

TITLE OF THE INVENTION

MAINTENANCE INFORMATION REFERENCE DEVICE AND METHOD THEREOF

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a technology that allows a plurality of involved parties in different positions to refer to information of other involved parties. Examples of the information include contract information such as operation information indicating the operating state of building facility such as an elevator and maintenance information.

2. Description of the Related Art

In general, reference availability for involved parties regarding contract information such as operation information and maintenance information is determined according to the contract details in a facility that becomes a discretionary management unit in the same building or the like. Here, examples of the involved parties include users such as a building management company involved in building management, a building owner, and a condominium management association. Then, when each user having a building facility maintenance contract with a building facility maintenance company refers to the operating state of the building facility, access

availability is determined by the user ID given to each user by the maintenance company. Then, based on the determination result, i.e., the user's own contract, each user can refer to operation data and maintenance data of the building facility for which the user has ownership.

For example, it is not possible for a building management company to access data for which a building owner or a management association has ownership, and hence the building management company sometimes obtains data from a building facility maintenance company with the approval of the building owner or the management association.

There is a technique disclosed in Japanese Patent Laid-Open Publication No. 2006-48452 in which various data of the same building are stored in an integrated database and a building tenant can access the integrated database and refer to the data based on rights given by a database manager.

SUMMARY OF THE INVENTION

However, in the technique described in Japanese Patent Laid-Open Publication No. 2006-48452, data such as drawings for which a system administrator has ownership are collectively stored and managed in an integrated database. In Japanese Patent Laid-Open Publication No. 2006-48452, the data are disclosed to a user such as a tenant in a

building. Therefore, it is necessary for the system administrator to obtain, from each tenant, data for which the system administrator does not have ownership, e.g., data for which a tenant has ownership. Since it is necessary to make an arrangement with each tenant for the reference range of the obtained data and decide the access rights to the data for each user, a large amount of time and cost are required for system management.

An object of the present invention to make it possible to flexibly access, i.e., visualize, from information of other involved parties with a simple configuration, information for which each of a plurality of involved parties has rights.

Examples of the involved parties include users such as a building management company involved in building management and a building owner who are involved in the same building, and, in a case of a condominium, a condominium management association. The information includes operation data and maintenance data of the building facility for which each involved party has rights such as ownership. The rights of the information are based on a building facility maintenance contract that each involved party has contracted with the building facility maintenance company. Furthermore, the visualization includes integrating and referring to each piece of

information.

In order to solve the above problems and achieve the object of the present invention, the present invention employs the following configuration. A contract information reference device that controls reference to a plurality of pieces of contract information regarding facility management in a facility where a plurality of involved parties exist, the contract information reference device having: a database that stores the contract information and a contractant ID of a contractant included in the involved parties and having rights to the contract information in association with each of the plurality of pieces of contract information; a data reference application processing unit that receives a data reference application for first contract information stored in the database from a first involved party operation terminal used by a first involved party; and a reference processing unit that notifies, of reference application information to the first contract information including information indicating the first involved party, a first contractant operation terminal used by a first contractant indicated by a first contractant ID associated with the first contract information, and stores, in the database, reference rights to the first involved party for the first contract information in response to a response from the first

contractant for the reference application information.

The present invention also includes a contract information reference method using the contract information reference device and a computer program product that implements the function of the contract information reference device as a computer.

In the present description, reference includes visualization and browsing of information, and when access to information is permitted, reference also becomes possible.

According to the present invention, with a simple configuration, it is possible for an involved party in facility management to flexibly refer to data of other involved parties who do not have rights such as ownership.

Problems, configurations, and effects other than those described above will be made clear by the description of the following embodiments.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block diagram of a building contract information system according to an embodiment of the present invention;

Fig. 2 is a view showing an example of a client DB according to the embodiment of the present invention;

Fig. 3 is a view showing a first display example of

an operating state confirmation screen according to the embodiment of the present invention;

Fig. 4 is a first display example of a data reference application screen according to the embodiment of the present invention;

Fig. 5 is a view showing an example of an application status management DB according to the embodiment of the present invention;

Fig. 6 is a second display example of the data reference application screen according to the embodiment of the present invention;

Fig. 7 is a view showing a second display example of the operating state confirmation screen according to the embodiment of the present invention;

Fig. 8A and Fig. 8B is a view (part 1) showing an example of a flow of data reference application processing according to the embodiment of the present invention; and

Fig. 9 is a view (part 2) showing an example of the flow of the data reference application processing according to the embodiment of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

An embodiment of the present invention will be described below. First, a definition of a hardware configuration for implementing the present embodiment will

be described as a premise. In the following description, an "interface device" may be one or more interface devices. The one or more interface devices may be at least one of the following.

One or more input/output (I/O) interface devices. The I/O interface device is an interface device for at least one of an I/O device and a remote display computer. The I/O interface device for the display computer may be a communication interface device. The at least one I/O device may be a user interface device, for example, either an input device such as a keyboard and a pointing device, or an output device such as a display device.

One or more communication interface devices. The one or more communication interface devices may be one or more communication interface devices of the same type (e.g., one or more network interface cards (NIC)). The one or more communication interface devices may be two or more communication interface devices of different types (e.g., NIC and host bus adapter (HBA)).

In the following description, a "memory" is one or more memory devices, and may typically be a main storage device. The at least one memory device in the memory may be a volatile memory device or may be a nonvolatile memory device.

In the following description, a "persistent storage

device" is one or more persistent storage devices. The persistent storage device is typically a non-volatile storage device (e.g., auxiliary storage device), and specifically a hard disk drive (HDD) or a solid state drive (SSD), for example.

In the following description, a "storage device" may be the memory or at least the memory of the persistent storage device.

In the following description, a "processor" is one or more processor devices. The at least one processor device is typically a microprocessor device such as a central processing unit (CPU). However, the at least one processor device may be another type of processor device such as a graphics processing unit (GPU). The at least one processor device may be single-core or multi-core. The at least one processor device may be a processor core. The at least one processor device may be a processor device in a broad sense such as a hardware circuit that performs a part of or the entirety of the processing. The hardware circuit includes, for example, a field-programmable gate array (FPGA) or an application specific integrated circuit (ASIC).

In the following description, the function will sometimes be described by the expression "kkk unit". Here, each function may be implemented by one or more computer

programs being executed by the processor, may be implemented by one or more hardware devices (e.g., FPGA or ASIC), or may be implemented by a combination of them. The description of each function is an example, and a plurality of functions may be brought together into one function, and one function may be divided into a plurality of functions.

In the following description, information in which an output is obtained for an input will sometimes be described by an expression such as "xxx DB". Here, the information may be data of any structure (e.g., structured data or unstructured data) or may be a learning model such as a neural network that generates an output for an input. Therefore, "xxx DB" can be mentioned as "xxx information". In the following description, the configuration of each DB is an example, and one DB may be divided into two or more DBs, or the entirety or a part of the two or more DBs may be one DB. Note that "DB" stands for database.

An embodiment of the present invention will be described below with reference to the drawings. Hereinafter, in the present description, those having the same function are given the same reference numerals unless otherwise specified, and repeated description thereof is omitted. Description of the main rope, the counterweight, the car, the hoisting machine, the security camera, the video recording device, and the like that constitute the

elevator is omitted. In the following description, an elevator and a security camera are employed as an example of building facility. However, the present invention can be applied to a building facility other than the elevator and the security camera, e.g., a building facility including a passenger conveyor such as an escalator and an air conditioner, in place of or in addition to the elevator and the security camera.

Fig. 1 is a block diagram showing the configuration of the entire system according to the present embodiment.

An elevator control device 21 and a security camera control device 22 installed in a building 2 are connected to a contract information reference device 1 via a communication network 4, and a client operation terminal 3 is connected to the contract information reference device 1 via a communication network 5.

The elevator control device 21, which is a device provided in an elevator not illustrated, constantly monitors and stores an operating state (e.g., presence/absence of failure) of the elevator, and transmits information indicating the operating state to the contract information reference device 1. The elevator control device 21 is provided in each of a plurality of elevators.

The security camera control device 22, which is a device provided in a security camera not illustrated,

constantly monitors and stores the operating state (e.g., presence/absence of failure) of the security camera, and transmits information indicating the operating state to the contract information reference device 1. The security camera control device 22 is provided in each of a plurality of security cameras.

The number of buildings in which such the plurality of building facilities are installed is not limited to one but may be two or more. In the present embodiment, the building facility is treated as one management unit, but the management unit is not limited to this. For example, a building group including a plurality of buildings may be a management unit. A part (floor) of the building may be a management unit. Furthermore, a structure such as a factory and a station other than a building may be a management unit.

Each of the communication networks 4 and 5 may be, e.g., the Internet, a mobile communication network, a wired LAN, a wireless LAN, a dedicated line, or a combination of these. The communication networks 4 and 5 may be one communication network (e.g., the Internet). The client operation terminal 3 is an information processing terminal owned or used by the client, and includes a display device, an input device, and an interface device. The input device may be a keyboard, a mouse, or a touch screen integrated

with the display device. Specific examples of the client operation terminal 3 are not particularly limited, but the client operation terminal 3 is applicable to, e.g., a personal computer, a tablet, a smartphone, and the like. The number of the client operation terminals 3 is not limited to one but may be two or more.

The client in the present embodiment refers to a person or organization (contractant) who has concluded a maintenance and management contract (hereinafter, maintenance contract) for the building 2. In the present embodiment, an involved party other than the contractant can refer to the contract information by using the client operation terminal 3 of his own. For example, the owner of the building 2 who has not concluded the maintenance contract corresponds to this.

The contract information reference device 1 may be a device including an interface device not illustrated, a storage device 12, and a processor connected to them, or may be a device implemented on the device (e.g., cloud infrastructure). The interface device is connected to the communication networks 4 and 5. The contract information reference device 1 includes a client information input unit 11, a collection processing unit 13, a reference processing unit 14, and a data reference application processing unit 15.

The storage device 12 stores a client DB 12a, an operating state DB 12b, and an application status management DB 12c. The client DB 12a holds information regarding the client. The operating state DB 12b holds operating state information, which is information regarding the operating states of the elevator and the security camera. The application status management DB 12c holds information regarding the application status of data reference and data integration.

In the contract information reference device 1, the processor is, for example, a central processing unit (CPU). The storage device 12 includes a memory. The memory is, for example, a read only memory (ROM) and a random access memory (RAM). When the CPU reads and executes a program code stored in the ROM, the software and the hardware cooperate to implement functions such as the client information input unit 11, the collection processing unit 13, the reference processing unit 14, and the data reference application processing unit 15. The storage device 12 includes a persistent storage device such as a hard disk drive (HDD) in addition to the ROM and the RAM.

For each elevator indicated by the client DB 12a, the collection processing unit 13 is connected to the elevator control device 21 via the communication network 4, e.g., once every 30 minutes. The collection processing

unit 13 periodically collects operation information showing the operating state of the elevator and registers the collected information into the operating state DB 12b. The operating state information of the elevator includes information by which whether the elevator is in operation or out of service can be determined. Similarly to the case of the elevator, processing performed also for the security camera control device 22.

Various types of information will be described below. The client information of the client who has concluded the maintenance contract is registered in the client DB 12a by the client information input unit 11 in response to an input from a sales representative who performs a sales activity.

As shown in Fig. 2, the client DB 12a has a client record indicating one piece of client information for each building facility ID for which the maintenance contract has been concluded. The client record includes a client ID, a building ID, a building address, a building facility, and a building facility ID.

In Fig. 2, in a building A, a client "△△ Building Management" has a maintenance contract for two elevators, and a client "○○ Management Association" has a maintenance contract for one security camera. In a building B, a client "×× Real Estate" has a maintenance contract for one

elevator.

The storage device 12 may store a user DB not illustrated (not illustrated). Here, the "user" is a person (e.g., employee) belonging to the client in the present embodiment. The user DB may have a user record for each user. The user record desirably includes a user ID, a password, and a client ID. The user ID and the password are authentication information for identifying a user who can access the contract information reference device 1.

The use of the user ID and the password will be explained now. The client operation terminal 3 is connected to the contract information reference device 1 via the communication network 5 by a user's operation. In response to this connection, the reference processing unit 14 requests the use a user ID and a password. That is, the reference processing unit 14 outputs information prompting the user ID and the password to the client operation terminal 3.

When receiving the user ID and the password registered in the user DB, the reference processing unit 14 can display, on the client operation terminal 3, the operating state information acquired from the client DB 12a and the operating state DB 12b. The reference data created by the reference processing unit 14 is not particularly limited in terms of data format, but, for example, an image

format, an HTML format, an XML format, a CSV format, or the like can be adopted.

In the present embodiment, reference to the operating state information of the elevator will be described, but an inquiry response, a scheduled inspection date, an inspection record, or the like of the elevator may be displayed in place of or in addition to the operating state of the elevator. The operating state of a maintenance target device such as an escalator and an air conditioning facility other than the elevator may be displayed. Thus, in the present embodiment, various types of contract information regarding the elevator can be handled.

Next, with reference to Fig. 3, an example of display of an operating state confirmation screen of a building facility such as an elevator will be described. Fig. 3 is a view showing the first display example of the operating state confirmation screen according to the present embodiment. The explanation will be made on an assumption that in Fig. 3, the user of the client "△△ Building Management" operates the operating state confirmation screen.

An operating state confirmation screen 301 displayed on the client operation terminal 3 by the reference processing unit 14 is as shown in Fig. 3. The operating

state confirmation screen 301 is, for example, a graphical user interface (GUI), and has a client display field 3011, a building ID display field 3012, an elevator operating state display field 3013, and a data reference application button 3015. An example of display of the operating state displayed in the operating state display field 3013 of the elevator includes an operating unit number display field 3014. Each of these tools 3011 to 3015 (display areas) can be implemented by, for example, a GUI component.

The display in the operating unit number display field 3014 is an example of the display of the operating state. The operating unit number display field 3014 shows a numerical value in which the number of all elevators for which the client has made a maintenance contract is a denominator and the number of elevators in operation (i.e., elevators that are not in an out-of-service state due to failure, inspection, or the like) is a numerator. Furthermore, the operating unit number display field 3014 shows a doughnut chart using the numerical values of these denominator and numerator. In the example of Fig. 3, two out of two (units) are in operation. If only one unit is in operation, the doughnut chart is displayed in half, i.e. in a state where the color for one unit is lost. Since the denominator, the numerator, and the doughnut chart are important information, they may be displayed in color and

the like distinguishing them from other characters. In order to make it clear that this figure is about the operating state of "elevator", the color of the elevator icon may also be displayed in color distinguishing it from others.

The data reference application button 3015 is displayed when there is a client who has a maintenance contract for a building facility other than the client "△△ Building Management" of the user who is accessing the building facility of the building A. When the user presses the data reference application button 3015, the display screen of the client operation terminal 3 displays a data reference application screen 302, which allows the user to confirm all the building facilities for which the maintenance contract is made in the building A.

Next, an example of a screen for applying for data reference will be described with reference to Fig. 4. Fig. 4 is the first display example of the data reference application screen according to the present embodiment.

As shown in Fig. 4, the data reference application screen 302 displayed on the client operation terminal 3 by the reference processing unit 14 is, for example, a graphical user interface (GUI). The data reference application screen 302 has a client display field 3021, a building ID display field 3022, and a building facility

list display field 3023. Here, the building facility list display field 3023 has a building facility record for each building facility ID for which a maintenance contract has been concluded in the building with the building ID. Of them, the building facility record includes the client, the building facility, the building facility ID, the reference availability, the reference application, and the application status of the building ID. For the data displayed in the building facility list display field 3023, all of the client, the building facility, and the building facility ID of the client record of the building ID are acquired and displayed with reference to the client DB.

Next, display of the reference application will be described in detail. The display screen of the client operation terminal 3 displays a client display field 3024 of a data reference applicant, a permit button 3025, and a reject button 3026 in a case of a reference application record of a building facility for which the client of the operating user has concluded a maintenance contract. This example will be described with reference to the upper view of Fig. 4. The upper view of Fig. 4 shows the display of the data related to the elevator (building facility ID "E001" or "E002") of the building A for which by the client "△△ Building Management" has ownership in a case where the data reference application from the client "○○ Management

Association" has not been made. Then, the client display field 3024 of the data reference applicant is blank, and the permit button 3025 and the reject button 3026 are inactive.

In a case of a reference application record of the building facility for which the client "△△ Building Management" has not concluded the maintenance contract, an application button 3027 for data reference is displayed. Each of these tools 3021 to 3027 can be implemented by, for example, a GUI component.

Next, an example of registration of the application status of data reference and information regarding data integration will be described with reference to Fig. 5. Fig. 5 is a view showing an example of the application status management DB according to the present embodiment.

In response to an operation on the application button 3027 of Fig. 4 by the user, the application status of data reference and information regarding data integration are registered in the application status management DB 12c.

As shown in Fig. 5, the application status management DB 12c has a data reference application record for each building facility ID for which a maintenance contract has been concluded. The data reference application record includes an applicant client, an

applicant client ID, a building ID, an application destination client ID, an application destination building facility ID, and an application status. The application status changes depending on the application and its permission status, such as "Answered" and "Reference Completed", in addition to "Pending" shown in the figure. If a certain condition is satisfied (e.g., a certain length of time has elapsed), "Answered" and "Reference Completed" may be changed to "Expired", "Reapplicable", and "(blank = initial state)". These processing will be described later.

Next, an example of the data reference application screen after an application for data reference is made will be described with reference to Fig. 6. Fig. 6 is the second display example of the data reference application screen according to the present embodiment.

Here, the reference availability to the building facility list display field 3023 shown in Fig. 6, the reference application, and the display of the application status will be described for each application status.

First, in a case of use by the user of the client "△△ Building Management", the following information for the building facility record of the security camera for which the client "○○ Management Association" has made a maintenance contract is displayed as a data reference application screen. The contents include the reference

availability, the reference application, and the application status in addition to the client, the building facility, and the building facility ID. Here, the initial state of this screen is the display shown in S3021. That is, on the data reference application screen, the reference availability is displayed as "Unavailable", the application button for data reference of reference application is active, and the application status is displayed as "Not Yet Applied".

When the user operates the application button 3027 (applies) for data reference, the data reference application screen is updated to the display of S3022. That is, the application button 3027 for data reference of the reference application is inactive, and the application status is displayed as "Pending".

In response to this application, when the user of the application destination client operates the permit button 3025 to the client operation terminal 3 used by the user himself, the data reference application screen is updated to the display of S3023. That is, the reference availability is displayed as "Available", the application button 3027 for data reference of the reference application is inactive, and the application status is displayed as "Permit". Through these operations, the data reference application processing unit 15 registers application

information in the application status management DB 12c described with reference to Fig. 5 and updates the application status. If the application is rejected, the display may be returned to the display of the initial state S3021, and in addition, the number of times of rejection and the like may be displayed.

Each record of the data reference application screen is created for each application, and the number of displayed records also increases.

Next, the data reference application screen in a case of use by the user of the client "〇〇 Management Association" will be described with reference to the lower view of Fig. 6. In this case, the initial state of the data reference application screen is the display shown in S3024, the reference availability is displayed as "Available", the client display field 3024 of the data reference applicant of the reference application is blank, the permit button 3025 and the reject button 3026 are inactive, and the application status is displayed as "Not Yet Applied". When the user of the client "△△ Building Management" operates on the application button 3027 for data reference and applies for data reference, the data reference application screen is updated to the display of S3025. That is, on the data reference application screen, the client display field 3024 of the data reference

applicant of the reference application is displayed as "△△ Building Management", the permit button 3025 and the reject button 3026 are active, and the application status is displayed as "Pending".

When the user of the client "○○ Management Association" operates on the permit button 3025, the data reference application screen is updated to the display of S3026. That is, the client display field 3024 of the data reference applicant of the reference application is blank, the permit button 3025 and the reject button 3026 are inactive, and the application status is displayed by joining "Permit" and the client "△△ Building Management", who has permitted the application.

If the reject button 3026 is operated, the data reference application screen may be returned to the display of the initial state S3024 in the case of use by the user of the client "○○ Management Association", or may additionally display information so as to indicate that the application of the client "△△ Building Management" has been rejected.

Thus, after the display is updated to the display of S3023, the user of the client "△△ Building Management" confirms the operating state confirmation screen 301, thereby making it possible to refer the data for which the data reference has been applied for the client "○○

Management Association".

Next, an example of the operating state confirmation screen 301 after the data reference application has been permitted will be described with reference to Fig. 7. Fig. 7 is a view showing the second display example of the operating state confirmation screen according to the embodiment.

The explanation will be made on an assumption that in Fig. 7, the user of the client "△△ Building Management" operates the operating state confirmation screen of the client operation terminal 3.

The operating state confirmation screen 301 displayed on the client operation terminal 3 by the reference processing unit 14 is, for example, a graphical user interface (GUI). Then, as shown in Fig. 7, an operating state display field 3016 of the security camera permitted by the client "○○ Management Association" is additionally displayed on the display of the tool 3011 to 3015 described in Fig. 3. An example of display of the operating state to be displayed in the operating state display field 3016 of the security camera includes an operating unit number display field 3017. Each of these tools 3016 and 3017 is, for example, a GUI component. Note that in Fig. 7, as in Fig. 3, some displays may be displayed to be distinguished from others.

In the present embodiment, the operating state display fields of the elevator and the security camera are displayed separately, but in place of or in addition to it, another display method may be adopted.

Next, the processing of the data reference application will be described with reference to Figs. 8A, 8B and 9. Figs. 8A, 8B and 9 are views showing an example of the flow of the data reference application processing according to the present embodiment.

In Figs. 8A, 8B and 9, the explanation will be made regarding the processing flow of an application in which the client "△△ Building Management" refers to the data of the client "○○ Management Association" in the building ID "Building A". In Figs. 8A, 8B and 9, a flow performed among the contract information reference device 1, the client operation terminal 3 used by the user of the client "△△ Building Management", and the client operation terminal 3 used by the user of the client "○○ Management Association" will be described. Hereinafter, the client operation terminal 3 used by the user of the client "△△ Building Management" will be referred to as △△ Building Management user terminal 31. The client operation terminal 3 used by the user of the client "○○ Management Association" is referred to as ○○ Management Association user terminal 32.

Basic operations such as login and logout to/from

the system will not be described. In this flow, the client "△△ Building Management" or its user is the applicant of the reference. The client "○○ Management Association" or its user is the application destination of the reference.

First, the △△ Building Management user terminal 31 displays the data reference application screen according to the operation of the △△ Building Management user (A001). Then, the △△ Building Management user terminal 31 outputs an access request including the client ID or the user ID to the contract information reference device 1.

Next, in response to the access request, the reference processing unit 14 of the contract information reference device 1 refers to the client DB 12a and confirms the building ID of the building facility for which the client "△△ Building Management" has the maintenance contract. That is, the contract information reference device 1 identifies the building ID corresponding to the client ID or the user ID included in the access request. Then, the reference processing unit 14 joins the client record of the identified building ID from the client information DB 12a and causes it to be displayed on the data reference application screen of the △△ Building Management user terminal 31 (K001). At this time, the reference processing unit 14 also causes the client record of another client to be displayed. The reference

processing unit 14 also refers to the application status management DB. However, since there is no data reference application record, the application status of the building facility record in the data reference application screen is displayed as "Not Yet Applied". These contents are as described in Fig. 4.

Next, the $\Delta\Delta$ Building Management user terminal 31 displays the data reference application screen. In the present embodiment, it is assumed that this data reference application screen displays a building facility record regarding the security camera of the client "○○ Management Association" (see Fig. 4).

Then, the $\Delta\Delta$ Building Management user terminal 31 receives, from the $\Delta\Delta$ Building Management user, determination results as to whether there is a building facility in the same building for which another client has a maintenance contract (A002) or whether there is a building facility of another client for which data reference is desired (A003). As a result, if there is no building facility for which another client has a maintenance contract (No in A002) or if there is no building facility of another client for which data reference is desired (No in A003), the processing of this flow ends. Specifically, the $\Delta\Delta$ Building Management user terminal 31 continues to display the data reference

application screen as it is, or stops its function in accordance with an end instruction from the $\Delta\Delta$ Building Management user.

If there is a building facility for which another client has a maintenance contract (Yes in A002) or there is a building facility of another client for which data reference is desired (Yes in A003), the processing proceeds to A004.

Next, the $\Delta\Delta$ Building Management user terminal 31 receives, from the $\Delta\Delta$ Building Management user, selection of a building facility record desired to refer. In the present embodiment, it is assumed that the building facility record regarding the security camera of the client "oo Management Association" has been selected. Therefore, the $\Delta\Delta$ Building Management user terminal 31 receives pressing of the corresponding application button from the $\Delta\Delta$ Building Management user. Then, the $\Delta\Delta$ Building Management user terminal 31 notifies the contract information reference device 1 of the data reference application including its own client ID or user ID (A004). If the building owner who has not concluded the maintenance contract desires reference, the client operation terminal 3 of the building owner notifies the data reference application including the building ID. In this case, the subsequent processing is made possible by using, as the

client ID of the building owner, the client ID associated with the building ID. In this case, it is possible to prevent fraud by performing authentication specific to the building owner.

Next, the data reference application processing unit 15 of the contract information reference device 1 receives a request for data reference application. Then, the data reference application processing unit 15 associates the client ID of the client "○○ Management Association" and the building facility ID of the security camera to be applied with the client ID of the client "△△ Building Management" included in the data reference application. By this, the data reference application processing unit 15 creates a data reference application record and stores it in the application status management DB (K002).

In creating the data reference application record, the data reference application processing unit 15 updates the application status of the data reference application record in the application status management DB to "Pending".

Next, the reference processing unit 14 acquires, from the user DB (not illustrated), user information such as email addresses of the △△ Building Management user and the ○○ Management Association user (K003). That is, the reference processing unit 14 identifies the contact of each

client.

Next, the reference processing unit 14 notifies, by email transmission, the ○○ Management Association user terminal 32 of data application information indicating that the △△ Building Management user has applied for data reference (K004). That is, the reference processing unit 14 transmits the data reference application email to the ○○ Management Association user terminal 32.

The reference processing unit 14 notifies the △△ Building Management user terminal 31 that the data reference application email has been transmitted to the ○○ Management Association user terminal 32.

Next, by the processing of the reference processing unit 14, the △△ Building Management user terminal 31 displays a data reference application screen to be confirmed (A005). This allows the △△ Building Management user to confirm that the display of the building facility record regarding the security camera of the client "○○ Management Association" has been updated to "Pending".

The ○○ Management Association user terminal 32 receives the data reference application email (B001).

Next, the ○○ Management Association user terminal 32 displays a data reference application screen based on the received data reference application email (B002). Here, the ○○ Management Association user terminal 32 can perform

this display by accessing the link destination described in the received data reference application email. The oo Management Association user terminal 32 may start display of the data reference application screen by the operation of the oo Management Association user. The display of this data reference application screen is conditional on the input of authentication information from the oo Management Association user to the oo Management Association user terminal 32. While email is used in the present embodiment, another message exchange function such as a messenger application may be used.

Then, the reference processing unit 14 of the contract information reference device 1 executes K005 in response to the display of the data reference application screen by the oo Management Association user terminal 32 in B002. That is, the reference processing unit 14 of the contract information reference device 1 refers to the client DB 12a, confirms the building ID of the building facility having the maintenance contract of the client "oo Management Association", and joins the information on the same building ID from all the information including the clients other than the client "oo Management Association". Then, the reference processing unit 14 causes the oo Management Association user terminal 32 to display a data reference application screen indicating this joined

information (K005). This screen example is as shown in Fig. 6.

Next, the ○○ Management Association user terminal 32 receives, from the ○○ Management Association user, an input indicating whether or not to permit the application shown on the data reference application screen (B003). Here, the ○○ Management Association user refers to the data reference application screen, confirms that the △△ Building Management user has applied for data reference regarding the security camera, and determines whether or not to permit the application.

First, the case of permitting the application (Permit in B003) will be described, and the case of not permitting the application (Not Permit in B003) will be described later in detail with reference to Fig. 9.

In the case of permitting the application, the ○○ Management Association user terminal 32 detects the pressing of the permit button of the building facility record regarding the security camera of the client “○○ Management Association” input from the ○○ Management Association user terminal 32 (B004). As a result, the ○○ Management Association user terminal 32 notifies the contract information reference device 1 that the application has been permitted.

Next, in the contract information reference device

1, the data reference application processing unit 15 refers to the application status management DB 12c, identifies the data reference application record of application permission, and updates the application status to "Permit" (K006). That is, the reference rights are given.

Here, it is desirable that the data reference application processing unit 15 changes the updated application status in accordance with a predetermined condition thereafter. The predetermined condition includes elapse of a certain period of time from the update or application. Specifically, if the application status is updated to "Permit" in K006, the data reference application processing unit 15 changes the application status to one of "Reject", "Expired", "Reapplicable", and "(blank = initial state)" after a certain period of time has elapsed. That is, it is a state where no right is given. The certain period of time may be changed by the system administrator or the like. The certain period of time may be changed according to the client, its user, and the involved party.

The predetermined condition further includes a state that the collection processing unit 13 detects a change regarding the contract of the applied data. The change regarding the contract includes a change in the contract or a change in the contract information. This is for considering the possibility that, if the contract

information changes (including increase and decrease) due to a contract or the like, it becomes necessary to change the handling of data from the past.

Next, the reference processing unit 14 acquires, from the user DB (not illustrated), user information such as email addresses of the ○○ Management Association user and the △△ Building Management user (K007). Since this processing is similar to that of K003, the result of K003 may be used.

Next, the reference processing unit 14 creates an email indicating that the application for data reference has been permitted, and notifies, by email transmission, the △△ Building Management user terminal 31 that the application for data reference has been permitted (K008). While email is used in this processing, another message exchange function may be used as described above.

At this time, the reference processing unit 14 notifies, by email, the system administrator of the contract information reference device 1 that the application for data reference has been permitted between the △△ Building Management user and the ○○ Management Association user (K009). This makes it possible to handle inquiries from the △△ Building Management user and the ○○ Management Association user. Here, a message exchange function other than email may be used. The destination in

the email or message exchange function may be another relevant party (sales representative or the like) of the contract information reference device 1.

By the operation of the ○○ Management Association user, the ○○ Management Association user terminal 32 displays that the display of the building facility record regarding the security camera on the data reference application screen has been updated to "Permit" (B005). This allows the ○○ Management Association user to confirm that the application has been permitted. Here, the operation of the ○○ Management Association user includes a data reference application screen reload instruction and a redisplay instruction to the ○○ Management Association user terminal 32.

The △△ Building Management user terminal 31 receives and displays the application permission email (A006). Then, the △△ Building Management user terminal 31 displays the data reference application screen in accordance with the operation of the △△ Building Management user (A007). Here, the operation of the △△ Building Management user includes a data reference application screen reload instruction and a redisplay instruction to the △△ Building Management user terminal 31.

The reference processing unit 14 of the contract information reference device 1 refers to the client DB 12a,

confirms the building ID of the building facility having the maintenance contract of the client "△△ Building Management", and joins the information on the same building ID from all the information including the clients other than the client "△△ Building Management". Then, the reference processing unit 14 causes the △△ Building Management user terminal 31 to display a data reference application screen indicating this joined information (K010). At this time, the reference processing unit 14 refers also to the application status management DB 12c and acquires "Permit" registered in the application status of the target data reference application record. Then, the reference processing unit 14 causes the application status of the building facility record in the data reference application screen to be displayed by joining "Permit" and the client "△△ Building Management".

The △△ Building Management user terminal 31 displays the data reference application screen (A008). The △△ Building Management user can refer to this content and confirm that the application has been permitted. Then, the △△ Building Management user terminal 31 receives a display request of an operating state screen from the △△ Building Management user (A009).

In response to A009, the reference processing unit 14 of the contract information reference device 1

identifies the building facility ID of the client record that is the client "△△ Building Management" of the client DB 12a and the data reference application record that is the applicant client "△△ Building Management" of the application status management DB 12c. Then, the reference processing unit 14 acquires, from these, the application destination client ID and the application destination building facility ID of the record of which the application status is "Permit", and acquires the operating state of the building facility from the operating state DB using these as keys. Then, the reference processing unit 14 causes the acquired operating state to be displayed on the operating state screen of the △△ Building Management user terminal 31 (K011).

Then, the △△ Building Management user terminal 31 displays this operating state screen. This allows the △△ Building Management user to confirm the operating state. Specifically, the △△ Building Management user can confirm the operating states of the elevators of the building facility IDs "E001" and "E002" and the security cameras of the client ID "002" and the building facility ID "K001".

Next, the case of not permitting in B003 of the ○○ Management Association user terminal 32 will be described with reference to Fig. 9.

If the application is not permitted in B003, the ○○

Management Association user terminal 32 receives, from the ○○ Management Association user, the pressing of the reject button of the building facility record regarding the security camera of the client “○○ Management Association”. Then, the ○○ Management Association user terminal 32 notifies the contract information reference device 1 of rejection of the application (B006).

Next, the data reference application processing unit 15 of the contract information reference device 1 refers to the application status management DB 12c, identifies the data reference application record of the application permission, and updates the application status to “Reject” (K012). Note that “Reject” of the application status can be changed in accordance with a predetermined condition as in K006 (“Permit”). However, in this case, it is desirable to suppress a change from “Reject” to “Permit”.

Next, the reference processing unit 14 of the contract information reference device 1 acquires, from the user DB (not illustrated), user information such as email addresses of the ○○ Management Association user and the △△ Building Management user. Since this processing is similar to those of K003 and K007, these results may be used. Then, the reference processing unit 14 notifies, by email transmission, the △△ Building Management user terminal 31 that the application for data reference has been rejected

(K013). Furthermore, the reference processing unit 14 notifies, by email, the ○○ Management Association user terminal 32 that the application rejection email has been notified to the △△ Building Management user terminal 31.

Then, the reference processing unit 14 notifies, by email, the system administrator and the like that the application for data reference has been rejected (K014). This processing is the same as that of K009. This allows the system administrator and the like to handle inquiries from the △△ Building Management user and the ○○ Management Association user.

The above emails of K013 and K014 may be made by using another message exchange function as described above.

When displaying the data reference application screen, the ○○ Management Association user terminal 32 displays the building facility record regarding the security camera that has been updated to the blank (initial state) (B005). This allows the ○○ Management Association user to confirm, also from this screen, that the application has been rejected in the system.

The △△ Building Management user terminal 31 receives the application rejection email (A011). Then, the △△ Building Management user confirms this email, and, by the operation of the △△ Building Management user, the △△ Building Management user terminal 31 launches the data

reference application screen (A007).

In response to the processing of A007, the reference processing unit 14 of the contract information reference device 1 refers to the client DB 12a, and identifies the building ID of the building facility having the maintenance contract of the client "△△ Building Management". Then, the reference processing unit 14 joins information on the identified same building ID from all the information including the clients other than the client "△△ Building Management", and causes the △△ Building Management user terminal 31 to display it on the data reference application screen (K015). At this time, the application status management DB 12c is also referred to. Then, the reference processing unit 14 acquires "Reject" registered in the application status of the target data reference application record, and causes the application status of the building facility record in the data reference application screen to be displayed as "Not Yet Applied" (initial state) (A013).

In response to the processing of K015, the △△ Building Management user terminal 31 displays the data reference application screen. With reference to this content, the △△ Building Management user can confirm that the application has been rejected in the system.

This is all for the description of the processing flow of the present embodiment. In the present embodiment,

the explanation has been made on the assumption that the information on one building is displayed on the data reference application screen. However, a configuration in which a plurality of buildings are collectively displayed may be adopted. A part of a building may be targeted, or a facility other than a building may be targeted.

In the present embodiment, the application for data reference is described. However, a configuration in which the client or its user of the application destination can limit the data reference range and function may be adopted.

In the present embodiment, the explanation is given on the assumption of only simply permitting an application for data reference. However, a configuration in which the application destination client or its user can set time limit for data reference may be adopted, or a configuration of providing a function for invalidating an application once having been permitted may be adopted.

In the present embodiment, the explanation has been made regarding a client having concluded a maintenance contract. However, for example, information of a building owner who has does not have a direct contract with the maintenance company in the upstream of the management company contracted with the maintenance company is managed in association with the client ID of the contract client and the building ID that are stored in the client DB. A

configuration in which such an involved party can also refer to data by application to the management company may be adopted.

According to the embodiment described above, the following can be performed, even in a case where a building management company involved in building management and a building owner in the same building, a condominium management association in a case of a condominium, and the like exist, and each of them has a building facility maintenance contract with a building facility maintenance company. Based on this contract, it is possible to integrate and refer to operation data and maintenance data of the building facility for which each involved party such as the building management company, the building owner, and the condominium management association has ownership.

Since it is not necessary to obtain data from each tenant, make an arrangement with each tenant for the reference range of the obtained data, and decide the access rights to the data for each involved party, an effect of being capable of reducing time and cost for managing the system is achieved.

The present invention is not limited to the above-described embodiments and modifications, but includes various modifications. For example, the above-described embodiment has been explained in detail for the purpose of

explaining the present invention in an easy-to-understand manner, and is not necessarily limited to that including all the described configurations. It is also possible to replace a part of the configuration of a certain embodiment with the configuration of another embodiment, and it is also possible to add the configuration of another embodiment to the configuration of a certain embodiment. A part of the configuration of each embodiment can be added to, deleted from, or replaced with another configuration.

CLAIMS

1. A contract information reference device that controls reference to a plurality of pieces of contract information and operating state information regarding each of a plurality of facilities, each facility of the plurality of facilities associated with a facility ID for the facility, the contract information reference device comprising:

- (a) a collection processing unit,
 - (i) wherein the collection processing unit is in data connection with a plurality of control devices via a communication network;
 - (ii) wherein the collection processing unit is configured to collect the operating state information related to a plurality of facility devices via the control devices;
 - and
 - (iii) wherein each facility device is associated with the facility ID for the facility in which the facility device is installed;
- (b) a database that stores for each facility of the plurality of facilities:
 - (i) the operating state information of the facility devices associated with the facility ID of the facility;
 - and
 - (ii) the contract information and a contractant ID of a contractant included in a list of authorized parties and having rights to the contract information and the operating state information associated with the facility ID for the facility;
- (c) a data reference application processing unit that for each facility of the plurality of facilities, receives a data reference application for the contract information associated with the facility ID of the facility and the operating state information associated with the facility ID of the facility

stored in the database from an authorized party operation terminal used by one of the authorized parties; and

(d) a reference processing unit that, for each facility of the plurality of facilities:

(i) notifies reference application information to the contract information including information indicating the authorized party and the operating state information associated with the facility ID of the facility, a contractant operation terminal used by a contractant indicated by a contractant ID associated with the contract information; and

(ii) stores, in the database, reference rights to the authorized party for the contract information and the operating state information associated with the facility ID of the facility in response to a response from the contractant for the reference application information.

2. The contract information reference device according to claim 1, wherein for each of the plurality of facilities:

the data reference application processing unit receives a reference application including the facility ID identifying the facility in which an unauthorized party has no contract for the contract information or the operating state information associated with the facility ID of the facility;

the reference processing unit notifies the reference application information including information indicating the unauthorized party identified based on the facility ID; and

the reference processing unit stores, in the database, reference rights to the unauthorized party having no rights to the contract information or the operating state information associated with the facility ID of the facility in response to a response from the contractant.

3. The contract information reference device according to any of claims 1 to 2, wherein

the database stores, in association with the contract information, an application status indicating correspondence to the data reference application, and

the reference processing unit stores, as the application status, the application status and a result of giving the reference rights.

4. The contract information reference device according to claim 3, wherein

the reference processing unit has a means for changing the application status in accordance with a predetermined condition.

5. The contract information reference device according to claim 4, wherein

the reference processing unit changes, after a certain period of time, from a state in which the reference rights are given to a state in which the reference rights are not given.

6. The contract information reference device according to claim 4, wherein

the reference processing unit changes the application status when detecting at least one of a change in a contract indicated by the contract information and a change in the contract information.

7. The contract information reference device according to any one of claims 1 to 6, wherein

the plurality of control devices include at least one of an elevator control device and a security camera control device; and

the plurality of facility devices includes at least one of an elevator and a security camera.

8. A contract information reference method for controlling reference to a plurality of pieces of contract information and operating state information regarding each of a plurality of facilities, each facility of the plurality of facilities associated with a facility ID for the facility, the contract information reference method comprising the steps of, for each facility of the plurality of facilities:

- (a) maintaining data connection with a control devices via a communication network;
- (b) collecting the operating state information related to a plurality of facility devices via the control devices, wherein each facility device is associated with the facility ID for the facility in which the facility device is installed; and
- (c) storing in a database:
 - (i) the operating state information of the facility devices associated with the facility ID of the facility; and
 - (ii) the contract information and a contractant ID of a contractant included in a list of authorized parties and having rights to the contract information and the operating state information associated with the facility ID for the facility;
- (d) receiving a data reference application for the contract information associated with the facility ID of the facility and the operating state information associated with the facility ID of the facility stored in the database from an authorized party operation terminal used by one of the authorized parties;
- (e) notifying reference application information to the contract information including information indicating the authorized party and the operating state information

associated with the facility ID of the facility, a contractant operation terminal used by a contractant indicated by a contractant ID associated with the contract information; and
(f) storing, in the database, reference rights to the authorized party for the contract information and the operating state information associated with the facility ID of the facility in response to a response from the contractant for the reference application information.

9. The contract information reference method according to claim 8, wherein

the step of receiving a reference application includes the facility ID identifying the facility in which an unauthorized party has no contract for the contract information or the operating state information associated with the facility ID of the facility;

the step of notifying the reference application information includes information indicating the unauthorized party identified based on the facility ID; and

the step of storing in the database includes storing reference rights to the unauthorized party having no rights to the contract information or the operating state information associated with the facility ID of the facility in response to a response from the contractant.

10. The contract information reference method according to claim 8 or 9, wherein in the step of storing, the database stores, in association with the contract information:

an application status indicating correspondence to the data reference application;

the application status; and

a result of giving the reference rights.

11. The contract information reference method according to claim 10, wherein

the step of storing includes changing the application status in accordance with a predetermined condition.

12. The contract information reference method according to claim 11, wherein

the step of storing includes changing, after a certain period of time, from a state in which the reference rights are given to a state in which the reference rights are not given.

13. The contract information reference method according to claim 11, wherein

the step of storing includes changing the application status when detecting at least one of a change in a contract indicated by the contract information and a change in the contract information.

14. The contract information reference method according to any one of claims 8 to 13, wherein

the plurality of control devices include at least one of an elevator control device and a security camera control device; and

the plurality of facility devices includes at least one of an elevator and a security camera.