DESCRIPTION

MANAGEMENT APPARATUS OR DEVICE INFORMATION TRANSMITTING APPARATUS

TECHNICAL FIELD

The present disclosure relates to a management apparatus or a device information transmitting apparatus.

BACKGROUND ART

Hitherto, there has been a system in which a device information transmitting apparatus and a management apparatus communicate with each other via a communication network. For example, PTL 1 (Japanese Unexamined Patent Application Publication No. 2010-210209) discloses a system in which an information transmitting apparatus that transmits information about an air conditioner at a predetermined timing and a management apparatus that manages a plurality of air conditioners communicate with each other via the Internet.

SUMMARY OF THE INVENTION

<Technical Problem>

In the foregoing system, it may be difficult to transmit and receive information that is necessary for operating the system when communication quality in the communication network decreases. Such a situation is to be suppressed.

<Solution to Problem>

According to a first aspect of the present disclosure, there is provided a management apparatus that communicates with a device information transmitting apparatus via a communication network under a predetermined communication condition. The device information transmitting apparatus is an apparatus that transmits device information, the device information transmitting apparatus controls the device, the management apparatus further communicates with an information output terminal, the information output terminal is associated with the device information transmitting apparatus and transmits a request related to the device controlled by the device information transmitting apparatus to the management apparatus. The device information is information about a predetermined device. The management apparatus includes a first measuring unit, a first determining unit, and a first control unit. The first measuring unit measures communication quality in the communication network. The first determining unit determines a degree of decrease in the communication quality. The first control unit executes first control in accordance with the degree of decrease in the communication quality. In the first control, the first control unit changes the

communication condition in accordance with a degree of priority of each of pieces of information transmitted between the device information transmitting apparatus and the management apparatus, and wherein the management apparatus further comprises a first notifying unit that notifies the information output terminal that the first control is being executed such that a person who operates the information output terminal is able to recognize the execution of the first control, when the first control unit executes the first control.

Accordingly, even in a case where the communication quality in the communication network decreases in the communication between the management apparatus and the device information transmitting apparatus via the communication network, necessary information can be transmitted and received.

The "first control" herein may include not only a single process but also a plurality of processes.

The "communication condition" herein is not limited and may be any condition related to communication between the management apparatus and the device information transmitting apparatus and related to the amount of communication. For example, the "communication condition" herein is the timing to transmit or receive information, the number of transmissions or receptions of information, the details of information that is transmitted or received, or the like, between the management apparatus and the device information transmitting apparatus.

The "degree of priority" herein is the degree of priority of information transmitted between the management apparatus and the device information transmitting apparatus and is, for example, individually determined in accordance with the degree of importance of each piece of information. For example, the degree of priority is individually determined in accordance with the degree of necessity of each piece of information in operating the system including the device information transmitting apparatus and the management apparatus. For example, the degree of priority is determined in accordance with a condition (for example, a type, a place of disposition, an ability, or the like) of the device that transmits or receives information.

In an embodiment of the above management apparatus, in the first control, the first control unit changes the communication condition regarding transmission of information from the management apparatus to the device information transmitting apparatus. Accordingly, in a case where the communication quality in the communication network decreases in the communication between the management apparatus and the device information transmitting apparatus via the communication network, the communication condition is changed regarding transmission of information from the management apparatus to the device information transmitting apparatus.

In an embodiment of the above management apparatus, in the first control, the first control unit transmits, to the device information transmitting apparatus, an instruction to change the communication condition regarding transmission of information from the device information transmitting apparatus to the management apparatus. Accordingly, in a case where the communication quality in the communication network decreases in the communication between the management apparatus and the device information transmitting apparatus via the communication network, the communication condition is changed regarding transmission of information from the device information transmitting apparatus to the management apparatus.

In an embodiment of the above management apparatus, the device includes an air conditioner. The degree of priority is determined based on at least one of an installation status of the air conditioner, a usage status of the air conditioner, an attribute of the air conditioner, and a monitoring purpose of the air conditioner. Accordingly, in a case where the communication quality in the communication network decreases in the communication between the management apparatus and the device information transmitting apparatus in the system that manages the air conditioner via the communication network, the communication condition can be finely determined. The "usage status" herein is, for example, the operation state, operation time section of the air conditioner or the like. The "monitoring purpose" herein includes whether there is a monitoring purpose and/or the details of the monitoring purpose.

An embodiment of the above management apparatus further includes a first notifying unit. The first notifying unit notifies a predetermined information output terminal that the first control is being executed, when the first control unit executes the first control. Accordingly, a user or a system operator is able to grasp that the first control is being executed.

In an embodiment of the above management apparatus, the first control unit suspends or stops the first control in response to receipt of, from another apparatus, a command of suspending or stopping execution of the first control. Accordingly, it is possible to determine execution, and suspension or stop of the first control as appropriate.

In an embodiment of the above management apparatus, the first determining unit determines the communication quality, based on a reference value of the communication quality, the reference value being determined based on a result of measurement of the communication quality during a predetermined period. Accordingly, it is possible to accurately determine the degree of decrease in the communication quality. The "predetermined period" is appropriately set in accordance with design specifications or an installation environment.

In an embodiment of the above management apparatus , a reference value is determined by another information processing apparatus. Accordingly, it is possible to appropriately set a trigger for the first control.

According to a second aspect of the present disclosure, there is provided a device information transmitting apparatus that communicates with a management apparatus via a communication network under a predetermined communication condition and transmits device information. The device information is information about a predetermined device, the device information transmitting apparatus controls the device, the device information transmitting apparatus further communicates with an information output terminal, the information output terminal is associated with the device information transmitting apparatus and transmits a request related to the device controlled by the device information transmitting apparatus to the management apparatus. The device information transmitting apparatus includes a second measuring unit, a second determining unit, and a second control unit. The second measuring unit measures communication quality in the communication network. The second determining unit determines a degree of decrease in the communication quality. The second control unit executes second control. The second control is control executed in accordance with the degree of decrease in the communication quality. In the second control, the second control unit changes the communication condition in accordance with a degree of priority of each of pieces of information transmitted between the device information transmitting apparatus and the management apparatus, and wherein the device information transmitting apparatus further comprises a second notifying unit that notifies the information output terminal that the second control is being executed such that a person who operates the information output terminal is able to recognize the execution of the second control, when the second control unit executes the second control.

Accordingly, even in a case where the communication quality in the communication network decreases in the communication between the management apparatus and the device information transmitting apparatus via the communication network, necessary information can be transmitted and received.

The "second control" herein may include not only a single process but also a plurality of processes.

The "communication condition" herein is not limited and may be any condition related to communication between the management apparatus and the device information transmitting apparatus and related to the amount of communication. For example, the "communication condition" herein is the timing to transmit or receive information, the number of transmissions or receptions of information, the details of information that is transmitted or received, or the like, between the management apparatus and the device information transmitting apparatus.

The "degree of priority" herein is the degree of priority of information transmitted between the management apparatus and the device information transmitting apparatus and is,

for example, individually determined in accordance with the degree of importance of each piece of information. For example, the degree of priority is individually determined in accordance with the degree of necessity of each piece of information in operating the system including the device information transmitting apparatus and the management apparatus.

In an embodiment of the above device information transmitting apparatus, in the second control, the second control unit changes the communication condition regarding transmission of information from the device information transmitting apparatus to the management apparatus. Accordingly, in a case where the communication quality in the communication network decreases in the communication between the management apparatus and the device information transmitting apparatus via the communication network, the communication condition is changed regarding transmission of information from the device information transmitting apparatus to the management apparatus.

In an embodiment of the above device information transmitting apparatus, in the second control, the second control unit transmits, to the management apparatus, an instruction to change the communication condition regarding transmission of information from the management apparatus to the device information transmitting apparatus. Accordingly, in a case where the communication quality in the communication network decreases in the communication between the management apparatus and the device information transmitting apparatus via the communication network, the communication condition is changed regarding transmission of information from the management apparatus to the device information transmitting apparatus.

In an embodiment of the above device information transmitting apparatus, the device includes an air conditioner. The degree of priority is determined based on at least one of an installation status of the air conditioner, a usage status of the air conditioner, an attribute of the air conditioner, and a monitoring purpose of the air conditioner. Accordingly, in a case where the communication quality in the communication network decreases in the communication between the management apparatus and the device information transmitting apparatus in the system that manages the air conditioner via the communication network, the communication condition can be finely determined. The "usage status" herein is, for example, the operation state, operation time section of the air conditioner or the like. The "monitoring purpose" herein includes whether there is a monitoring purpose and/or the details of the monitoring purpose.

An embodiment of the above device information transmitting apparatus further includes a second notifying unit. The second notifying unit notifies a predetermined information output terminal that the second control is being executed, when the second control unit executes the second control. Accordingly, a user or a system operator is able to grasp that the second control

is being executed.

In an embodiment of the above device information transmitting apparatus, the second control unit suspends or stops the second control in response to receipt of, from another apparatus, a command of suspending or stopping execution of the second control. Accordingly, it is possible to determine execution, and suspension or stop of the second control as appropriate.

In an embodiment of the above device information transmitting apparatus, the second determining unit determines the communication quality, based on a reference value of the communication quality, the reference value being determined based on a result of measurement of the communication quality during a predetermined period. Accordingly, it is possible to accurately determine the degree of decrease in the communication quality. The "predetermined period" is appropriately set in accordance with design specifications or an installation environment.

In an embodiment of the above device information transmitting apparatus, the reference value is determined by another information processing apparatus. Accordingly, it is possible to appropriately set a trigger for the second control.

BRIEF DESCRIPTION OF DRAWINGS

<Fig. 1> Fig. 1 is a schematic diagram illustrating the configuration of a device management system.

<Fig. 2> Fig. 2 is a schematic diagram illustrating the configuration of an air conditioner.

<Fig. 3> Fig. 3 is a schematic diagram illustrating functional blocks of individual apparatuses constituting a device management system according to a first embodiment.

<Fig. 4> Fig. 4 is a schematic diagram illustrating an example of communication conditions related to communication between a management apparatus and one control terminal.

<Fig. 5> Fig. 5 is a schematic diagram illustrating an example of information that is taken into account in determining the degree of priority.

<Fig. 6> Fig. 6 is a schematic diagram illustrating an example of a manner of determining the degree of priority.

<Fig. 7> Fig. 7 is a schematic diagram illustrating an example of a manner of determining the degree of priority.

<Fig. 8> Fig. 8 is a schematic diagram illustrating an example of a manner of determining the degree of priority.

<Fig. 9> Fig. 9 is a schematic diagram illustrating an example of a manner of

CLAIMS

1. A management apparatus ~~(30)~~ that communicates with a device information transmitting apparatus ~~(20)~~ via a communication network ~~(NW1)~~ under a predetermined communication condition ~~(A1, A2, A3 ・・・)~~, the device information transmitting apparatus ~~(20)~~ transmitting device information ~~(D1, D2, D3 ・・・)~~ which is information about a predetermined device ~~(10)~~, the device information transmitting apparatus controls the device, the management apparatus further communicates with an information output terminal, the information output terminal is associated with the device information transmitting apparatus and transmits a request related to the device controlled by the device information transmitting apparatus to the management apparatus, the management apparatus ~~(30)~~ comprising:

a first measuring unit ~~(342)~~ that measures communication quality in the communication network;

a first determining unit ~~(343)~~ that determines a degree of decrease in the communication quality; and

a first control unit ~~(344)~~ that executes first control in accordance with the degree of decrease in the communication quality, wherein

in the first control, the first control unit changes the communication condition in accordance with a degree of priority of each of pieces of information transmitted between the device information transmitting apparatus and the management apparatus, and

wherein the management apparatus further comprises a first notifying unit that notifies the information output terminal that the first control is being executed such that a person who operates the information output terminal is able to recognize the execution of the first control, when the first control unit executes the first control.

2. The management apparatus ~~(30)~~ according to Claim 1, wherein

in the first control, the first control unit changes the communication condition regarding transmission of information from the management apparatus to the device information transmitting apparatus.

3. The management apparatus ~~(30)~~ according to Claim 1 or 2, wherein

in the first control, the first control unit transmits, to the device information transmitting apparatus, an instruction to change the communication condition regarding transmission of information from the device information transmitting apparatus to the management apparatus.

4. The management apparatus ~~(30)~~ according to any one of Claims 1 to 3, wherein

the device comprises an air conditioner ~~(10)~~, and

the degree of priority is determined based on at least one of an installation status of the air conditioner, a usage status of the air conditioner, an attribute of the air conditioner, and a monitoring purpose of the air conditioner.

~~5. The management apparatus (30) according to any one of Claims 1 to 4, further comprising~~

~~a first notifying unit (33, 344) that notifies a predetermined information output terminal (40) that the first control is being executed, when the first control unit executes the first control.~~

~~6~~5. The management apparatus ~~(30)~~ according to any one of Claims 1 to ~~5~~4, wherein

the first control unit suspends or stops the first control in response to receipt of, from another information processing apparatus ~~(40)~~, a command of suspending or stopping execution of the first control.

~~7~~6. The management apparatus ~~(30)~~ according to any one of Claims 1 to ~~6~~5, wherein

the first determining unit determines the communication quality, based on a reference value ~~(SV)~~ of the communication quality, the reference value ~~(SV)~~ being determined based on a result of measurement of the communication quality during a predetermined period.

~~8~~7. The management apparatus ~~(30)~~ according to Claim ~~7~~6, wherein

the reference value is determined by another information processing apparatus ~~(40)~~.

~~9~~8. A device information transmitting apparatus ~~(20')~~ that communicates with a management apparatus ~~(30)~~ via a communication network ~~(NW1)~~ under a predetermined communication condition ~~(A1, A2, A3 ・・・)~~ and that transmits device information ~~(D1, D2, D3 ・・・)~~ which is information about a predetermined device ~~(10)~~, the device information transmitting apparatus controls the device, the device information transmitting apparatus further communicates with an information output terminal, the information output terminal is associated with the device information transmitting apparatus and transmits a request related to the device controlled by the device information transmitting apparatus to the management apparatus, the device information transmitting apparatus ~~(20')~~ comprising:

a second measuring unit ~~(232)~~ that measures communication quality in the

communication network;

a second determining unit ~~(233)~~ that determines a degree of decrease in the communication quality; and

a second control unit ~~(234)~~ that executes second control in accordance with the degree of decrease in the communication quality, wherein

in the second control, the second control unit changes the communication condition in accordance with a degree of priority of each of pieces of information transmitted between the device information transmitting apparatus and the management apparatus, and

wherein the device information transmitting apparatus further comprises a second notifying unit that notifies the information output terminal that the second control is being executed such that a person who operates the information output terminal is able to recognize the execution of the second control, when the second control unit executes the second control.

~~10~~9. The device information transmitting apparatus ~~(20')~~ according to Claim ~~9~~8, wherein

in the second control, the second control unit changes the communication condition regarding transmission of information from the device information transmitting apparatus to the management apparatus.

~~11~~10. The device information transmitting apparatus ~~(20')~~ according to Claim ~~9~~8 or ~~10~~9, wherein

in the second control, the second control unit transmits, to the management apparatus, an instruction to change the communication condition regarding transmission of information from the management apparatus to the device information transmitting apparatus.

~~12~~11. The device information transmitting apparats ~~(20')~~ according to any one of Claims ~~9~~8 to ~~11~~10, wherein

the device comprises an air conditioner ~~(10)~~, and

the degree of priority is determined based on at least one of an installation status of the air conditioner, a usage status of the air conditioner, an attribute of the air conditioner, and a monitoring purpose of the air conditioner.

~~13. The device information transmitting apparatus (20') according to any one of Claims 9 to 12, further comprising~~

~~a second notifying unit (22, 234) that notifies a predetermined information output~~

~~terminal (40) that the second control is being executed, when the second control unit executes the second control.~~

~~14~~12. The device information transmitting apparatus ~~(20')~~ according to any one of Claims ~~9~~8 to ~~13~~11, wherein

the second control unit suspends or stops the second control in response to receipt of, from another information processing apparatus ~~(40)~~, a command of suspending or stopping execution of the second control.

~~15~~13. The device information transmitting apparatus ~~(20')~~ according to any one of Claims ~~9~~8 to ~~14~~12, wherein

the second determining unit determines the communication quality, based on a reference value ~~(SV)~~ of the communication quality, the reference value ~~(SV)~~ being determined based on a result of measurement of the communication quality during a predetermined period.

~~16~~14. The device information transmitting apparatus ~~(20')~~ according to Claim ~~15~~13, wherein

the reference value is determined by another information processing apparatus ~~(40)~~.