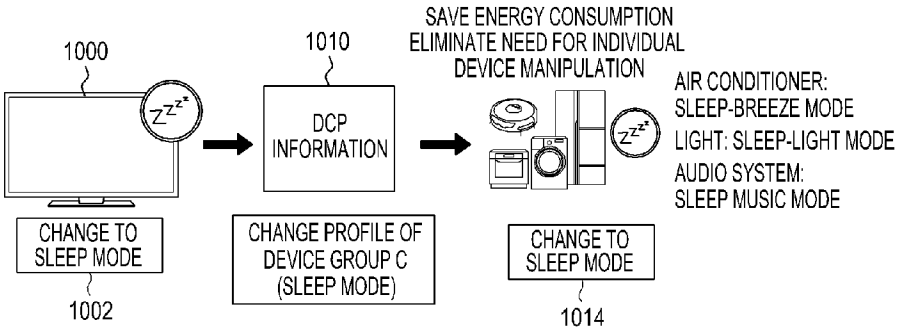
[Fig. 8]



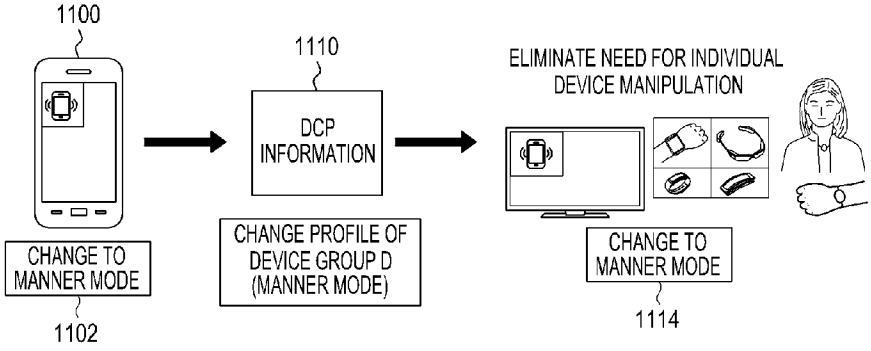
[Fig. 9]



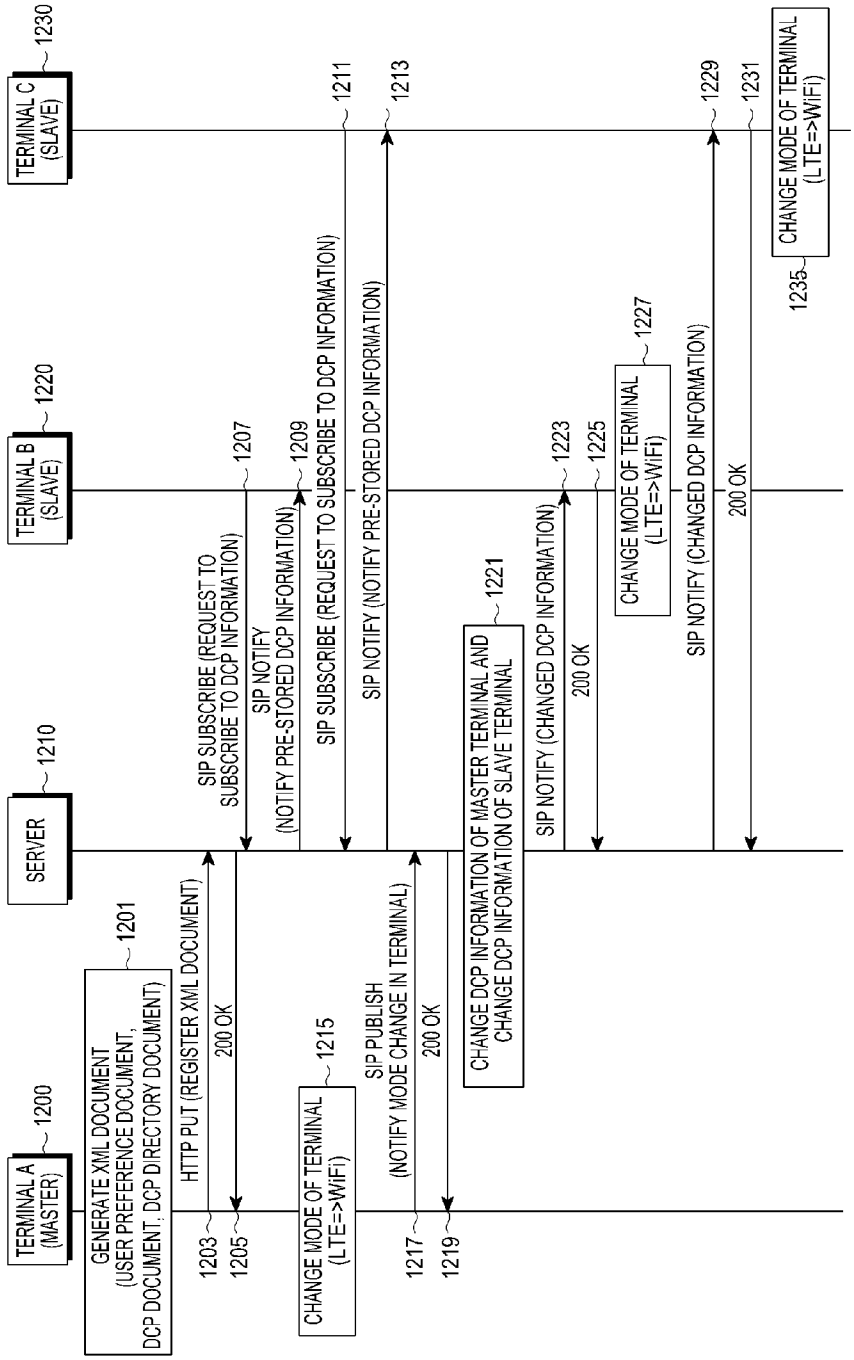
[Fig. 10]


1000
1010
SAVE ENERGY CONSUMPTION
ELIMINATE NEED FOR INDIVIDUAL DEVICE MANIPULATION
DCP INFORMATION
AIR CONDITIONER: SLEEP-BREEZE MODE
LIGHT: SLEEP-LIGHT MODE
AUDIO SYSTEM: SLEEP MUSIC MODE
CHANGE TO SLEEP MODE
1002
CHANGE PROFILE OF DEVICE GROUP C (SLEEP MODE)
CHANGE TO SLEEP MODE
1014

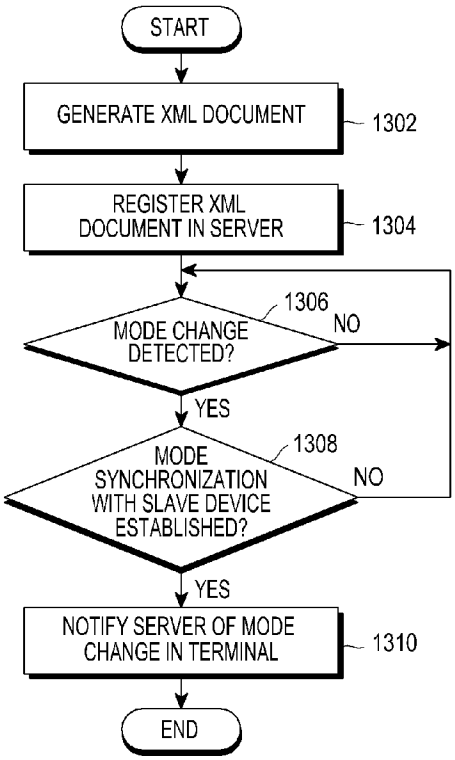
[Fig. 11]


1100
1110
ELIMINATE NEED FOR INDIVIDUAL DEVICE MANIPULATION
DCP INFORMATION
CHANGE TO MANNER MODE
1102
CHANGE PROFILE OF DEVICE GROUP D (MANNER MODE)
CHANGE TO MANNER MODE
1114

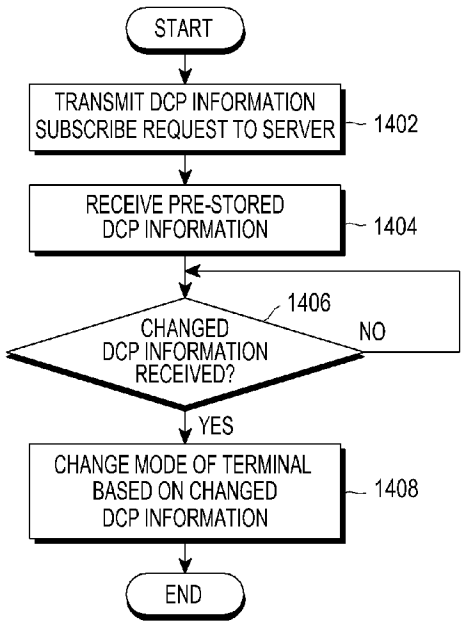
[Fig. 12]


TERMINAL A (MASTER)
1200
SERVER
1210
TERMINAL B (SLAVE)
1220
TERMINAL C (SLAVE)
1230
GENERATE XML DOCUMENT (USER PREFERENCE DOCUMENT, DCP DOCUMENT, DCP DIRECTORY DOCUMENT)
1201
HTTP PUT (REGISTER XML DOCUMENT)
1203
200 OK
1205
SIP SUBSCRIBE (REQUEST TO SUBSCRIBE TO DCP INFORMATION)
1207
SIP NOTIFY (NOTIFY PRE-STORED DCP INFORMATION)
1209
SIP SUBSCRIBE (REQUEST TO SUBSCRIBE TO DCP INFORMATION)
1211
SIP NOTIFY (NOTIFY PRE-STORED DCP INFORMATION)
1213
CHANGE MODE OF TERMINAL (LTE=>WiFi)
1215
SIP PUBLISH (NOTIFY MODE CHANGE IN TERMINAL)
1217
200 OK
1219
CHANGE DCP INFORMATION OF MASTER TERMINAL AND CHANGE DCP INFORMATION OF SLAVE TERMINAL
1221
SIP NOTIFY (CHANGED DCP INFORMATION)
1223
200 OK
1225
CHANGE MODE OF TERMINAL (LTE=>WiFi)
1227
SIP NOTIFY (CHANGED DCP INFORMATION)
1229
200 OK
1231
CHANGE MODE OF TERMINAL (LTE=>WiFi)
1235

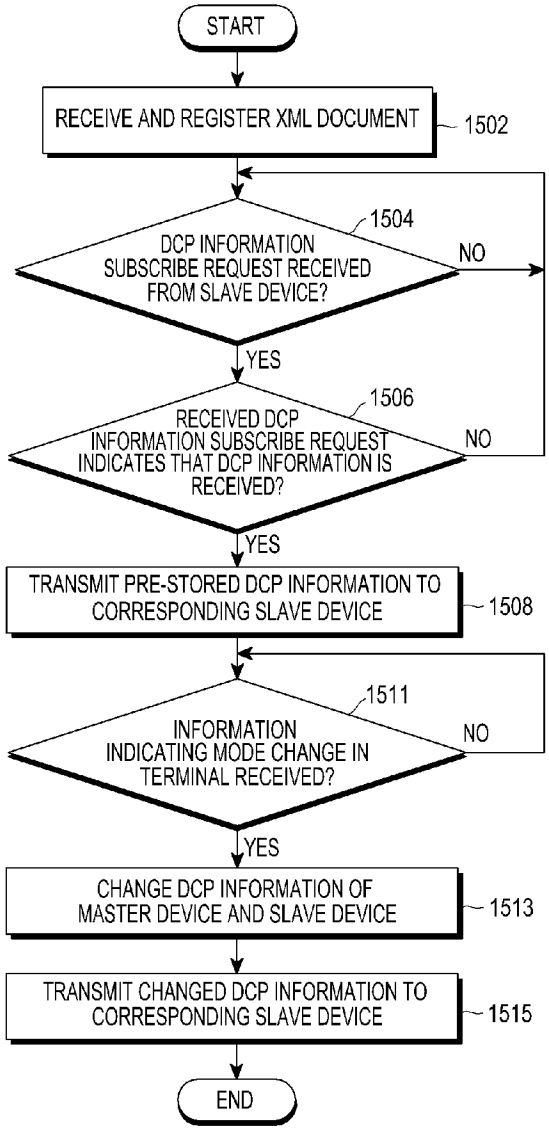
[Fig. 13]


START
GENERATE XML DOCUMENT
1302
REGISTER XML DOCUMENT IN SERVER
1304
1306
MODE CHANGE DETECTED?
NO
YES
1308
MODE SYNCHRONIZATION WITH SLAVE DEVICE ESTABLISHED?
NO
YES
NOTIFY SERVER OF MODE CHANGE IN TERMINAL
1310
END

[Fig. 14]


START
TRANSMIT DCP INFORMATION SUBSCRIBE REQUEST TO SERVER
1402
RECEIVE PRE-STORED DCP INFORMATION
1404
1406
CHANGED DCP INFORMATION RECEIVED?
NO
YES
CHANGE MODE OF TERMINAL BASED ON CHANGED DCP INFORMATION
1408
END

[Fig. 15]



[Fig. 16]

```
<User-Pref id=abc123>
<mode-sync state="on">
<wifi-sync> true </wifi-sync>
<airplane-sync> true </airplane-sync>
<sleep-sync> true </sleep-sync>
<manner-sync> true </manner-sync>
<roaming-sync> true </roaming-sync>
</mode-sync>
</User-Pref>
```

[Fig. 17a]

```
· LTE Profile
  <rule id="f3g44r1">
    <conditions>
      - LTE connection
    </conditions>
    <actions>
      - Deliver Notifications from Subscribed Services (Blocked if Roaming case)
      - Deliver Message Notifications
      - Block 3rd party Service Notifications
      - many such actions can be included
    </actions>
  </rule>
```

[Fig. 17b]

```
· WiFi Profile
  <rule id="ythk764">
    <conditions>
      - WiFi connection
    </conditions>
    <actions>
      - Deliver Notifications from Subscribed Services
      - Deliver Message Notifications
      - Deliver 3rd party Service Notifications
      - many such actions can be included
    </actions>
  </rule>
```

[Fig. 17c]

```
· Airplane Mode Profile
  <rule id="f1t2t45">
    <conditions>
      - Airplane
    </conditions>
    <actions>
      - Block Notifications from Subscribed Services
      - Block Message Notifications
      - Block 3rd party Service Notifications
      - Deactivate the data connection
      - many such actions can be included
    </actions>
  </rule>
```

[Fig. 17d]

```
· Sleep Mode Profile
  <rule id="ythk764">
    <conditions>
      - Sleep
    </conditions>
    <actions>
      - Block Notifications from Subscribed Services
      - Deliver Message Notifications
      - Block 3rd party Service Notifications
      - Activate the maximum power saving mode for mobile, tablet
      - Activate the sleep mode for air-conditioner and lights
      - many such actions can be included
    </actions>
  </rule>
```

[Fig. 18]

Content of Device Context Profile (DCP) Directory Document of a user :

Create profiles named "LTE", "WiFi", "Roaming", "Airplane" and "Sleep" etc.

- Application Server selects "LTE" profile as Active device DCP from his master device whose id is sip:ronald.underwood@example.com;gr= qazyhnujmgh78a.
- Application Server selects "WiFi" profile (ref-id="abc9i") as Active slave device DCP (id="1qaz") if master device's network connection becomes WiFi connection and does profile change to WiFi.
- Application Server selects "LTE" profile (ref-id="xyz8dh") as Active slave device DCP (id="1qaz") if master device's network connection becomes LTE connection and does profile change to LTE.
- Application Server selects "Roaming" profile (ref-id="def7j") as Active slave device DCP (id="1qaz") if master device's network connection becomes Roaming connection and does profile change to Roaming.
- Application Server selects "Airplane" profile (ref-id="ghi6k") as Active slave device DCP (id="3edc") and apply it to the dedicated device group (dp-id="aaa111") if master device's mode becomes Airplane mode and does profile change to Airplane.
- Application Server selects "Sleep" profile (ref-id="jkl5l") as Active slave device DCP (id="5tgb") and apply it to the dedicated device group (dp-id="bbb222") if master device's mode becomes Sleep mode and does profile change to Sleep.

[Fig. 19a]

```
<?xml version="1.0" encoding="UTF-8"?>
<dcp-directory xmlns="urn:xml:xdm:dcp-directory">
   <!-set of Device Context Profiles available created-->
  <!-set of per-mode device context profiles-->

     <dcp-set>
      <dcp dcp-id="xyz8dh">
           <display-name> LTE </display-name>
      </dcp>
      <dcp dcp-id="abc9i">
           <display-name> Wifi </display-name>
      </dcp>
      <dcp dcp-id="def7j">
           <display-name> Roaming </display-name>
      </dcp>
      <dcp dcp-id="ghi6k">
           <display-name> Airplane </display-name>
      </dcp>
      <dcp dcp-id="jkl5l">
           <display-name> Sleep </display-name>
      </dcp>
      </dcp-set>

     <!-set of Devices for Device Profiles available created-->
     <!-set of terminal lists (wearable terminal list, home appliance list, master terminal list)-->
```

[Fig. 19b]

```
<dp-set>
 <dp dp-id="aaa111">
        <display-name> wearable devices </display-name>
        <device-list>
        <device device-type="wearable" device-
id="sip:ronald.underwood@example.com;gr=kdfdhjkurgh97d"/>
        <device device-type="wearable" device-
id="sip:ronald.underwood@example.com;gr=yhndhjkurgh98d"/>
        <device device-type="wearable" device-
id="sip:ronald.underwood@example.com;gr=ujmdhjkurgh99d"/>
        </device-list>
</dp>
<dp dp-id="bbb222">
        <display-name> home appliances </display-name>
        <device-list>
        <device device-type="homeappliance" device-
id="sip:ronald.underwood@example.com;gr=qazdhjkurgh12q"/>
        <device device-type="homeappliance" device-
id="sip:ronald.underwood@example.com;gr=yhnwsxkurgh34r"/>
        <device device-type="homeappliance" device-
id="sip:ronald.underwood@example.com;gr=rfvdhjkurgh45t"/>
        </device-list>
</dp>
<dp dp-id="ccc333">
        <display-name> master device </display-name>
        <device-list>
        <device device-type="mobile" device-
id="sip:ronald.underwood@example.com;gr=qazyhnujmgh78a"/>
        <device device-type="tablet" device-
id="sip:ronald.underwood@example.com;gr=yhnujmikngh56d"/>
        </device-list>
</dp>
<dp-set>
<!-set of Active Device Context Profiles available created-->
<!-set of device-activated device context profiles-->
<active-dcp>
<!-Master Device's Device Context Profiles available created-->
<!-device context profile activated in master device-->
  <master-dcp>
      <master-device-id="sip:ronald.underwood@example.com;gr=qazyhnujmgh78a"/>
      <active-device-dcp dcp-reference ref-id="xyz8dh"> <!? LTE Profile -->
 </master-dcp>
```

[Fig. 19c]

```
<!-set of Devices' active Device Context Profiles rule available created-->
<!-set of device context profile rules according mode change in master terminal (e.g., if master terminal
changes to roaming, profile of dependent (slave) terminal is changed/operated in roaming profile) -->
<ruleset>
<rule id="f3g66r1">
<conditions>
- master device Connection becomes WiFi connection
</conditions>
<actions>
- Activate WiFi Profile(ref-id="abc9i") on behalf of the existing Profile of slave
devices dcp (id="1qaz")
</actions>
</rule>
<rule id="g6j88h1">
<conditions>
- master device Connection becomes LTE connection
</conditions>
<actions>
- Activate LTE Profile(ref-id="xyz8dh") on behalf of the existing Profile of slave
devices dcp (id="1qaz")
</actions>
</rule>
<rule id="r4y88s3">
<conditions>
- master device's Connection becomes Roaming connection
</conditions>
<actions>
- Activate Roaming Profile(ref-id="def7j") on behalf of the existing Profile of slave
devices dcp (id="1qaz")
</actions>
</rule>
<rule id="g3g22g1">
<conditions>
- master device becomes Airplane Mode
</conditions>
<actions>
- Activate Airplane Mode (ref-id="ghi6k") on the dedicated slave device group (dp-id="aaa111")
</actions>
</rule>
<rule id="a3g22d1">
<conditions>
- master device becomes Sleep Mode
</conditions>
<actions>
- Activate Sleep Mode (ref-id="jkl5l") on the dedicated slave device group (dp-id="bbb222")
</actions> </rule>
</ruleset>
```

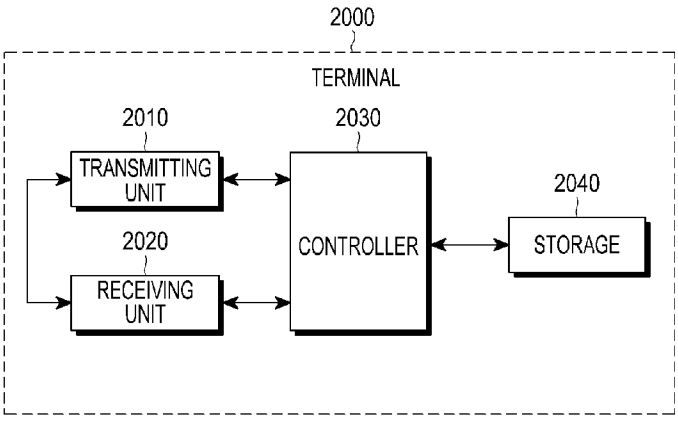
[Fig. 19d]

```
<!-set of Slave Devices' active Device Context Profiles available created-->
<!-set of device context profiles activated in dependent device (e.g., in case master terminal turns
   into airplane mode (ghi6k),airplane mode applies to wearable terminal (aaa111) as well) -->
 <slave-device-dcp-set>
<slave-device-dcp id="1qaz">
          <dcp-reference ref-id="xyz8dh"/> <!- LTE Profile -->
          <device-id="sip:ronald.underwood@example.com;gr=kdfdhjkurgh97d"/>
          <device-id="sip:ronald.underwood@example.com;gr=qazdhjkurgh12q"/>
          <device-id="sip:ronald.underwood@example.com;gr=yhnujmikngh56d"/>
</slave-device-dcp>
<slave-device-dcp id="3edc">
          <dcp-reference ref-id="ghi6k"/> <!- Airplane Profile -->
          <dp-reference dp-id="aaa111"/>
</slave-device-dcp>
<slave-device-dcp id="5tgb">
          <dcp-reference ref-id="jkl5l"/> <!- Sleep Profile -->
          <dp-reference dp-id="bbb222"/>
</slave-device-dcp>
</slave-device-dcp-set>

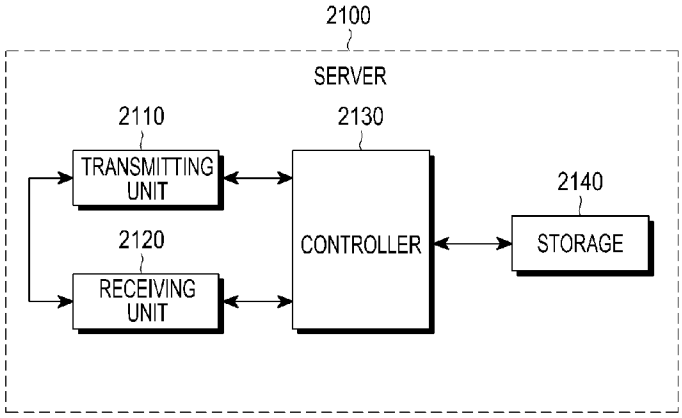
           <!-set of Active Device Context Profiles available created-->
    <!-set of terminals applied with separate device context profile among terminals-->

     <active-device-dcp-set>
<active-device-dcp id="2wsx">
          <dcp-reference ref-id="abc9i"/> <!- WiFi Profile -->
          <device-id="sip:ronald.underwood@example.com;gr=yhndhjkurgh98d"/>
          <device-id="sip:ronald.underwood@example.com;gr=yhnwsxkurgh34r"/>
</active-device-dcp>
<active-device-dcp id="4rfv">
          <dcp-reference ref-id="ghi6k"/> <!- Airplane Profile -->
          <device-id="sip:ronald.underwood@example.com;gr=yhnujmikngh56d"/>
</active-device-dcp>
<active-device-dcp id="9olk">
          <dcp-reference ref-id="jkl5l"/> <!- Sleep Profile -->
          <device-id="sip:ronald.underwood@example.com;gr=rfvdhjkurgh45t"/>
</active-device-dcp-set>
</active-dcp>
</dcp-directory>
```

[Fig. 20]



[Fig. 21]


2100
SERVER
2110
TRANSMITTING UNIT
2120
RECEIVING UNIT
2130
CONTROLLER
2140
STORAGE

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2015/004637

A. CLASSIFICATION OF SUBJECT MATTER

H04N 7/14(2006.01)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)
H04N 7/14; H04N 7/15; H04M 1/00; G05B 19/18; G10L 21/00; G06F 13/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Korean utility models and applications for utility models
Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
eKOMPASS(KIPO internal) & Keywords:terminal, receive, camera, image, number, identifier, request, turn on/off

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2008-0225109 A1 (EUN YOUNG LEE) 18 September 2008 See paragraphs [0027]-[0029], [0045]-[0046], [0051]; and figures 1, 3A-3C, 4A-4C, 6A-6D, 7A-7B, 8A-8B.	1-18
A	US 7554571 B1 (ALEXANDER JOHN GRAY BECK et al.) 30 June 2009 See column 6, lines 4-5, 19-23; and figure 5.	1-18
A	US 2014-0012587 A1 (SAMSUNG ELECTRONICS CO., LTD.) 09 January 2014 See paragraphs [0011]-[0016], [0042]; and figure 4.	1-18
A	US 2012-0320142 A1 (RANDALL B. BAIRD) 20 December 2012 See paragraphs [0011]-[0013]; and figure 1A.	1-18
A	US 2005-0065619 A1 (JAE-KWON KIM et al.) 24 March 2005 See paragraphs [0010]-[0019]; and figure 6.	1-18

☐ 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
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents,such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
13 August 2015 (13.08.2015)	**13 August 2015 (13.08.2015)**

Name and mailing address of the ISA/KR
International Application Division
Korean Intellectual Property Office
189 Cheongsa-ro, Seo-gu, Daejeon Metropolitan City, 302-701, Republic of Korea
Facsimile No. +82-42-472-7140

Authorized officer
KIM, Seong Woo
Telephone No. +82-42-481-3348

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/KR2015/004637

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2008-0225109 A1	18/09/2008	KR 10-1387479 B1	21/04/2014
		KR 10-2008-0084392 A	19/09/2008
		US 8558870 B2	15/10/2013
US 7554571 B1	30/06/2009	None	
US 2014-0012587 A1	09/01/2014	EP 2683147 A1	08/01/2014
		KR 10-2014-0005410 A	15/01/2014
		WO 2014-007545 A1	09/01/2014
US 2012-0320142 A1	20/12/2012	None	
US 2005-0065619 A1	24/03/2005	AU 2004-302144 A1	17/02/2005
		AU 2004-302144 B2	14/06/2007
		CN 1857025 A	01/11/2006
		CN 1857025 B	23/06/2010
		CN 1857025 C	01/11/2006
		DE 602004027199 D1	01/07/2010
		EP 1505554 A2	09/02/2005
		EP 1505554 A3	31/10/2007
		EP 1505554 B1	27/10/2010
		EP 1507210 A2	16/02/2005
		EP 1507210 A3	29/03/2006
		EP 1508888 A2	23/02/2005
		EP 1508888 A3	21/11/2007
		EP 1508888 B1	19/05/2010
		EP 1661430 A1	31/05/2006
		EP 1950661 A2	30/07/2008
		EP 1950661 A3	28/10/2009
		EP 1950662 A2	30/07/2008
		EP 1950662 A3	28/10/2009
		KR 10-0520118 B1	10/10/2005
		KR 10-0533676 B1	05/12/2005
		KR 10-0587539 B1	08/06/2006
		KR 10-0608807 B1	03/08/2006
		KR 20050023126 A	09/03/2005
		US 07450148 B2	11/11/2008
		US 07774527 B2	10/08/2010
		US 07853732 B2	14/12/2010
		US 08214863 B2	03/07/2012
		US 2005-0033887 A1	10/02/2005
		US 2005-0034160 A1	10/02/2005
		US 2005-0102699 A1	12/05/2005
		WO 2005-015943 A1	17/02/2005