

BUILDING MANAGEMENT SERVER

BACKGROUND OF THE INVENTION

Field of the Invention

[01] The present invention relates to a building management server, and more particularly, to a building management server, which can receive information from devices, such as sensors or cameras, located in a building and control devices existing inside or outside the building, thereby integratedly managing the building.

Background Art

[02] Conventionally, a gateway device, which collects and integratedly manages information from a plurality of sensors included in a building, did not exist.

[03] However, needless to individually connect gateway devices to sensors, it is necessary to collect and manage information by just one gateway device regardless of the number of sensors.

[04] It is also necessary to determine whether or not there is any error in a building when the gateway device receives all received signals regardless of kinds of external devices or units having sensors.

[05] It is necessary to provide a gateway device having a single circuit board, which can communicate with all sensors existing in the building.

[06] Moreover, it is also necessary to provide a building management server, which automatically controls devices or units existing in the building by utilizing information received from the gateway device even though a person does not intervene.

SUMMARY OF THE INVENTION

[07] Accordingly, the present invention has been made in view of the above-mentioned problems occurring in the prior art, and it is an object of the present invention to provide a building management server, which includes a single gateway device to collect and manage information regardless of the number of sensors.

[08] It is another object of the present invention to provide a building management server, which can determine whether or not there is any error in a building by receiving all received signals regardless of kinds of external devices or units having sensors.

[09] It is a further object of the present invention to provide a building management server, which includes a

gateway device having a single circuit board capable of communicating with all sensors existing in the building.

[10] It is a still further object of the present invention to provide a building management server, which automatically controls devices or units existing in the building by utilizing information received from the gateway device even though a person does not intervene.

[11] Technical objects of the present invention are not limited to the above-mentioned technical objects, and the above and other objects and merits of the present invention will be apparent from the following detailed description of the preferred embodiments of the invention in conjunction with the accompanying drawings.

[12] To accomplish the above object, according to the present invention, there is provided a building management server including: a first communication unit, which communicates with a gateway device, which receives information from a sensor device mounted on a building, by wire or wirelessly; and an electric quantity control unit, which receives electricity reading information from the gateway device and sends a power outage command to the gateway device when the read quantity of electricity contained in the electricity reading information is more than a predetermined numerical value.

[13] In an embodiment, the building management server further includes a water quantity control unit, which receives water reading information from the gateway device and sends a water outage command to the gateway device when the read quantity of water contained in the water quantity reading information is more than a predetermined numerical value.

[14] In an embodiment, the building management server further includes a gas quantity control unit, which receives gas reading information from the gateway device and sends a gas supply shutoff command to the gateway device when the read quantity of gas contained in the gas quantity reading information is more than a predetermined numerical value.

[15] In an embodiment, the building management server further includes an illumination control unit, which receives a fire detection information from the gateway device and sends the gateway device a lighting command to turn on a light located within a predetermined distance from the location of fire outbreak contained in the fire detection information.

[16] In an embodiment, the building management server further includes an illumination control unit, which receives illumination intensity information by each zone inside the building from the gateway device, and sends the gateway

device a brightness adjustment command to adjust brightness of lights existing in a specific zone when brightness contained in the illumination intensity information of the specific zone is more than or less than a predetermined numerical value.

[17] In an embodiment, the building management server further includes a gas valve control unit, which receives gas detection information from the gateway device and sends a gas valve locking command to lock a gas valve located within a predetermined distance from the gas leak location contained in the gas detection information.

[18] In an embodiment, the building management server further includes an elevator control unit, which sends the gateway device a number input button display command to display a number input button on a display window in an elevator to which a destination floor reservation device, which receives information of a destination floor in advance, is applied, when receiving emergency state information from the gateway device.

[19] In an embodiment, the building management server further includes an entrance control unit, which receives entrance opening and closing information of a building entrance from the gateway device, and sends the gateway

device an entrance locking command to close and lock the entrance when the entrance is opened at a predetermined time.

[20] In an embodiment, the building management server further includes an image storage unit, which receives image information containing images of the inside or outside of the building from the gateway device 100, compares a presently received image with a previous image, and, when there is a movement of an object, stores an image of the movement into a storage device.

[21] In an embodiment, the building management server further includes a parking management unit, which receives information of a vehicle entering an entrance of a parking lot, determines whether or not the vehicle information is information of the vehicle, which has been registered previously into the building management server, and then, when the vehicle information is information of the previously registered vehicle, sends the gateway device a parking lot barrier opening command to open a parking lot barrier.

[22] As described above, according to the preferred embodiments of the present invention, the building management server includes the single gateway device to collect and manage information regardless of the number of sensors.

[23] Moreover, the building management server according to the present invention can determine whether or not there

is any error in a building by receiving all received signals regardless of kinds of external devices or units having sensors.

[24] Furthermore, the building management server according to the present invention provides the gateway device having one circuit board capable of communicating with all sensors existing in the building.

[25] Additionally, the building management server according to the present invention automatically controls devices or units existing in the building by utilizing information received from the gateway device even though a person does not intervene.

[26] The effects of the present invention are not limited to the above-mentioned effects and further effects not described above will be clearly understood by those skilled in the art.

BRIEF DESCRIPTION OF THE DRAWINGS

[27] The above and other objects, features and advantages of the present invention will be apparent from the following detailed description of the preferred embodiments of the invention in conjunction with the accompanying drawings, in which:

[28] FIG. 1 is a view showing the entire structure of a building management system according to a preferred embodiment of the present invention;

[29] FIG. 2 is a view showing the entire structure of a building management server according to a preferred embodiment of the present invention;

[30] FIG. 3 is a block diagram showing the entire structure of a gateway device;

[31] FIGS. 4A to 4C are circuit diagrams showing a power supply unit;

[32] FIGS. 5A to 5D are circuit diagrams of an input unit;

[33] FIGS. 6A to 6C are circuit diagrams of a storage unit;

[34] FIG. 7 is a circuit diagram of a timer;

[35] FIG. 8 is a block diagram of an interface unit;

[36] FIGS. 9A to 9D are circuit diagrams of a first interface unit;

[37] FIG. 10 is a circuit diagram of a second interface unit;

[38] FIG. 11 is a circuit diagram of a third interface unit;

[39] FIG. 12 is a circuit diagram of a fourth interface unit;

[40] FIG. 13 is a circuit diagram of a fifth interface unit;

[41] FIG. 14 is a circuit diagram of a mechanical switch;

[42] FIG. 15 is a circuit diagram of a contactless relay;

[43] FIG. 16 is a circuit diagram of a temperature-humidity sensor unit;

[44] FIG. 17 is a circuit diagram of a buzzer unit; and

[45] FIGS. 18A and 18B are circuit diagrams of a control unit.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[46] Hereinafter, the above-mentioned and additional aspects according to the present invention will be described with reference to the accompanying drawings in detail. It should be understood that components of exemplary embodiments of the present invention may be made in diverse combination unless there is no contradiction between the components. Additionally, the present disclosure may be implemented in various ways without being limited to the embodiments.

[47] In addition, those parts which are not related to the description are omitted from the accompanying drawings in order to more clarify the description of the present invention,

and the same reference numerals and signs are used throughout the specification in order to designate the same or similar components. Moreover, when any portion "includes" any component, this does not exclude other components but means that any other component can be further included.

[48] Furthermore, in the entire specification of the present disclosure, to "connect" some part with another part means that some part is "directly connected" with another part and that some part is "indirectly connected" with another part through an element. Additionally, in the entire specification of the present disclosure, signals mean the quantity of electricity, such as voltages or electric currents.

[49] In the specification, "a unit" means a "block configured to change a hardware system or a software system or be plugged into the system", namely, means a unit or a block capable of performing a specific function of hardware or software.

[50] FIG. 1 is a view showing the entire structure of a building management system according to a preferred embodiment of the present invention. The building management system includes a building management server 300, a gateway device 100, a sensor device 200, and an imaging device 210.

[51] FIG. 2 is a view showing the entire structure of the building management server 300 according to a preferred embodiment of the present invention.

[52] In the preferred embodiment, the building management server 300 includes a first communication unit 301, and an electricity quantity control unit 302.

[53] The first communication unit 301 communicates with the gateway device 100, which receives information from the sensor device 200 mounted on a building, by wire or wirelessly. The first communication unit 301 of the building management server 300 is connected with the gateway device 100 regardless of environment of mobile network, such as 3G or 4G, and wireless communication network, such as WiFi. However, the present invention is not limited to the above, and the first communication unit 301 may be connected with the gateway device 100 through wireless local area network including at least one of near field communication (NFC), Bluetooth and others.

[54] The gateway device is mounted inside a building to receive data from the sensor device 200, such as an electric meter, and send the data to the building management server 300. The sensor device 200 includes an electric meter, a water meter, a hot-water meter, a gas meter, a fire sensor, a gas

leak sensor, an illumination sensor, a temperature sensor, and so on.

[55] The gateway device 100 receives image information not only from the sensor device 200 but also from the image device 210 and sends the image information to the building management server 300. The image device 210 is, for instance, a CCTV or a camera.

[56] In an embodiment, the electricity quantity control unit 302 receives electricity reading information from the gateway device 100, and then, sends a power outage command to the gateway device 100 when the quantity of electricity contained in the electricity reading information is more than a predetermined numerical value.

[57] The electricity quantity control unit 302 calculates the predetermined numerical value on the basis of at least one of the location of the building, time, seasons, and the number of residents in the building. The electricity quantity control unit 302 compares the calculated numerical value with the read quantity of electricity contained in the electricity reading information received in real time. The electricity quantity control unit 302 can receive electricity reading information by room included in the building. The electricity quantity control unit 302 can compare the read quantity of electricity contained in the electricity reading

information by room with the predetermined numerical value calculated by room, and then, send the gateway device 100 a power outage command on a room that the read quantity of electricity is more than the predetermined numerical value.

[58] The gateway device 100 receiving the power outage command controls a power breaker, which is included in the room that the read quantity of electricity is more than the predetermined numerical value, to interrupt electric power. Because the power outage command contains room information, the gateway device 100 can send the power outage command to the power breaker, which is included in the room that the read quantity of electricity is more than the predetermined numerical value among rooms included in the building. The power breaker receiving the power outage command interrupts electric power of the room including the power breaker.

[59] In an embodiment, the building management server 300 further includes a water quantity control unit 303.

[60] The water quantity control unit 303 receives water reading information from the gateway device 100, and then, sends a water outage command to the gateway device 100 when the read quantity of water contained in the water quantity reading information is more than a predetermined numerical value.

[61] The water quantity control unit 303 calculates the predetermined numerical value on the basis of at least one of the location of the building, time, seasons, and the number of residents in the building. The water quantity control unit 303 compares the calculated numerical value with the read quantity of water contained in the water reading information received in real time. The water quantity control unit 303 can receive water reading information by room included in the building. The water quantity control unit 303 can compare the read quantity of water contained in the water reading information by room with the predetermined numerical value calculated by room, and then, send the gateway device 100 a water outage command on a room that the read quantity of water is more than the predetermined numerical value.

[62] The gateway device 100 receiving the water outage command controls a water supply breaker, which is included in the room that the read quantity of water is more than the predetermined numerical value, to interrupt water supply. Because the water outage command contains room information, the gateway device 100 can send the water outage command to the water supply breaker, which is included in the room that the read quantity of water is more than the predetermined numerical value among rooms included in the building. The water supply breaker receiving the water outage command

interrupts water supply of the room including the water supply breaker.

[63] In an embodiment, the building management server 300 further includes a gas quantity control unit 304.

[64] The gas quantity control unit 304 receives gas reading information from the gateway device 100, and then, sends a gas supply shutoff command to the gateway device 100 when the read quantity of gas contained in the gas quantity reading information is more than a predetermined numerical value.

[65] The gas quantity control unit 304 calculates the predetermined numerical value on the basis of at least one of the location of the building, time, seasons, and the number of residents in the building. The gas quantity control unit 304 compares the calculated numerical value with the read quantity of gas contained in the gas reading information received in real time. The gas quantity control unit 304 can receive gas reading information by room included in the building. The gas quantity control unit 304 can compare the read quantity of gas contained in the gas reading information by room with the predetermined numerical value calculated by room, and then, send the gateway device 100 a gas supply shutoff command on a room that the read quantity of gas is more than the predetermined numerical value.

[66] The gateway device 100 receiving the gas supply shutoff command controls a gas circuit breaker, which is included in the room that the read quantity of gas is more than the predetermined numerical value, to shut off gas supply. Because the gas supply shutoff command contains room information, the gateway device 100 can send the gas supply shutoff command to the gas circuit breaker, which is included in the room that the read quantity of gas is more than the predetermined numerical value among rooms included in the building. The gas circuit breaker receiving the gas supply shutoff command shuts off gas supply of the room including the gas circuit breaker.

[67] In an embodiment, the building management server 300 further includes an illumination control unit 305.

[68] The illumination control unit 305 receives a fire detection information from the gateway device 100, and then, sends the gateway device 100 a lighting command to turn on a light located within a predetermined distance from the location of fire outbreak contained in the fire detection information.

[69] The gateway device 100 receives fire detection information from a fire detection device. The fire detection device senses outbreak of fire or a gas leak which is at risk of fire or suffocation, and sends fire detection information

to the gateway device 100. The fire detection device may include at least one of a fire sensor for sensing whether or not fire breaks out and a gas leak sensor for sensing whether or not gas escapes.

[70] The fire sensor may include at least one of a differential temperature detector working when ambient temperature is more than a predetermined rate of rise, a fixed temperature detector working when ambient temperature is more than a predetermined temperature and using bi-metal, a photoelectric detector operated by a change in the quantity of light meeting a photoelectronic device by inflow of air containing smoke of a predetermined concentration, and an ultraviolet/infrared flame detector having an ultraviolet -ray sensor for sensing wavelength characteristics of ultraviolet rays radiated from flames and an infrared-ray sensor for sensing wavelength characteristics of infrared rays radiated from flames.

[71] The gas leak sensor senses gas used in the building. The gas may be poisonous gas, such as LNG, LPG, oxidizing gas or carbon monoxide.

[72] The gateway device 100 receiving fire detection information from the fire detection device sends fire detection information to the illumination control unit 305 of the building management server 300. The illumination control

unit 305 sends the gateway device 100 the lighting command to turn on the light located within the predetermined distance from the location of fire outbreak contained in the fire detection information. The gateway device 100 sends the lighting command to the light located within the determined distance from the fire outbreak position, and then, the light is turned on.

[73] The illumination control unit 305 sends the lighting command to control a plurality of the lights existing on an evacuation route in the building to be turned on in sequential order. Because only the lights existing on an evacuation route in the building are turned on in sequential order, persons who exist in the building can easily follow the evacuation route.

[74] In an embodiment of the present invention, the illumination control unit 305 receives illumination intensity information by each zone inside the building from the gateway device 100, and then, sends the gateway device 100 a brightness adjustment command to adjust brightness of lights existing in a specific zone when brightness contained in the illumination intensity information of the specific zone is more than or less than a predetermined numerical value.

[75] The gateway device 100 receives illumination intensity information from the illumination sensor device 200

arranged by each zone inside the building, and then, sends the illumination intensity information to the illumination control unit 305 of the building management server 300.

[76] The illumination control unit 305 receives illumination intensity information by each zone inside the building from the gateway device 100, and then, sends the gateway device 100 a brightness adjustment command to make the lights bright, exists in the specific zone, when brightness contained in the illumination intensity information of the specific zone is more than the predetermined numerical value.

[77] the illumination control unit 305 receives illumination intensity information by each zone inside the building from the gateway device 100, and then, sends the gateway device 100 a brightness adjustment command to make the lights dark, exists in the specific zone, when brightness contained in the illumination intensity information of the specific zone is less than the predetermined numerical value.

[78] In an embodiment of the present invention, the building management server 300 further includes a gas valve control unit 306.

[79] The gas valve control unit 306 receives gas detection information from the gateway device 100, and sends a gas valve locking command to lock a gas valve located within a

predetermined distance from the gas leak location contained in the gas detection information.

[80] The gateway device 100 receives gas detection information from the gas leak sensor, and then, sends the gas detection information to the gas valve control unit 306 of the building management server 300. The gas valve control unit 306 sends the gateway device 100 the gas valve locking command to lock all gas valves of a gas pipe located within the predetermined distance from the gas leak sensor, which sensed the gas leak. The gateway device 100 transfers the gas valve locking command to all of the gas valves of the gas pipe located within the predetermined distance from the gas leak sensor, and locks the gas valve.

[81] In an embodiment of the present invention, the building management server 300 further includes an elevator control unit 307.

[82] The elevator control unit 307 sends the gateway device 100 a number input button display command to display a number input button on a display window in an elevator to which a destination floor reservation device is applied, when receiving emergency state information from the gateway device 100.

[83] The emergency state information contains gas leak information sent by the gas leak sensor and fire detection information sent by the fire sensor.

[84] The elevator to which the destination floor reservation device is applied is an elevator, which receives information of a destination floor before a person gets in the elevator. When the person selects the destination floor and one of a plurality of elevators through his or her terminal, the selected elevator receives information of the destination floor. The terminal may directly send the destination floor information containing the destination floor and the selected elevator to the elevator. Alternatively, the terminal may first send the building management server the destination floor information containing the destination floor and the selected elevator, the building management server may send the destination floor information to the gateway device 100, and the gateway device 100 may send the information of the destination floor to the elevator.

[85] As described above, because the elevator knows the information of destination floor in advance, when the person gets in the elevator, there is no need to provide the number input button on the display window included in the elevator.

[86] The elevator control unit 307 of the building management server 300 controls to display information of each

floor on the internal display window of the elevator to which the destination floor reservation device is applied.

[87] The elevator control unit 307 of the building management server 300 sends the gateway device 100 the number input button display command to display the number input button on the internal display window of the elevator to which the destination floor reservation device is applied, when receiving the emergency state information. The elevator control unit 307 sends the number input button display command to the gateway device 100 such that the person, who is getting in the elevator, can input a new floor number in order to avoid the floor where an emergency state arises. The gateway device 100 sends the received number input button display command to the building management server 300.

[88] In an embodiment of the present invention, the building management server 300 further includes an entrance control unit 308.

[89] The entrance control unit 308 receives entrance opening and closing information of a building entrance from the gateway device 100, and then, sends the gateway device 100 an entrance locking command to close and lock the entrance when the entrance is opened at a predetermined time.

[90] The entrance control unit 308 can receive the entrance opening and closing information of the building

entrance from the infrared-ray sensor. The entrance opening and closing information contains whether the entrance is opened or closed. The predetermined time is, for instance, from 8p.m. to 6a.m. When the entrance is opened at the above-mentioned time, the entrance control unit 308 sends the gateway device 100 the entrance locking command to close and lock the entrance. The gateway device 100 transfers the entrance locking command to the entrance, such that the entrance is closed and locked.

[91] In an embodiment of the present invention, the building management server 300 further includes an image storage unit 310.

[92] The image storage unit 310 receives image information, in which images of the inside or outside of the building are contained, from the gateway device 100, compares a presently received image with a previous image, and then, when there is a movement of an object, stores an image of the movement into a storage device. The image storage unit 310 detects a movement vector and compares the presently received image with the previous image to check a movement state. After that, when there is a movement, the image storage unit 310 stores the image of the movement into the storage device.

[93] The storage device is a module capable of inputting and outputting information, such as a hard disk drive, a solid

state drive (SSD), a flash memory, a compact flash card (CF card), a secure digital card (SD card), a smart media card (SM card), a multi-media card (MMC card), or a memory stick, and may be disposed inside the building management server 300 or a separate device.

[94] The gateway device 100 receives the image information from a camera, which is one of image devices 210, in real time. The image storage unit 310 manages only images of movements separately so as to analyze the images more easily.

[95] In an embodiment of the present invention, the building management server 300 further includes a parking management unit 309.

[96] The parking management unit 309 receives information of a vehicle, which is entering an entrance of a parking lot, and determines whether or not the vehicle information is information of the vehicle, which has been registered previously into the building management server 300. After that, when the vehicle information is information of the previously registered vehicle, the parking management unit 309 sends the gateway device 100 a parking lot barrier opening command to open a parking lot barrier.

[97] The image device 210, such as the camera, takes a picture of a license plate of the vehicle entering the

entrance of the parking lot to create vehicle information, and then, sends the vehicle information to the gateway device 100. The vehicle information is information of the license number written on the license plate. When the gateway device 100 sends the license plate information to the parking management unit 309 of the building management server 300, the parking management unit 309 determines whether or not the vehicle information is the information of the previously registered vehicle, and when the vehicle information is the information of the previously registered vehicle, sends the parking lot barrier opening command to the gateway device 100.

[98] The gateway device 100 transfers the received parking lot barrier opening command to a parking lot barrier, such that the parking lot barrier is opened.

[99] FIG. 3 is a block diagram showing the entire structure of the gateway device 100.

[100] The gateway device is installed inside the building, receives data from a sensor, such as an electric meter, and sends to the building management server.

[101] In an embodiment of the present invention, the gateway device 100 includes a power supply unit 131, a control unit 121, a storage unit 130, an interface unit 126, and an input unit 128.

[102] FIGS. 4A to 4C are circuit diagrams showing a power supply unit.

[103] The power supply unit 131 supplies electric power to the gateway device 100.

[104] The power supply unit 131 includes: DC power supply units 131 and J24 for supplying a DC source; a fuse F1 whose one side is connected with the DC source; a first converter 201 connected with the other side of the fuse; a second converter 202 connected with the other side of the fuse; and a third converter 203 connected with the second converter 202.

[105] The DC power supply units 131 and J24 supply a DC voltage of 24V. The fuse F1 is blown when overcurrent flows.

[106] The first converter 201 performs stepdown of the 24V voltage supplied by the DC power supply units 131 and J24 to supply 14V voltage. In FIGS. 2 to 18, a contact point indicated by VCC14 is voltage supplied by the first converter 201.

[107] The second converter 202 performs stepdown of the 24V voltage supplied by the DC power supply units 131 and J24 to supply 5V voltage. In FIGS. 2 to 18, a contact point indicated by VCC5 is voltage supplied by the second converter 202.

[108] The third converter 203 performs stepdown of the 5V voltage supplied by the second converter 202 to supply 3.3V voltage. In FIGS. 2 to 18, a contact point indicated by VCC3V3 is voltage supplied by the third converter 203. Numerical values of elements illustrated in FIGS. 2 to 18 are as follows.

[109] In an embodiment of the present invention, the first converter 201 includes: a capacitor C33 connected with the other side of the fuse F1; a diode D800 of which the anode is connected with the other side of the fuse F1; a stepdown converter U6 whose number 1 terminal is connected with the cathode of the diode D800; a capacitor C34 whose one side is connected with the number 1 terminal of the stepdown converter U6 and the other side is connected with the number 5 terminal, the number 6 terminal and the number 3 terminal of the stepdown converter U6; a diode D802 of which the cathode is connected with the number 2 terminal of the stepdown converter U6 and the anode is connected with the number 5 terminal, the number 6 terminal and the number 3 terminal of the stepdown converter U6; an inductor L6 of which one side is connected with the number 2 terminal of the stepdown converter U6 and the other side is connected with the number 4 terminal of the stepdown converter U6; a capacitor C32 of which one side is connected with the number

4 terminal of the stepdown converter U6 and the other side is connected with the number 5 terminal, the number 6 terminal and the number 3 terminal of the stepdown converter U6; a capacitor C35 of which one side is connected with the number 4 terminal of the stepdown converter U6 and the other side is connected with the number 5 terminal, the number 6 terminal and the number 3 terminal of the stepdown converter U6; and a capacitor C36 of which one side is connected with the number 4 terminal of the stepdown converter U6 and the other side is connected with the number 5 terminal, the number 6 terminal and the number 3 terminal of the stepdown converter U6.

[110] For the stepdown converter U6, AP1701 may be used. Functions of the diodes, capacitors, inductor resistance, transistors and so on existing in the circuit diagram are obvious to those skilled in the art.

[111] In an embodiment of the present invention, the second converter 202 includes: a capacitor C38 connected with the other side of the fuse F1; a diode D801 of which the anode is connected with the other side of the fuse F1; a stepdown converter U7 whose number 1 terminal is connected with the cathode of the diode D801; a capacitor C39 whose one side is connected with the number 1 terminal of the stepdown converter U7 and the other side is connected with the number 5 terminal, the number 6 terminal and the number 3 terminal

of the stepdown converter U7; a diode D803 of which the cathode is connected with the number 2 terminal of the stepdown converter U7 and the anode is connected with the number 5 terminal, the number 6 terminal and the number 3 terminal of the stepdown converter U7; an inductor L7 of which one side is connected with the number 2 terminal of the stepdown converter U7 and the other side is connected with the number 4 terminal of the stepdown converter U7; a capacitor C37 of which one side is connected with the number 4 terminal of the stepdown converter U7 and the other side is connected with the number 5 terminal, the number 6 terminal and the number 3 terminal of the stepdown converter U7; a capacitor C40 of which one side is connected with the number 4 terminal of the stepdown converter U7 and the other side is connected with the number 5 terminal, the number 6 terminal and the number 3 terminal of the stepdown converter U7; and a capacitor C41 of which one side is connected with the number 4 terminal of the stepdown converter U7 and the other side is connected with the number 5 terminal, the number 6 terminal and the number 3 terminal of the stepdown converter U7.

[112] For the stepdown converter U7, AP1701 may be used.

[113] In an embodiment of the present invention, the third converter 203 includes: a capacitor C42 of which one side is connected with one side of the capacitor C41; a low-

dropout regulator U800 whose number 3 terminal is connected with one side of the capacitor C42; and a capacitor C43 of which one side is connected with the number 2 terminal and the number 4 terminal of the low-dropout regulator U800.

[114] For the low-dropout regulator U800, AZ1284 may be used.

[115] As described above, the power supply unit 131 includes the DC power supply unit 131, the first converter 201, the second converter 202, and the third converter 203 to supply voltage for elements of a memory included in the storage unit 130 and a CPU, which is the control unit 121.

[116] FIGS. 5A to 5D are circuit diagrams of an input unit.

[117] In an embodiment of the present invention, the input unit 128 includes at least one input button, and the input button includes a switch 127. The input unit 128 includes 14 input buttons SW0, SW1, SW2, SW3, SW4, SW5, SW6, SW7, SW8, SW9, SW12 and SW13. The respective input buttons are number 1 or 0, an input button, and a release button. Signals respectively outputted by the 14 switches 127 are inputted into a No. 40 pin, a No. 41 pin, a No. 42 pin, a No. 43 pin, a No. 44 pin, a No. 47 pin, a No. 48 pin, a No. 49 pin, and a No. 50 pin of a CPU U3, which will be described later.

[118] The input unit has just 14 switches for manipulating the gateway device 100, such that a printed circuit board included in the gateway device 100 can be compact-sized.

[119] FIGS. 6A to 6C are circuit diagrams of a storage unit.

[120] In an embodiment of the present invention, the storage unit 130 includes: a capacitor C55; a memory U21 of which the eighth terminal is connected with one side of the capacitor C55; a transistor Q26 of which the source terminal is connected with the number 1 terminal of the memory U21; a transistor Q27 of which the source terminal is connected with the number 6 terminal of the memory U21; a resistance R178 of which one side is connected with a gate terminal of the transistor Q26 and a gate terminal of the transistor Q27 and the other side is connected with the source terminal of the transistor Q26; and a resistance R179 of which one side is connected with a drain terminal of the transistor Q26.

[121] The transistor Q26 of which the source terminal is connected with the number 1 terminal of the memory U21, the transistor Q27 of which the source terminal is connected with the number 6 terminal of the memory U21, the resistance R178 of which one side is connected with the gate terminal of the transistor Q26 and the gate terminal of the transistor Q27

and the other side is connected with the source terminal of the transistor Q26, and the resistance R179 of which one side is connected with a drain terminal of the transistor Q26 carry out step-up of the level of signals outputted from the memory U21 from 3.3V to 5V, and then, output the signals to the CPU U3. In detail, the signals are outputted to the number 20 terminal and the number 92 terminal of the CPU U3.

[122] In an embodiment of the present invention, the storage unit 130 includes: a capacitor C55; a memory U21 whose number 8 terminal is connected with one side of the capacitor C55; a transistor Q28 of which the source terminal is connected with the number 2 terminal of the memory U21; and a transistor Q29 of which the source terminal is connected with the number 5 terminal of the memory U21.

[123] The transistor Q28 of which the source terminal is connected with the number 2 terminal of the memory U21 and a transistor Q29 of which the source terminal is connected with the number 5 terminal of the memory U21 carry out step-up of the level of signals outputted from the memory U21 from 3.3V to 5V, and then, output the signals to the CPU U3.

[124] The memory U21 may store data necessary for operation of the gateway device 100. For the memory U21, MXIC25L3206E may be used.

[125] FIG. 7 is a circuit diagram of the timer 129.

[126] In an embodiment of the present invention, the gateway device 100 further includes the timer 129 for outputting the present time to the control unit 121. The timer 129 includes: a an oscillator Y3; a real time clock U20 whose number 1 terminal is connected with one side of the oscillator Y3 and the number 2 terminal is connected with the other side of the oscillator Y3; a battery Bt1 connected with the number 3 terminal of the real time clock U20; a resistance R174 of which one side is connected with the number 7 terminal of the real time clock U20; a resistance R175 of which one side is connected with the number 6 terminal of the real time clock U20; a resistance R176 of which one side is connected with the number 5 terminal of the real time clock U20; a transistor Q24 of which the source terminal is connected with the number 6 terminal of the real time clock U20; a transistor Q25 of which the source terminal is connected with the number 5 terminal of the real time clock U20; a resistance R170 of which one side is connected with a gate terminal of the transistor Q24 and a gate terminal of the transistor Q25 and the other side is connected with the source terminal of the transistor Q25; a resistance R171 of which one side is connected with a gate terminal of the transistor Q24 and a gate terminal of the transistor Q25 and the other side is connected with the

source terminal of the transistor Q24; a resistance R172 of which one side is connected with a drain terminal of the transistor Q24; and a resistance R173 of which one side is connected with a drain terminal of the transistor Q25.

[127] The oscillator Y3 is an electric oscillator using mechanical resonance formed when crystals of piezo-electric materials by a crystal oscillator necessary for a clock generation circuit, and makes precise frequencies.

[128] The timer 129 provides the present time, which is standard time. The timer 129 is connected to the CPU U3 to receive a control command, and is a module to support real time operation of program recorded in the CPU U3 during control by the CPU U3.

[129] The timer 129 may be operated by a battery and supports the CPU U3 to read the present time. For the real time clock, DS1507 may be used. A signal outputted by the timer 129 is inputted to a No. 94 terminal and a No. 95 terminal.

[130] FIG. 8 is a block diagram of an interface unit.

[131] In an embodiment of the present invention, the interface unit 126 includes a first interface unit 601, a second interface unit 602, a third interface unit 603, fourth interface units 604 and 126, and fifth interface units 605 and 126.

[132] FIGS. 9A to 9D are circuit diagrams of the first interface unit 601. A plurality of terminals a, b, c, d, e, f, g, h, i, j, k and l in FIG. 9A are respectively connected with terminals a, b, c, d, e, f, g, h, i, j, k and l in FIG. 9B.

[133] The interface unit 126 includes the first interface unit 601, and the first interface unit 601 includes: a LAN connector U2 to which a LAN port is inserted; a resistance R85 connected with the number 1 terminal of the LAN connector U2; a resistance R86 connected with the number 2 terminal of the LAN connector U2; a capacitor C18 connected with the number 3 terminal of the LAN connector U2; a resistance R89 connected with the number 7 terminal of the LAN connector U2; a resistance R90 connected with the number 8 terminal of the LAN connector U2; a resistance R88 connected with the number 12 terminal of the LAN connector U2; a resistance R87 connected with the number 14 terminal of the LAN connector U2; a capacitor C18 connected with the number 15 terminal of the LAN connector U2; a capacitor C19 connected with the number 16 terminal of the LAN connector U2; an IP module U1 whose number 5, 6, 8 and 9 terminals are connected with the number 7, 8, 1 and 2 terminals of the LAN connector U2; a transistor Q19 of which the source terminal is connected with the number 31 terminal of the IP module U1;

a transistor Q20 of which the source terminal is connected with the number 27 terminal of the IP module U1; a resistance R71 of which one side is connected with a gate terminal of the transistor Q19 and a gate terminal of the transistor Q20 and the other side is connected with the source terminal of the transistor Q19; a resistance R72 of which one side is connected with a drain terminal of the transistor Q19; a transistor Q17 of which the source terminal is connected with the number 29 terminal of the IP module U1; a transistor Q18 of which the source terminal is connected with the number 30 terminal of the IP module U1; a resistance R53 of which one side is connected with a gate terminal of the transistor Q17 and a gate terminal of the transistor Q18 and the other side is connected with the source terminal of the transistor Q17; and a resistance R54 of which one side is connected with a drain terminal of the transistor Q17.

[134] The first interface unit 601 does TCP/IP communication by a LAN in order to do bidirectional communication with an external device, such as the building management server.

[135] The IP module U1 may be W5100, which is an Ethernet module chipset of a single chip for elements necessary to realize networking, such as an Ethernet MAC chip

and a PHY chip, by realizing TCP/IP, which is an internet protocol, with hardware.

[136] The signal of 3.3V level outputted by the IP module U1 is stepped up after passing the transistors Q17 to Q20, such that a signal of 5V level is outputted. The signal of 5V level outputted by the IP module U1 is stepped up while passing the transistors Q17, Q18, Q19 and Q20, such that a signal of 5V level is outputted. The 5V level signal is inputted to the number 20 terminal, the number 21 terminal, the number 22 terminal and the number 88 terminal of the CPU U3.

[137] FIG. 10 is a circuit diagram of the second interface unit.

[138] The interface unit 126 includes a second interface unit 602, and the second interface unit 602 includes a resistance R138, and a 2-pin connector J26 whose number 1 terminal is connected with the other side of the resistance R138.

[139] The 2-pin connector J26 receives read data from at least one of the electric meter, the water meter, the hot-water meter, and the gas meter. The second interface unit 602 outputs the received read data to at least one of the number 8 terminal, the number 9 terminal, the number 18 terminal, the number 27 terminal, the number 23 terminal, the

number 24 terminal, the number 25 terminal, the number 26 terminal, and the number 35 terminal.

[140] FIG. 11 is a circuit diagram of the third interface unit 603.

[141] In FIG. 11, the interface unit 126 includes a third interface unit 603.

[142] The third interface unit 603 includes: a resistance R144; a resistance R146; a 3-pin connector J26 whose number 2 terminal is connected with one side of the resistance R146; a photo coupler U15 whose number 1 terminal is connected with the other side of the resistance R144 and the number 2 terminal is connected with the other side of the resistance R146; and a resistance R142 of which one side is connected with the number 4 terminal of the photo coupler U15.

[143] The 3-pin connector J28 receives the read data from at least one of the electric meter, the water meter, the hot-water meter, and the gas meter. The third interface unit 603 outputs the received read data to at least one of the number 8 terminal, the number 9 terminal, the number 18 terminal, the number 27 terminal, the number 23 terminal, the number 24 terminal, the number 25 terminal, the number 26 terminal, and the number 35 terminal.

[144] The photo coupler U15 serves to transfer an input electric signal and an output electric signal as 'light'. In

general, the photo coupler U15 is an optical coupled device in which a light emitting element and a light receiving element are combined into one package in order to transfer signals through light by electrically insulating between input and output. The photo coupler U15 may be PC817.

[145] The third interface unit 603 receives the read data from at least one of the electric meter, the water meter, the hot-water meter, and the gas meter. The third interface unit 603 outputs the received read data to at least one of the number 8 terminal, the number 9 terminal, the number 18 terminal, the number 27 terminal, the number 23 terminal, the number 24 terminal, the number 25 terminal, the number 26 terminal, and the number 35 terminal.

[146] The interface unit 126 includes four third interface units 603. The third interface units may be respectively connected with a smoke sensor, a gas sensor, a door lock and a temperature sensor.

[147] FIG. 12 is a circuit diagram of the fourth interface units 604 and 126.

[148] In an embodiment of the present invention, the interface unit 126 includes the fourth interface units 604 and 126, and each of the fourth interface units 604 and 126 includes: an RS232 communication chip U9 whose number 1 terminal is connected with the other side of the capacitor

C46, the number 3 terminal is connected with one side of the capacitor C46, the number 4 terminal is connected with the other side of the capacitor C50, the number 5 terminal is connected with one side of the capacitor C50, the number 6 terminal is connected with the capacitor C52, the number 2 terminal is connected with one side of the capacitor C48; and a 3-pin connector J900 whose number 2 terminal is connected with the number 15 terminal of the RS232 communication chip U9.

[149] The RS232 communication chip U9 may be MAX232. The RS232 communication chip U9 sends and receives signals to/from the number 45 terminal or the number 46 terminal of the CPU U3. The RS232 communication chip U9 steps up or down the signal, received from an external device connected with the 3-pin connector J900, as rated signals of the CPU U3.

[150] The interface unit 126 has two fourth interface units 604 and 126.

[151] FIG. 13 is a circuit diagram of fifth interface units 605 and 126.

[152] In an embodiment of the present invention, the interface unit 126 includes fifth interface units 605 and 126, and each of the fifth interface units 605 and 126 includes: an RS485 communication chip U13 of which number 1 terminal is connected with the resistance R129, the number 2 terminal is

connected with the number 3 terminal, the number 7 terminal is connected with the other side of the resistance R130, and the number 6 terminal is connected with the other side of the resistance R134; and a 3-pin connector J25 whose number 1 terminal is connected with one side of the resistance R130 and the number 3 terminal is connected with one side of the resistance R134.

[153] The RS485 communication chip U13 may be SN75176A. The RS485 communication chip U13 sends and receives signals to the number 14 terminal, the number 15 terminal or the number 66 terminal of the CPU U3 through the number 1 terminal, the number 2 terminal and the number 4 terminal. The RS485 communication chip U13 steps up or down the signals received from the external device connected with the 3-pin connector J25 to rated signals of the CPU U3.

[154] FIG. 14 is a circuit diagram of the mechanical switch 127.

[155] The gateway device 100 further includes the mechanical switch 127, which applies electric power to the external device. The mechanical switch 127 includes: a 2-pin connector J1; a diode D1 of which the anode is connected with the number 1 terminal of the 2-pin connector J1 and the cathode is connected with the number 2 terminal of the 2-pin connector J1; a transistor Q1 whose drain terminal is

connected with the number 2 terminal of the 2-pin connector J1; a resistance R2 of which one side is connected with a gate terminal of the transistor Q1; a diode D4 of which the anode is connected with the gate terminal of the transistor Q1; a resistance R8 of which one end is connected with the gate terminal of the transistor Q1; a transistor Q4 whose number 3 terminal is connected with the other end of the resistance R8; and a resistance R15 of which one end is connected with the number 2 terminal of the transistor Q4.

[156] The mechanical switch 127 may be connected with the number 5 terminal, the number 6 terminal, the number 17 terminal and the number 18 terminal of the CPU U3. The CPU U3 controls the mechanical switch 127 to control ON-OFF of the external device connected with the mechanical switch 127. Four mechanical switches 127 may be provided, and the mechanical switches 127 may be respectively connected with a fan of 24V rated voltage, a fan of 14V rated voltage, an LED lamp, and a solenoid valve.

[157] FIG. 15 is a circuit diagram of a contactless relay.

[158] The gateway device 100 further includes a contactless relay to apply electric power to an external device. The contactless relay includes: a 3-pin connector J7; a resistance R37 of which one end is connected with the

number 2 terminal of the 3-pin connector J7; a transistor Q13 whose number 3 terminal is connected with the other end of the resistance R37; a resistance R41 of which one end is connected with the number 2 terminal of the transistor Q13; and a resistance R39 of which the other end is connected with the number 2 terminal of the transistor Q13.

[159] The contactless relay may be an electronic switch 127 using a solid state relay (SSR). Four contactless relays may be provided. The contactless relays may be connected with the number 82 terminal, the number 83 terminal, the number 84 terminal and the number 85 terminal of the CPU U3. The contactless relays may be respectively connected with the electric meter, the hot-water meter, the water meter and the gas meter to turn on or off the electric meter, the hot-water meter, the water meter and the gas meter according to the control of the CPU U3.

[160] FIG. 16 is a circuit diagram of a temperature-humidity sensor unit 125.

[161] In an embodiment of the present invention, the gateway device 100 further includes a temperature-humidity sensor unit 125 for measuring temperature or humidity of the gateway device 100. The temperature-humidity sensor unit 125 includes: a temperature-humidity sensor U4; a capacitor C29 of which one end is connected with the number 2 terminal of

the temperature-humidity sensor U4 and the other end is connected with the number 3 terminal of the temperature-humidity sensor U4; a transistor Q22 whose source terminal is connected with the number 1 terminal of the temperature-humidity sensor U4; a resistance R121 of which one end is connected with a gate terminal of the transistor Q22 and a gate terminal of the transistor Q23 and the other end is connected with the source terminal of the transistor Q22; a resistance R100 of which one end is connected with the gate terminal of the transistor Q22 and the other end is connected with the source terminal of the transistor Q23; a resistance R122 of which one end is connected with the drain terminal of the transistor Q22; a resistance R123 of which one end is connected with the other end of the resistance R122; and a transistor Q23 whose drain terminal is connected with the other end of the resistance R123.

[162] The temperature-humidity sensor U4 may be SHT-75. The temperature-humidity sensor unit 125 outputs signals obtained by measurement of temperature or humidity to the number 69 terminal or the number 79 terminal of the CPU U3.

[163] FIG. 17 is a circuit diagram of a buzzer unit 122.

[164] In an embodiment of the present invention, the gateway device 100 further includes a buzzer unit 122 for outputting a sound according to a predetermined standard.

The buzzer unit 122 includes: a buzzer LS1 for outputting a sound; a resistance R93 of which one end is connected with the number 1 terminal of the buzzer LS1; a transistor Q21 whose number 3 terminal is connected with the number 2 terminal of the buzzer LS1; a resistance R94 of which one end is connected with the number 2 terminal of the transistor Q21; and a resistance R95 of which one end is connected with the other end of the resistance R94.

[165] The buzzer LS1 may be KPX-1405A. The buzzer unit 122 is connected with the number 29 terminal of the CPU U3 to output an audible sound according to control of the CPU U3.

[166] FIGS. 18A and 18B are circuit diagrams of the control unit 121. The CPU U3 of the control unit 121 may be ATMEGA2560V. FIG. 18A illustrates a part of the control unit 121, and FIG. 18B illustrates the remaining part of the control unit 121. The control unit 121 is one CPU formed in such a way that the part illustrated in FIG. 18A and the remaining part illustrated in FIG. 18B are combined integrally.

[167] The control unit 121 can output temperature or humidity sensed by the temperature-humidity sensor unit 125. Display units 123 are to show information visually and acoustically, and may be a flat display.

[168] The control unit 121 controls to turn on the LED lamp connected through the mechanical switch 127 or the

contactless relay when a number different from the password preset in the door lock through the interface is inputted more than two times. That is, the control unit 121 determines that not a house owner but an outsider manipulated the door lock and turns on the LED lamp so as to make as if someone is in the house.

[169] The control unit 121 sends the received signals and information of various kinds to the building management server, such that the building management server can check differences between parameters like temperature and predetermined numerical values.

[170] The control unit 121 controls to actuate the fan connected through the mechanical switch 127 or the contactless relay when a number different from the password preset in the door lock through the interface is inputted more than two times. That is, the control unit 121 determines that not a house owner but an outsider manipulated the door lock and actuates the fan so as to make as if someone is in the house.

[171] As described above, those skilled in the art will understand that the present invention can be implemented as other concrete forms without changing the inventive concept or essential features. Therefore, these embodiments as described above are only proposed for illustrative purposes and do not limit the present invention. Moreover, it should not be

understood that the flow charts shown in the drawings are just sequential order illustrated exemplarily to obtain the most desirable results, and it is clear that additional steps may be provided or some steps may be omitted.

[172] The technical features described in this specification and the components for realizing the technical features may be realized by digital electronic circuits, by computer software, firmware or hardware, which includes the configuration described in this specification and structural equivalents, or by combination of at least one of them. Furthermore, the components implementing the technical features of the present invention may be realized by computer program products, namely, modules related with computer program commands encoded on a tangible program storage media in order to control the operation of a processing system or in order to carry out operations by the control.

[173] Media readable by a computer may be a machine-readable storage device, a machine-readable storage board, a composite of materials influencing on machine-readable full-waveform signals, or combination of at least one of them.

[174] In the meantime, the terms, 'device' or 'system', in this specification include all apparatuses, devices and machines for processing information, such as processors, computers, multiprocessors, or multi-computers. The

processing computer may include all kinds of codes for forming execution environment of computer programs on demand, such as codes constituting processor firmware, protocol stacks, information base management systems, operating systems, or combination of at least one of them, beside hardware.

[175] Computer programs known as programs, software, software applications, scripts or codes may be made in any form of programming language including compiled or interpreted language or priori and procedural language, and may be realized by any form including standalone programs or modules, components, subroutines, or other units suitable for computer environment.

[176] In the meantime, the computer programs do not essentially correspond to files of a file system, and may be stored in a single file supplied to a requested program, in a multi-interacting file, for instance, a file for storing one or more modules, subprograms or some of codes, or in a part of a file having other program or information, for instance, at least one script stored in a markup language document.

[177] The computer program may be located in one site or diffused to a plurality of sites so as to run on a multi-computer or at least one computer interconnected by a wire/wireless communication network.

[178] In the meantime, as computer-readable media suitable for storing computer program commands and information, there are semiconductor memory devices, such as EPROMs, EEPROMs and flash memory devices, non-volatile memories of all types including magnetic discs, such as internal hard discs or external discs, magneto-optical discs, CDs and DVD discs, non-volatile media and memory devices. Processors and memories may be supplemented by logic circuits of a special purpose or may be integrated to the logic circuits.

[179] The components for realizing the technical features described in this specification may be implemented in a computation system including a back-end component like an information server, a middleware component like an application server, a front-end component like a client computer having a web browser or a graphic user interface that a user can interact with the components described in this specification, or all combinations of the back-end component, the middleware component and the front-end component. The components of the system are interconnectable by any form or media of digital information communication, such as communication networks.

[180] Hereinafter, preferred embodiments to implement components for the system described in this specification and a method for offering MO service-based benefits will be described in detail.

[181] The method in this specification may be used partially or entirely through means for executing computer software, program codes or commands on a server related with a client device or a web-based storage system or on at least one processor included in the server. Here, the processor may be a part of computing platform, such as a server, a client, a network infra structure, a mobile computing platform, or a fixed computing platform, and in detail, may be a kind of computers or processing devices, which can execute program commands, codes and the likes. Moreover, the processor may further include a memory for storing methods, commands, codes and programs, and in the case that the processor does not include the memory, the process can access storage devices, such as CD-ROMs, DVDs, memories, hard discs, flash drives, RAMs, ROMs, caches, and the likes, in which the method, the commands, the codes and the programs are stored.

[182] Additionally, the system and the method described in this specification may be used partially or entirely through a device executing computer software on a server, a client, a gateway, a hub, a router or a network hardware. Here, the software may be executed in servers of various kinds, such as file servers, print servers, domain servers, internet servers, intranet servers, host servers, distributed servers, and the likes, and the above-mentioned servers may further

include a memory, a processor, a computer-readable storage medium, a storage medium, a communication device, a port, a client, and an interface which can access other servers through a wire/wireless network.

[183] In addition, the methods, the commands, the codes according to the present invention may be executed by a server, and devices necessary for executing the methods may be realized as a part of a hierarchy structure associated with the server.

[184] Moreover, the server may offer interfaces to other devices including a client, another server, an information base server, a print server, a file server, a communication server, a distributed server and others, and connection through the interfaces promotes remote execution of programs through a wire/wireless network.

[185] Furthermore, any one of the devices connected to the server through the interface may further include at least one storage device, which can store methods, commands, codes and others, and a central processor of the server provides the device with commands, codes and others, which will be executed on different devices, to be stored in the storage device.

[186] In the meantime, the methods described in this specification may be used partially or entirely through a network infra structure. Here, the network infra structure

may include all of devices, such as computing devices, servers, routers, hubs, firewalls, clients, personal computers, network devices, and routing devices, and modules which can execute functions of the devices, and may further include storage media, such as flash memories, buffers, stacks, RAMs, and ROMs, besides the above-mentioned devices and modules. Additionally, the methods, commands, codes and others may be executed and stored by one of the devices, modules and storage media included in the network infra structure, and other devices necessary for executing the methods may be also realized as a part of the network infra structure.

[187] In addition, the system and method described in this specification may be realized by hardware or combination of hardware and software suitable for specific applications. Here, the hardware includes all of general-purpose computer devices, such as personal computers and mobile communication terminals, and enterprise-type specific computer devices. The computer devices may be realized by devices including a memory, a microprocessor, a microcontroller, a digital signal processor, an application integrated circuit, a programmable gate array, a programmable array structure, and so on, or combination of them.

[188] The computer software, the commands, the codes and others described above may be stored or accessed by readable

devices, and the readable device may include memories, such as a semiconductor storage like a computer component, a RAM or a ROM having digital information used for computing during a predetermined time interval, a permanent storage like an optical disc, a mass storage like a hard disc, a tape and a drum, an optical storage like a CD or a DVD, a flash memory, a floppy disc, a magnetic tape, a paper tape, a standalone type RAM disc, a mass storage and a dynamic memory detachable from a computer, a static memory, a variable storage, and a network access type storage like clouds. In the meantime, the commands and codes includes all kinds of languages, namely, information-oriented language such as SQL, dBase and so on, system language such as C, Objective C, C++, and assembly, architecture language such as Java and NET, and application language such as PHP, Ruby, Perl, Phthon, and so on, but the present invention is not limited to the above, and includes all kinds of languages known widely to those skilled in the art.

[189] Furthermore, the 'computer-readable media' described in this specification includes all kinds of media for providing the processor with commands for executing programs. In detail, the computer-readable media includes non-volatile media, such as information storage devices, optical discs, magnetic discs and others, volatile media such

as dynamic memories, and transmission media, such as coaxial cables, copper wires and optical fibers for transferring information. However, the present invention is not limited to the above.

[190] In the meantime, the components for realizing the technical features of the present invention illustrated in the block diagrams and flow charts mean logical boundaries among the components.

[191] However, according to exemplary embodiments of software or hardware, the components and their functions illustrated in the drawings are executed by standalone software modules, monolithic software structures, codes, services, and combination of them, are executed in a state where the components are stored in a medium executable in a computer having a processor. Therefore, it would be appreciated that all of the exemplary embodiments belong to the scope of the present invention.

[192] The attached drawings and description of this specification explain the technical features of the present invention, but a specific arrangement of software to execute the technical features of the present invention should not be deduced simply, unless explicitly stated otherwise. That is, because there are various exemplary embodiments described above and such embodiments have the same technical features as

the present invention and may be modified and changed, it would be appreciated that the exemplary embodiments belong to the scope of the present invention.

[193] Additionally, while operations are depicted in the drawings in a particular order, this should not be understood as requiring that such operations be performed in the particular order shown or in sequential order, or that all illustrated operations be performed, to achieve desirable results. In certain circumstances, multitasking and parallel processing may be advantageous. Moreover, the separation of various system components in the implementations described above should not be understood as requiring such separation in all implementations, and it should be understood that the described program components and systems can generally be integrated together in a single software product or packaged into multiple software products.

[194] As described above, in this specification, the invention is not limited to proposed specific terms. Therefore, while the invention has been described in detail with reference to the above-described examples, it will be understood by those skilled in the art that various changes, modifications, and alternations may be made without departing from the spirit and scope of the invention.

[195] It will be apparent to those skilled in the art that a variety of modifications and variations may be made without departing the spirit and scope of the present invention as defined by the appended claims. Further, such modifications and variations should not be understood independently from the technical idea or perspective of the present invention.

Industrial Applicability

[196] The present invention relates to a building management server, which can receive information from devices, such as sensors or cameras, located in a building and control devices existing inside or outside the building, thereby integratedly managing the building.

What is claimed is:

1. A building management server comprising:

a first communication unit, which communicates with a gateway device, which receives information from a sensor device mounted on a building, by wire or wirelessly;

an electric quantity control unit, which receives electricity reading information from the gateway device and sends a power outage command to the gateway device when the read quantity of electricity contained in the electricity reading information is more than a predetermined numerical value;

an illumination control unit, which receives a fire detection information from the gateway device and sends the gateway device a lighting command to turn on a light located within a predetermined distance from the location of fire outbreak contained in the fire detection information, such that a plurality of lights existing on an evacuation route in the building are turned on in sequential order; and

an elevator control unit, which sends the gateway device a number input button display command to display a number input button on a display window in an elevator to which a destination floor reservation device, which receives information of a

destination floor in advance, is applied, when receiving emergency state information from the gateway device.

2. The building management server according to claim 1, further comprising:

a water quantity control unit, which receives water reading information from the gateway device and sends a water outage command to the gateway device when the read quantity of water contained in the water quantity reading information is more than a predetermined numerical value.

3. The building management server according to claim 1, further comprising:

a gas quantity control unit, which receives gas reading information from the gateway device and sends a gas supply shutoff command to the gateway device when the read quantity of gas contained in the gas quantity reading information is more than a predetermined numerical value.

4. A building management system comprising:

a building management server according to claim 1; and

a gateway device,

wherein the gateway device comprises:

a power supply unit for supplying electric power to the gateway device;

a control unit for generally controlling the gateway device;

a storage unit for storing data necessary for operation of the gateway device;

an interface unit, which receives read data from at least one of the electric meter, the water meter, the hot-water meter, and the gas meter, and sends the received data to the building management server; and

an input unit manipulated to receive data,

wherein the power supply unit comprises:

a DC power supply unit (J24) for supplying a DC source;

a fuse (F1) whose one side is connected with the DC source;

a first converter connected with the other side of the fuse;

a second converter connected with the other side of the fuse; and

a third converter connected with the second converter,

wherein the first converter comprises:

a capacitor (C33) connected with the other side of the fuse (F1);

a diode (D800) of which the anode is connected with the other side of the fuse (F1);

a stepdown converter (U6) whose number 1 terminal is connected with the cathode of the diode (D800);

a capacitor (C34) whose one side is connected with the number 1 terminal of the stepdown converter (U6) and the other side is connected with the number 5 terminal, the number 6 terminal and the number 3 terminal of the stepdown converter (U6);

a diode (D802) of which the cathode is connected with the number 2 terminal of the stepdown converter (U6) and the anode is connected with the number 5 terminal, the number 6 terminal and the number 3 terminal of the stepdown converter (U6);

an inductor (L6) of which one side is connected with the number 2 terminal of the stepdown converter (U6) and the other side is connected with the number 4 terminal of the stepdown converter (U6);

a capacitor (C32) of which one side is connected with the number 4 terminal of the stepdown converter (U6) and the other side is connected with the number 5 terminal, the number 6 terminal and the number 3 terminal of the stepdown converter (U6);

a capacitor (C35) of which one side is connected with the number 4 terminal of the stepdown converter (U6) and the other side is connected with the number 5 terminal, the number 6 terminal and the number 3 terminal of the stepdown converter (U6); and

a capacitor (C36) of which one side is connected with the number 4 terminal of the stepdown converter (U6) and the other side is connected with the number 5 terminal, the number 6 terminal and the number 3 terminal of the stepdown converter (U6),

wherein the second converter comprises:

a capacitor (C38) connected with the other side of the fuse (F1);

a diode (D801) of which the anode is connected with the other side of the fuse (F1);

a stepdown converter (U7) whose number 1 terminal is connected with the cathode of the diode (D801);

a capacitor (C39) whose one side is connected with the number 1 terminal of the stepdown converter (U7) and the other side is connected with the number 5 terminal, the number 6 terminal and the number 3 terminal of the stepdown converter (U7);

a diode (D803) of which the cathode is connected with the number 2 terminal of the stepdown converter (U7) and the anode is connected with the number 5 terminal, the number 6 terminal and the number 3 terminal of the stepdown converter (U7);

an inductor (L7) of which one side is connected with the number 2 terminal of the stepdown converter (U7) and the other side is connected with the number 4 terminal of the stepdown converter (U7);

a capacitor (C37) of which one side is connected with the number 4 terminal of the stepdown converter (U7) and the other side is connected with the number 5 terminal, the number 6 terminal and the number 3 terminal of the stepdown converter (U7);

a capacitor (C40) of which one side is connected with the number 4 terminal of the stepdown converter (U7) and the other side is connected with the number 5 terminal, the number 6 terminal and the number 3 terminal of the stepdown converter (U7); and

a capacitor (C41) of which one side is connected with the number 4 terminal of the stepdown converter (U7) and the other side is connected with the number 5 terminal, the number 6 terminal and the number 3 terminal of the stepdown converter (U7),

wherein the third converter comprises:

a capacitor (C42) of which one side is connected with one side of the capacitor (C41); a low-dropout regulator (U800) whose number 3 terminal is connected with one side of the capacitor (C42); and

a capacitor (C43) of which one side is connected with the number 2 terminal and the number 4 terminal of the low-dropout regulator (U800),

wherein the gateway device further comprises a timer for outputting the present time to the control unit, and the timer comprises:

- an oscillator (Y3);

- a real time clock (U20) whose number 1 terminal is connected with one side of the oscillator (Y3) and the number 2 terminal is connected with the other side of the oscillator (Y3);

- a battery (Bt1) connected with the number 3 terminal of the real time clock (U20);

- a resistance (R174) of which one side is connected with the number 7 terminal of the real time clock (U20);

- a resistance (R175) of which one side is connected with the number 6 terminal of the real time clock (U20);

- a resistance (R176) of which one side is connected with the number 5 terminal of the real time clock (U20);

- a transistor (Q24) of which the source terminal is connected with the number 6 terminal of the real time clock (U20);

- a transistor (Q25) of which the source terminal is connected with the number 5 terminal of the real time clock (U20);

- a resistance (R170) of which one side is connected with a gate terminal of the transistor (Q24) and a gate terminal of the transistor (Q25) and the other side is connected with the source terminal of the transistor (Q25);

a resistance (R171) of which one side is connected with a gate terminal of the transistor (Q24) and a gate terminal of the transistor (Q25) and the other side is connected with the source terminal of the transistor (Q24);

a resistance (R172) of which one side is connected with a drain terminal of the transistor (Q24);

a resistance (R173) of which one side is connected with a drain terminal of the transistor (Q25); and

a contactless relay for applying electric power to an external device,

wherein the contactless relay comprises:

a 3-pin connector (J7);

a resistance (R37) of which one end is connected with the number 2 terminal of the 3-pin connector (J7);

a transistor (Q13) whose number 3 terminal is connected with the other end of the resistance (R37); a resistance R41 of which one end is connected with the number 2 terminal of the transistor (Q13); and

a resistance (R39) of which the other end is connected with the number 2 terminal of the transistor (Q13), and

wherein the interface is connected with a door lock, and the control unit controls to turn on an LED lamp connected through the interface when a number different from the password preset in

the door lock through the interface is inputted more than two times.

5. The building management server according to claim 1, further comprising:

an illumination control unit, which receives illumination intensity information by each zone inside the building from the gateway device, and sends the gateway device a brightness adjustment command to adjust brightness of lights existing in a specific zone when brightness contained in the illumination intensity information of the specific zone is more than or less than a predetermined numerical value.

6. The building management server according to claim 1, further comprising:

a gas valve control unit, which receives gas detection information from the gateway device and sends a gas valve locking command to lock a gas valve located within a predetermined distance from the gas leak location contained in the gas detection information.

7. The building management server according to claim 1, further comprising:

an entrance control unit, which receives entrance opening and closing information of a building entrance from the gateway device, and sends the gateway device an entrance locking command to close and lock the entrance when the entrance is opened at a predetermined time.

8. The building management server according to claim 1, further comprising:

an image storage unit, which receives image information containing images of the inside or outside of the building from the gateway device 100, compares a presently received image with a previous image, and, when there is a movement of an object, stores an image of the movement into a storage device.

9. The building management server according to claim 1, further comprising:

a parking management unit, which receives information of a vehicle entering an entrance of a parking lot, determines whether or not the vehicle information is information of the vehicle, which has been registered previously into the building management server, and then, when the vehicle information is information of the previously registered vehicle, sends the gateway device a parking lot barrier opening command to open a parking lot barrier.