

**COMMUNICATION SYSTEM, INFORMATION PROCESSING DEVICE, AND
CONNECTION SETTING METHOD**

[TECHNICAL FIELD]

[0001] The present disclosure relates to communication
5 technology and, more particularly, to a communication system,
an information processing apparatus, and a connection setting
method.

[BACKGROUND ART]

[0002] With the popularization of the Internet of things
10 (IoT) technology, houses in which various home electric
appliances and household equipment can be controlled via a
single input device (also referred to as "smart homes") have
become popular (see, for example, patent literature 1).

[0003]

15 [Patent Literature 1] JP2018-57245

[SUMMARY OF INVENTION]

[PROBLEMS TO BE SOLVED BY THE INVENTION]

[0004] In a house to which a user newly moves in, a
contractor normally performs basic setting of the user
20 equipment (e.g., home electric appliances and household
equipment) connected to a network, before a network is
established (e.g., before the Internet connection is made
available). Further, after the network is established, each
of the user equipment is required to be reconfigured for
25 connection to the network, etc.

[0005] The present disclosure addresses the above-

described issue, and a purpose thereof is to reduce the effort for setting up connection of the equipment provided in the user's facility to the network.

[SOLUTION TO PROBLEM]

5 **[0006]** A communication system according to an embodiment of the present disclosure includes: a communication apparatus and equipment provided in a facility of a user; and an operator apparatus, which is an apparatus of an operator that performs a work related to the equipment before a network in
10 the facility is established. The operator apparatus includes: an acknowledgment unit that acknowledges an input of connection information, which is information necessary to connect the equipment to the network; and a saving unit that saves the connection information on the equipment
15 acknowledged by the acknowledgment unit in a server. The communication apparatus includes: a reader that reads the connection information on the equipment saved in the server; and a setting unit that performs a process of connecting the equipment to the network in the facility based on the
20 connection information on the equipment read by the reader.

[0007] Another embodiment of the present disclosure relates to an information processing apparatus. The apparatus is an apparatus of an operator that performs, before a network is established in a user facility provided
25 with a communication apparatus and equipment, a work related to the equipment, including: an acknowledgment unit that

acknowledges an input of connection information, which is information necessary to connect the equipment to the network; and a saving unit that saves the connection information on the equipment acknowledged by acknowledgment unit in a server, thereby allowing the communication apparatus to perform an operation of reading the connection information on the equipment saved in the server and a process of connecting the equipment to the network in the facility based on the connection information.

10 **[0008]** Another embodiment of the present disclosure relates to a connection setting method. The method includes: acknowledging, using an apparatus of an operator that performs, before a network is established in a user facility provided with a communication apparatus and equipment, a work
15 related to the equipment, an input of connection information, which is information necessary to connect the equipment to the network; saving, using the apparatus of the operator, the connection information on the equipment thus acknowledged in a server; reading, using the communication apparatus, the
20 connection information on the equipment saved in the server; and performing, using the communication apparatus, a process for connecting the equipment to the network of the facility, based on the connection information on the equipment thus read.

25 **[0009]** Optional combinations of the aforementioned constituting elements, and implementations of the present

disclosure in the form of computer programs, recording mediums encoded with computer programs, etc. may also be practiced as additional modes of the present disclosure.

[ADVANTAGEOUS EFFECTS OF INVENTION]

5 **[0010]** According to the present disclosure, the effort for setting up connection of the equipment provided in the user's facility to the network can be reduced.

[BRIEF DESCRIPTION OF DRAWINGS]

10 **[0011]** Fig. 1 shows a configuration of a communication system according to the first embodiment;

 Fig. 2 is a block diagram showing the functional blocks of the operator apparatus of Fig. 1;

 Fig. 3 is a block diagram showing the functional blocks of the GW of Fig. 1;

15 Fig. 4 is a sequence chart showing the operation of the communication system according to the first embodiment;

 Fig. 5 shows a configuration of the communication system according to the variation;

20 Fig. 6 is a sequence chart showing the operation of the communication system according to the variation;

 Fig. 7 is also a sequence chart showing the operation of the communication system according to the variation;

 Fig. 8 is a block diagram showing the functional blocks of the GW of the second embodiment;

25 Fig. 9 is a sequence chart showing the operation of the communication system according to the second embodiment;

Fig. 10 is also a sequence chart showing the operation of the communication system according to the second embodiment; and

Fig. 11 is a sequence chart showing the operation of the communication system 10 according to the variation.

[0012] The device or the entity that executes the method according to the disclosure is provided with a computer. By causing the computer to run a program, the function of the device or the entity that executes the method according to the disclosure is realized. The computer is comprised of a processor that operates in accordance with the program as a main hardware feature. The disclosure is non-limiting as to the type of the processor so long as the function is realized by running the program. The processor is comprised of one or a plurality of electronic circuits including a semiconductor integrated circuit (IC) or a large-scale integration (LSI). The terms IC and LSI may change depending on the integration degree, and the processor may be comprised of a system LSI, a very large scale integration (VLSI), or an ultra large scale integration (USLI). A field programmable gate array (FPGA) programmed after the LSI is manufactured, or a reconfigurable logic device, in which the connections inside the LSI are reconfigurable or the circuitry blocks inside the LSI can be set up, can be used for the same purpose. The plurality of electronic circuits may be integrated in one chip or provided in a plurality of chips. The plurality of chips may be

aggregated in one device or provided in a plurality of apparatuses. The program is recorded in a non-transitory recording medium such as a computer-readable ROM, optical disk, and hard disk drive. The program may be stored in a recording medium in advance or supplied to a recording medium via wide area communication network including the Internet.

[0013] The concept of the embodiments will be described before describing the embodiments in details. In a house to which a user newly moves in, an operator (e.g., a construction professional or a household equipment professional) normally performs basic setting and operation checking of the user equipment provided in the user's house before the Internet connection is made available. For this purpose, the operator brings in a mobile router, etc. into the user's house and connects the user equipment to the network via the mobile router. After the Internet connection is made available, the user equipment is required to be reconfigured for connection to the network in the user's house (e.g., a Wi-Fi (registered trademark) access point), which has necessitated an effort.

[0014] This is addressed in the embodiments by causing the operator to connect the user's gateway (GW) and the equipment to the mobile router and save information relating to the connection in a server on a cloud. The communication apparatus of the user reads connection information on the GW and the equipment from the server to automatically register

the GW and the equipment in the Wi-Fi access point of the user. This reduces the effort of the user for connecting a large number of equipment units to the Wi-Fi access point.

[0015] In the embodiments, a publicly known "Wi-Fi Certified Easy Connect" is used to connect the GW and the equipment of the user to the Wi-Fi access point (the same is true of the mobile router). The technology involves the following steps. (1) A configurator reads the two-dimensional code of the access point and establishes connection to the access point based on the information indicated by the two-dimensional code. (2) The configurator reads the two-dimensional code of a client device that should be connected to Wi-Fi and registers the client device in the access point based on the information indicated by the two-dimensional code. (3) Thereafter, the client device can connect to the Wi-Fi network. In the embodiments, the GW or the user terminal 18 functions as the configurator.

[0016] The embodiments will be described in detail.

<First embodiment>

Fig. 1 shows a configuration of a communication system according to the first embodiment. The communication system 10 is provided with (1) user equipment 12, a GW 14, and an AP 16 provided in the user's house and used by the user after the user moves in, (2) an operator apparatus 20 and a mobile router 22 brought in by the operator for the work at the user's house, and (3) a server 24 provided

outside the user's house (e.g., on a cloud). The broken line in Fig. 1 shows the network configuration built for basic setting performed by the operator before the Internet connection in the user's house is made available, and the solid line of Fig. 1 shows the network configuration established after the Internet connection in the user's house is made available.

[0017] The user equipment 12 is inclusive of a plurality of home electric appliances, household equipment, and

10 information equipment that can be connected to a network.

For example, the user equipment 12 may be inclusive of an air conditioner, illumination, an electric window shutter, and an electric lock. The GW 14 is a communication apparatus

(gateway apparatus) for controlling a plurality of units of user equipment 12. The GW 14 may be implemented as a part of the function of a home energy management system (HEMS) controller. The AP 16 is a Wi-Fi access point (i.e., a Wi-Fi router) and is connected to the Internet 26.

[0018] The operator apparatus 20 is an information

20 processing apparatus for performing a setting work related to the user equipment 12 before the network in the user's house is established (before the Internet connection is made

available). The operator apparatus 20 may be, for example, a notebook PC, a tablet terminal, or a smartphone. The mobile

25 router 22 functions as a Wi-Fi router and connects to the Internet 26 by 4G or 5G communication. The server 24 is an

information processing apparatus that stores connection information necessary to connect the user equipment 12 to the network.

[0019] Fig. 2 is a block diagram showing the functional blocks of the operator apparatus 20 of Fig. 1. The blocks depicted in the block diagram of this disclosure are implemented in hardware such as devices and mechanical apparatus exemplified by a CPU and a memory of a computer, and in software such as a computer program. Fig. 2 depicts functional blocks implemented by the cooperation of these elements. Therefore, it will be understood by those skilled in the art that the functional blocks may be implemented in a variety of manners by a combination of hardware and software.

[0020] The operator apparatus 20 is provided with a camera unit 30, an acknowledgment unit 32, a setting unit 34, and a saving unit 36. A computer program implementing at least some of the functional blocks shown in Fig. 2 may be stored in a recording medium and installed in the storage of the operator apparatus 20 via the recording medium. Alternatively, the computer program may be installed in the storage of the operator apparatus 20 via a communication network. The CPU of the operator apparatus 20 may exhibit the functions of the function blocks by reading the computer program into a memory and running the computer program. The same holds true of the other block diagrams.

[0021] The camera unit 30 images a two-dimensional code

attached to the casing of the apparatus (hereinafter,
"apparatus to be registered") that should be registered in
the mobile router. The two-dimensional code encodes
connection information necessary to connect the apparatus to
5 be registered to the network. The connection information may
include the MAC address or the pass phrase of the apparatus.

[0022] The acknowledgment unit 32 acknowledges an input
of the connection information on the apparatus to be
registered. More specifically, the acknowledgment unit 32
10 acknowledges image data for the two-dimensional code output
from the camera unit 30. The acknowledgment unit 32 decodes
the two-dimensional code by analyzing the image data and
acquires the connection information indicated by the two-
dimensional code.

15 **[0023]** The setting unit 34 registered the apparatus to
be registered in the mobile router 22 based on the connection
information of the apparatus to be registered acknowledged by
the acknowledgment unit 32. This enables Wi-Fi communication
between the apparatus to be registered and the mobile router
20 22. The saving unit 36 accesses the server 24 via the
Internet 26 and saves the connection information of the
apparatus to be registered acknowledged by the acknowledgment
unit 32 in the server 24.

[0024] Fig. 3 is a block diagram showing the functional
25 blocks of the GW 14 of Fig. 1. The GW 14 includes a camera
unit 40, an acknowledgment unit 42, a reader 44, and a

setting unit 46. The camera unit 40 images a two-dimensional code attached to the casing of the apparatus to be registered that should be registered in the AP 16.

[0025] The acknowledgment unit 32 acknowledges an input
5 of the connection information on the apparatus to be registered. More specifically, the acknowledgment unit 42 acknowledges image data for the two-dimensional code output from the camera unit 40 and acquires the connection information indicated by the two-dimensional code. The
10 reader 44 accesses the server 24 via the Internet 26 and reads the connection information on the apparatus to be registered saved in the server 24.

[0026] The setting unit 46 performs the process to connect the apparatus to be registered to the network in the
15 user's house. More specifically, the setting unit 46 registers the apparatus to be registered in the AP 16 based on the connection information on the apparatus to be registered acknowledged by the acknowledgment unit 42. Further, the setting unit 46 registers the apparatus to be
20 registered in the AP 16 based on the connection information on the apparatus to be registered read by the reader 44. This enables Wi-Fi communication between the apparatus to be registered and the AP 16.

[0027] A description will now be given of the operation
25 of the communication system 10 according to the first embodiment. Fig. 4 is a sequence chart showing the operation

of the communication system 10 according to the first embodiment. The steps S10-S22 in the chart are steps related to the setting work performed by the operator before the network in the user's house is established, and, typically,
5 before the user moves in.

[0028] The operator manipulates the camera unit 30 of the operator apparatus 20 to image the two-dimensional code of the mobile router 22 (S10). The acknowledgment unit 32 of the operator apparatus 20 acquires the connection information
10 on the mobile router 22 indicated by the two-dimensional code, based on the image capturing the two-dimensional code of the mobile router 22. The setting unit 34 of the operator apparatus 20 registers the operator apparatus 20 in the mobile router 22 based on the connection information on the
15 mobile router 22 (S12).

[0029] The operator manipulates the camera unit 30 of the operator apparatus 20 to image the two-dimensional code of the GW 14 (S14). The acknowledgment unit 32 of the operator apparatus 20 acquires the connection information on
20 the GW 14 indicated by the two-dimensional code, based on the image capturing the two-dimensional code of the GW 14. The setting unit 34 of the operator apparatus 20 registers the GW 14 in the mobile router 22 based on the connection information on the GW 14 (S16).

25 **[0030]** The operator images the two-dimensional code of the user equipment 12 by using the camera unit 30 of the

operator apparatus 20 (S18). The acknowledgment unit 32 of the operator apparatus 20 acquires the connection information on the user equipment 12 indicated by the two-dimensional code, based on the image capturing the two-dimensional code
5 of the user equipment 12. The setting unit 34 of the operator apparatus 20 registers the user equipment 12 in the mobile router 22 based on the connection information on the user equipment 12 (S20). In practice, the two-dimensional codes of a plurality of units of user equipment 12 are
10 acquired, and the plurality of units of user equipment 12 are registered in the mobile router 22 based on the connection information indicated by the two-dimensional codes of the respective equipment units.

[0031] The operator performs basic setting of the user
15 equipment 12 and the GW 14. For example, the operator causes the user equipment 12 and the GW 14 to communicate with an apparatus outside the user's house (e.g., the server 24, etc.) via the mobile router 22-the Internet 26. Further, the operator tests the operation of the user equipment 12 by
20 transmitting a predetermined control signal from the operator apparatus 20 to the user equipment 12. Given that the user equipment 12 is illumination, for example, the operator confirms that the user equipment 12 is lighted in response to the control signal. Given that the user equipment 12 is an
25 electric window shutter, the operator confirms that the shutter is opened or closed in response to the control

signal.

[0032] When the basic setting is completed, the operator logs in from the operator apparatus 20 to the server 24 by using the ID and the password of the operator. The operator
5 inputs a user operation for directing the connection information to be saved to the operator apparatus 20. The saving unit 36 of the operator apparatus 20 transmits the connection information (i.e., the two-dimensional code information) on the user equipment 12 to the server 24 and
10 causes the server 24 to store the connection information (S22). In practice, the saving unit 36 transmits the connection information on each of a plurality of units of user equipment 12 to the server 24 and causes the server 24 to store the connection information.

15 **[0033]** The steps S24-S30 in Fig. 4 are steps related to the setting work performed by the user after the network in the user's house is established, and, typically, after the user moves in. The user images the two-dimensional code of the AP 16 by using the camera unit 40 of the GW 14 (S24).
20 The acknowledgment unit 42 of the GW 14 acquires the connection information on the AP 16 indicated by the two-dimensional code, based on the image capturing the two-dimensional code of the AP 16. The setting unit 46 of the GW 14 registers the GW 14 in the AP 16 based on the connection
25 information on the AP 16 (S26).

[0034] The reader 44 of the GW 14 reads from the server

24 the connection information (i.e., the two-dimensional code
information) on the user equipment 12 saved in the server 24
in S22 (S28). The setting unit 46 of the GW 14 registers the
user equipment 12 in the AP 16 based on the connection
5 information on the user equipment 12 (S30). Thereafter, it
is possible to manipulate the plurality of units of user
equipment 12 from the GW 14 or to manipulate the plurality of
units of user equipment 12 from the smartphone of the user.

[0035] According to the communication system 10 of the
10 first embodiment, the effort of the user for connecting a
large number of units of user equipment 12 to the Wi-Fi
access point can be reduced. Further, the user need not ask
the operator again to connect the user equipment 12 to the
network after the network in the user's house is established
15 and so can enjoy the benefit of cost reduction.

[0036] Given above is a description of the present
disclosure based on the first embodiment. The embodiment is
intended to be illustrative only and it will be understood by
those skilled in the art that various modifications to
20 constituting elements and processes could be developed and
that such modifications are also within the scope of the
present disclosure.

[0037] A description will be given of a variation to the
first embodiment. The features of the variation different
25 from those of the first embodiment will mainly be described
below, and a description of the common features will be

omitted. Those constituting elements of the variation that are identical to or corresponding to the constituting elements of the first embodiment will be denoted by the same reference symbols in the description.

5 **[0038]** Fig. 5 shows a configuration of the communication system 10 according to the variation. The communication system 10 according to the variation is further provided with a user terminal 18. The user terminal 18 is a communication apparatus capable of 4G or 5G communication in addition to
10 Wi-Fi communication. The user terminal 18 may be, for example, a smartphone or a tablet terminal of the user. The user terminal 18 is provided with the camera unit 40, the acknowledgment unit 42, the reader 44, and the setting unit 46, which are provided in the GW 14 in the first embodiment.
15 In this variation, an application implementing the functions of these functional blocks (hereinafter, "setting App") is installed in the user terminal 18.

[0039] A description will now be given of the operation of the communication system 10 according to the variation.
20 Fig. 6 is a sequence chart showing the operation of the communication system 10 according to the variation. The chart shows a process related to the setting work performed by the operator before the network in the user's house is established. The steps S40-S50 in the chart are the same as
25 the steps S10-S20 of Fig. 4 so that a description thereof is omitted.

[0040] The operator apparatus 20 logs in to the server 24 by using the ID and the password of the operator. The saving unit 36 of the operator apparatus 20 transmits the connection information on the GW 14 and the connection information on the user equipment 12 to the server 24 and causes the connection information to be stored in the storage area in the server 24 for the operator (hereinafter, "operator area") (S52).

[0041] The operator logs in to the server 24 by using the ID and the password of the operator and moves the connection information on the GW 14 and the connection information on the user equipment 12 stored in the operator area of the server 24 to the storage area in the server 24 for the user (hereinafter, "user area") (S54). The server 24 issues an ID and a password of the user and notifies the user equipment 12 accordingly (S56). The user equipment 12 may receive the notification via a 4G line or a 5G line. The ID and the password of the user can access the user area of the server 24 but cannot access the operator area.

[0042] Fig. 7 is also a sequence chart showing the operation of the communication system 10 according to the variation. The chart shows a process related to the setting work performed by the user after the network in the user's house is established. The user logs in to the setting App of the user terminal 18 by using the ID and the password communicated in S56. The user images the two-dimensional

code of the AP 16 by using the camera unit 40 of the user terminal 18 (S58). The acknowledgment unit 42 of the user terminal 18 acquires the connection information on the AP 16 indicated by the two-dimensional code, based on the image capturing the two-dimensional code of the AP 16. The setting unit 46 of the user terminal 18 registers the user terminal 18 in the AP 16 based on the connection information on the AP 16 (S60).

[0043] The reader 44 of the user terminal 18 logs in to the server 24 by using the ID and the password of the user input by the user and reads the connection information on the GW 14 and the connection information on the user equipment 12 stored in the user area of the server 24 (S62). The setting unit 46 of the user terminal 18 registers the GW 14 in the AP 16 based on the connection information on the GW 14 read from the server 24 (S64). For example, the setting unit 46 may enable Wi-Fi communication between the AP 16 and the GW 14 by transmitting the connection information on the GW 14 to the AP 16 and transmitting the connection information on the AP 16 to the GW 14.

[0044] Further, the setting unit 46 of the user terminal 18 registers the user equipment 12 in the AP 16 based on the connection information on the user equipment 12 read from the server 24 (S66). For example, the setting unit 46 may enable Wi-Fi communication between the AP 16 and the user equipment 12 by transmitting the connection information on the user

equipment 12 to the AP 16 and transmitting the connection information on the AP 16 to the user equipment 12.

[0045] The communication system 10 according to this variation provides the same advantage as the communication system 10 according to the first embodiment. In further accordance with the communication system 10 of this variation, it is possible to inherit, by using the ID and the password of the user, the connection information stored in the server 24 by using the ID and the password unique to the operator. In this way, the user can inherit the connection information on the respective equipment units and inhibit the security risk from being increased at the same time.

[0046]

<Second embodiment>

15 The features of the second embodiment different from those of the first embodiment will mainly be described below, and a description of the common features will be omitted. Those constituting elements of the second embodiment that are identical to or corresponding to the constituting elements of the first embodiment will be denoted by the same reference symbols in the description.

[0047] The configuration of the communication system 10 according to the second embodiment is the same as the configuration of the communication system 10 according to the first embodiment shown in Fig. 1. Like the operator apparatus 20 of the first embodiment, the operator apparatus

20 of the second embodiment is provided with the camera unit 30, the acknowledgment unit 32, the setting unit 34, and the saving unit 36 shown in Fig. 2.

[0048] The saving unit 36 of the operator apparatus 20
5 saves the connection information on the user equipment 12 in the server 24 and further saves setting information related to the detail that the operator has set in the user equipment 12. The setting information may, for example, include information related to the user, information designating the
10 operation mode determined by the status of the user's house, and information on the setting related to HEMS.

[0049] Fig. 8 is a block diagram showing the functional blocks of the GW 14 of the second embodiment. The GW 14 of the second embodiment is further provided with a saving unit
15 48 in addition to the functional blocks described in the first embodiment. The reader 44 of the GW 14 reads the connection information on the user equipment 12 saved in the server 24 in advance and further reads the setting information on the user equipment 12 saved in the server 24
20 in advance. The saving unit 48 of the GW 14 saves the setting information on the user equipment 12 read by the reader 44 in the user area in the server 24.

[0050] A description will be given of the operation of the communication system 10 according to the second
25 embodiment. Fig. 9 is a sequence chart showing the operation of the communication system 10 according to the second

embodiment. The steps shown in the chart are steps related to the setting work performed by the operator before the network in the user's house is established, and, typically, before the user moves in. The steps S70-S80 in the chart are the same as the steps S10-S20 of Fig. 4 so that a description thereof is omitted.

[0051] The setting unit 34 of the operator apparatus 20 transmits the data that should be set in the GW 14 (e.g., information on the user equipment 12 to be housed, etc.) to the GW 14 via the mobile router 22 in response to the manipulation by the operator (S82). The GW 14 communicates the result of setting to the operator apparatus 20 (S84). The setting unit 34 of the operator apparatus 20 transmits the data that should be set in the user equipment 12 (e.g., information on the GW 14 that houses the user equipment 12, etc.) to the user equipment 12 via the mobile router 22 in response to the manipulation by the operator (S86). The user equipment 12 communicates the result of setting to the operator apparatus 20 (S88).

[0052] The saving unit 36 of the operator apparatus 20 transmits the connection information (i.e., the two-dimensional code information) on the user equipment 12 to the server 24 and causes the server 24 to store the connection information (S90). Further, the saving unit 36 transmits setting information showing the detail set in the GW 14 and setting information showing the detail set in the user

equipment 12 to the server 24 and causes the server 24 to store the setting information (S92).

[0053] Fig. 10 is also a sequence chart showing the operation of the communication system 10 according to the second embodiment. The chart shows steps related to the setting work performed by the user after the network in the user's house is established, and, typically, after the user moves in. Before the steps in the chart are performed, the server 24 communicates the connection information related to the user and the address information (URI, etc.; hereinafter, also referred to as "read address") for accessing the setting information to the user in advance.

[0054] The steps S94, S96 in the chart are the same as the steps S24, S26 of Fig. 4 so that a description thereof is omitted. The GW 14 accesses the server 24 via the AP 16 and logs in to the server 24 by using the ID and the password of the user issued in advance. The reader 44 of the GW 14 reads from the server 24 the information registered by the operator, and, in this case, the connection information on the user equipment 12 by using the read address communicated to the user (S98). The setting unit 46 of the GW 14 registers the user equipment 12 in the AP 16 based on the connection information on the user equipment 12 (S100).

[0055] The reader 44 of the GW 14 reads from the server 24 the information registered by the operator, and, in this case, the setting information on the GW 14 and the setting

information on the user equipment 12 by using the read address communicated to the user (S102). The saving unit 48 of the GW 14 saves the setting information on the GW 14 and the setting information on the user equipment 12 read by the reader 44 in the user area of the server 24 (S104). The user area of the server 24 may be a storage area linked to the ID of the user and made accessible after log-in using the ID and the password of the user.

[0056] The communication system 10 according to the second embodiment provides the same advantage as the communication system 10 according to the first embodiment. In further accordance with the communication system according to the second embodiment, the the user can inherit and utilize the setting information on the GW 14 and the user equipment 12, by saving the information in the server 24 and causing the GW 14 to read the setting information after the network in the user's house is established. Further, writing the setting information on the GW 14 and the user equipment 12 into the user area of the server 24 helps facilitate utilization of setting information and maintain the security at the same time.

[0057] Given above is a description of the present disclosure based on the second embodiment. The embodiment is intended to be illustrative only and it will be understood by those skilled in the art that various modifications to constituting elements and processes could be developed and

that such modifications are also within the scope of the present disclosure.

[0058] A description will be given of a variation to the second embodiment. The features of the variation different
5 from those of the second embodiment will mainly be described below, and a description of the common features will be omitted. Those constituting elements of the variation that are identical to or corresponding to the constituting elements of the second embodiment will be denoted by the same
10 reference symbols in the description.

[0059] The communication system 10 according to this variation has the same configuration as that of the communication system 10 according to the variation to the first embodiment shown in Fig. 5. The user terminal 18 of
15 this variation is provided with the camera unit 40, the acknowledgment unit 42, the reader 44, the setting unit 46, and the saving unit 48 which are provided in the GW 14 of the second embodiment.

[0060] A description will be given of the operation of
20 the communication system 10 according to the variation. The steps in the operation of the communication system 10 according to the variation related to the setting work performed by the operator before the network in the user's house is established, and, typically, before the user moves
25 in are the same as the steps of the second embodiment shown in Fig. 9 so that a description thereof is omitted.

[0061] Fig. 11 is a sequence chart showing the operation of the communication system 10 according to the variation. The chart shows steps related to the setting work performed by the user after the network in the user's house is established, and, typically, after the user moves in. The server 24 notifies the user terminal 18 of the ID, password, and read address of the user (S110). The notification may be made through a network such as a cellular phone network to which the user terminal 18 is connected different from the network of the user's house.

[0062] The steps S112, S114 of Fig. 11 are the same as the steps S58, S60 shown in Fig. 7 so that a description thereof is omitted. The reader 44 of the user terminal 18 logs in to the server 24 by using the ID and the password of the user input by the user and reads from the server 24 the connection information on the GW 14 and the connection information on the user equipment 12 by using the read address (S116). The setting unit 46 of the user terminal 18 registers the GW 14 in the AP 16 based on the connection information on the GW 14 read from the server 24 (S118). Further, the setting unit 46 registers the user equipment 12 in the AP 16 based on the connection information on the user equipment 12 read from the server 24 (S120).

[0063] The saving unit 48 of the user terminal 18 reads the setting information on the GW 14 and the setting information on the user equipment 12 by using the read

address communicated to the user (S122). The saving unit 48 of the user terminal 18 saves, in the user area of the server 24, the setting information on the GW 14 and the setting information on the user equipment 12 read by the reader 44 (S124). The communication system 10 according to this variation provides the same advantage as the communication system 10 according to the second embodiment.

[0064] The technology described in the embodiments and the variations can also be applied to various facilities other than houses. For example, the technology can be applied to network connection setting in the equipment provided at corporate office, schools, etc.

[0065] Any combination of the embodiment and the variation described above will also be useful as an embodiment of the present invention. A new embodiment created by a combination will provide the combined advantages of the embodiment and the variation as combined. It will be understood to a skilled person that the functions that the constituting elements recited in the claims should achieve are implemented either alone or in combination by the constituting elements shown in the embodiments and the variations.

[0066] The technologies according to the second embodiment and variations may be defined by the following items.

[Item 1]

A communication system (10) including: a communication apparatus (14, 18) and equipment (12) provided in a facility of a user; and

an operator apparatus (20), which is an apparatus of an
5 operator that performs a work related to the equipment (12)
before a network in the facility is established, wherein

the operator apparatus (20) includes:

an acknowledgment unit (32) that acknowledges an input
of connection information, which is information necessary to
10 connect the equipment (12) to the network; and

a saving unit (36) that saves the connection
information on the equipment (12) acknowledged by the
acknowledgment unit in a server (24), wherein

the communication apparatus (14, 18) includes:

15 a reader (44) that reads the connection information on
the equipment (12) saved in the server (24); and

a setting unit (46) that performs a process of
connecting the equipment (12) to the network in the facility
based on the connection information on the equipment (12)
20 read by the reader (44).

[Item 2]

The communication system (10) according to item 1,
wherein the saving unit (36) of the operator apparatus (20)
accesses the server (24) by using the ID of the operator and
25 saves the connection information on the equipment (12) in an
operator area of the server (24), the connection information

on the equipment (12) is moved from the operator area to a user area in the server (24), and the reader (44) of the communication apparatus (14, 18) accesses the server (24) by using an ID of the user and reads the connection information
5 on the equipment (12) from the user area of the server (24).

[Item 3]

The communication system (10) according to item 1 or 2, wherein the saving unit (36) of the operator apparatus (20) further saves setting information related to a detail that
10 the operator has set in the equipment (12) in the server, and the reader (44) of the communication apparatus (14, 18) further reads the setting information on the equipment (12) saved in the server (24).

[Item 4]

15 The communication system (10) according to item 3, wherein the communication apparatus (14, 18) further includes a saving unit (48) that saves the setting information on the equipment (12) read by the reader (44) in a user area in the server (24).

20 [Item 5]

An information processing apparatus (20) of an operator that performs, before a network is established in a user facility provided with a communication apparatus (14, 18) and equipment (12), a work related to the equipment (12),
25 including: an acknowledgment unit (32) that acknowledges an input of connection information, which is information

necessary to connect the equipment (12) to the network; and a saving unit (36) that saves the connection information on the equipment (12) acknowledged by acknowledgment unit (32) in a server (24), thereby allowing the communication apparatus
5 (14, 18) to perform an operation of reading the connection information on the equipment (12) saved in the server (24) and a process of connecting the equipment (12) to the network in the facility based on the connection information.

[Item 6]

10 A connection setting method including: acknowledging, using an apparatus (20) of an operator that performs, before a network is established in a user facility provided with a communication apparatus (14, 18) and equipment (12), a work related to the equipment (12), an input of connection
15 information, which is information necessary to connect the equipment (12) to the network; saving, using the apparatus (20) of the operator, the connection information on the equipment (12) thus acknowledged in a server (24); reading, using the communication apparatus (14, 18), the connection
20 information on the equipment (12) saved in the server (24); and performing, using the communication apparatus (14, 18), a process for connecting the equipment (12) to the network of the facility, based on the connection information on the equipment (12) thus read.

25 [INDUSTRIAL APPLICABILITY]

[0067] The technology of the present disclosure can be

applied to systems and apparatuses related to communication.

[REFERENCE SIGNS LIST]

[0068] 10 communication system, 12 user equipment, 14
GW, 18 user terminal, 20 operator apparatus, 24 server, 32
5 acknowledgment unit, 34 setting unit, 36 saving unit, 42
acknowledgment unit, 44 reader, 46 setting unit, 48 saving
unit

[CLAIMS]

1. A communication system comprising:

a communication apparatus and equipment provided in a facility of a user; and

an operator apparatus, which is an apparatus of an operator that performs a work related to the equipment before a network in the facility is established and is an apparatus that the operator brings into the facility of the user, wherein

the operator apparatus includes:

an acknowledgment unit that acknowledges an input of connection information, which is information necessary to connect the equipment to the network and is information read from the equipment at the facility of the user before the network is established; and

a saving unit that saves the connection information on the equipment acknowledged by the acknowledgment unit in a server, wherein

the communication apparatus includes:

a reader that reads the connection information on the equipment saved in the server; and

a setting unit that performs a process of connecting the equipment to the network in the facility based on the connection information on the equipment read by the reader.

2. The communication system according to claim 1,

wherein

the saving unit of the operator apparatus accesses the server by using the ID of the operator and saves the connection information on the equipment in an operator area of the server,

the connection information on the equipment is moved from the operator area in the server to a user area in the server by the operator, and

the reader of the communication apparatus accesses the server by using an ID of the user and reads the connection information on the equipment from the user area of the server.

3. The communication system according to claim 1 or 2, wherein

the saving unit of the operator apparatus further saves setting information related to a detail that the operator has set in the equipment in the server, and

the reader of the communication apparatus further reads the setting information on the equipment saved in the server.

4. The communication system according to claim 3, wherein

the communication apparatus further includes a saving unit that saves the setting information on the equipment read by the reader in a user area in the server.

5. An information processing apparatus of an operator that performs, before a network is established in a user facility provided with a communication apparatus and equipment, a work related to the equipment, the information processing apparatus being an apparatus that the operator brings into the user facility, comprising:

an acknowledgment unit that acknowledges an input of connection information, which is information necessary to connect the equipment to the network and is information read from the equipment at the user facility before the network is established; and

a saving unit that saves the connection information on the equipment acknowledged by acknowledgment unit in a server, thereby allowing the communication apparatus to perform an operation of reading the connection information on the equipment saved in the server and a process of connecting the equipment to the network in the facility based on the connection information.

6. A connection setting method comprising:

acknowledging, using an apparatus of an operator that performs, before a network is established in a user facility provided with a communication apparatus and equipment, a work related to the equipment, an input of connection information, which is information necessary to connect the equipment to

the network and is information read from the equipment at the user facility before the network is established, the apparatus being an apparatus that the operator brings into the user facility;

saving, using the apparatus of the operator, the connection information on the equipment thus acknowledged in a server;

reading, using the communication apparatus, the connection information on the equipment saved in the server; and

performing, using the communication apparatus, a process for connecting the equipment to the network of the facility, based on the connection information on the equipment thus read.