

METHOD AND APPARATUS FOR PROCESSING INFORMATION, AND STORAGE MEDIUM

CROSS REFERENCE TO RELATED APPLICATIONS

This application is based on and claims priority to Chinese patent application No. 202210635508.3, titled “method and apparatus for processing information, and storage medium”, filed on June 06, 2022, the entire contents of which are incorporated herein by reference.

TECHNICAL FIELD

The disclosure relates to a field of smart devices, in particular to a method and an apparatus for processing information, and a storage medium.

BACKGROUND

In the related art, when establishing a local area network (LAN) of a family, a company or other units, a plurality of LANs may be established based on user information corresponding to the family or company. In this case, if a user wants to add a gateway to the LAN for the user information, it is necessary for the user to designate a certain LAN and then add the gateway to the designated LAN, which is a complex process. If the user does not designate a LAN, a target LAN needs to be selected from a plurality of LANs for the gateway to join, which results in low operational efficiency.

SUMMARY

The disclosure provides a method and an apparatus for processing information, and a storage medium.

The technical solutions of the embodiments of the disclosure are implemented in the following ways.

The embodiments of the disclosure provide a method for processing information, which is performed by a first platform. The method includes:

receiving request information sent by a client, in which the request information at least includes gateway information of a gateway and user information, and the request information is configured to request to join a LAN established based on the user information;

determining whether the LAN established based on the user information has already existed;
and

in response to determining that the LAN established based on the user information has already existed, sending network information of the LAN to the gateway according to the gateway information, in which the network information is configured for the gateway to join the LAN.

The embodiments of the disclosure also provide another method for processing information , which is performed by a gateway. The method includes:

receiving network information of a LAN sent by a first platform, in which the LAN is established based on user information corresponding to a client that initiates request information;
and

joining the LAN corresponding to the network information according to the network information.

The embodiments of the disclosure also provide an apparatus for processing information, which is configured as a first platform. The apparatus includes:

a first receiving module, configured to receive request information sent by a client, in which the request information at least includes gateway information of a gateway and user information, and the request information is configured to request to join a LAN established based on the user information;

a determination module, configured to determine whether the LAN established based on the user information has already existed; and

a first sending module, configured to, in response to determining that the LAN established based on the user information has already existed, send network information of the LAN to the gateway according to the gateway information, in which the network information is configured for the gateway to join the LAN.

The embodiments of the disclosure also provide another apparatus for processing information, which is configured as a gateway. The apparatus includes:

a second receiving module, configured to receive network information of a LAN sent by a first platform, in which the LAN is established based on user information corresponding to a client that initiates request information; and

an adding module, configured to join the LAN corresponding to the network information according to the network information.

The embodiments of the disclosure also provide a device for processing information. The device includes a processor and a memory configured to store computer programs capable of running on the processor.

The processor is configured to perform the steps of any of the above information processing methods when running the computer programs.

The embodiments of the disclosure also provide a computer storage medium having computer-executable instructions stored thereon. When the computer-executable instructions are executed by a processor, the steps of one of the above-described methods for processing information are implemented. It should be understood that the above general description and the following detailed description are exemplary and explanatory only, and are not intended to limit the disclosure. Additional features of the embodiments of the disclosure will become clear according to the following detailed description of the exemplary embodiments with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate embodiments consistent with the disclosure and, together with the description, serve to explain the technical solutions of the disclosure.

FIG. 1 is a schematic flowchart of a method for processing information according to the disclosure.

FIG. 2 is a schematic flowchart of another method for processing information according to the disclosure.

FIG. 3 is a schematic flowchart of yet another method for processing information according to the disclosure.

FIG. 4 is a schematic flowchart of a binding process for a Thread gateway device according to the embodiments of the disclosure.

FIG. 5 is a schematic flowchart of establishing a LAN according to the embodiments of the disclosure.

FIG. 6 is a schematic flowchart of a network configuration for a Thread gateway device according to the embodiments of the disclosure.

FIG. 7 is a schematic flowchart of a state synchronization for a Thread gateway device

according to the embodiments of the disclosure.

FIG. 8 is a structural schematic diagram of an apparatus for processing information according to the embodiments of the disclosure.

FIG. 9 is a structural schematic diagram of another apparatus for processing information according to the embodiments of the disclosure.

FIG. 10 is a structural schematic diagram of yet another apparatus for processing information according to the embodiments of the disclosure.

FIG. 11 is a structural schematic diagram of another device for processing information according to the embodiments of the disclosure.

DETAILED DESCRIPTION

Various exemplary embodiments, features, and aspects of the disclosure will be described in detail below with reference to the accompanying drawings. The same numeral number in the accompanying drawings indicates elements have identical or similar functions. Although various aspects of the embodiments are illustrated in the accompanying drawings, it is not necessary to draw the accompanying drawings to scale unless otherwise noted.

The term “exemplary” as used herein specifically means “used as an example or embodiment, or being illustrative”. Any embodiment described herein as “exemplary” need not be interpreted as being superior to or better than other embodiments.

The term “and/or” as used herein merely describes association relations of associated objects, which indicates that three types of relations may exist, e.g., A and/or B means that A exists alone, A and B both exist, and B exists alone. In addition, the term “at least one type” as used herein represents any one of a plurality of types, or any combination of at least two types among the plurality of types, e.g., including at least one of A, B, and C may means including any one or more elements selected from a set consisting of A, B, and C.

In addition, in order to better illustrate the embodiments of the disclosure, many specific details are given in the specific embodiments below. It should be understood by those skilled in the art that the embodiments of the disclosure can be implemented without certain specific details. In some embodiments, methods, means, components, and circuits that are well known to those skilled in the art are not described in detail, so as to highlight the main concept of the embodiments of the disclosure.

The embodiments of the disclosure provide a method for processing information. FIG. 1 is a schematic flowchart of a method for processing information according to the disclosure. As illustrated in FIG. 1, the method is performed by a first platform. The method includes the following steps.

At step S101, request information sent by a client is received, in which the request information at least includes gateway information of a gateway and user information, and the request information is configured to request to join a LAN established based on the user information.

At step S102, it is determined whether the LAN established based on the user information has already existed.

At step S103, if it is determined that the LAN established based on the user information has already existed, network information of the LAN is sent to the gateway according to the gateway information, in which the network information is configured for the gateway to join the LAN.

At step S101, the client is an application program in a terminal device. The user information is account information registered for use in case the user logs into the application program. The gateway can be a wireless gateway, an Internet gateway, a LAN gateway, a Zigbee gateway, a Thread gateway and the like.

In the embodiment, the gateway is a Thread gateway. The gateway, which is based on a Thread multithreaded network protocol, can realize data transmission of low power consumption, and the mesh-shaped network structure has no single-point failure and supports multithreaded data transmission.

The gateway information may be a gateway ID corresponding to the Thread gateway, or a gateway serial number (SN) information of the Thread gateway, or the gateway ID corresponding to the Thread gateway and the gateway SN information of the Thread gateway. In this embodiment, the gateway information is the gateway SN information of the Thread gateway.

The gateway SN information of the Thread gateway is a unique identifier of the Thread gateway generated when the device is shipped from the factory and attached to the Thread gateway device in the form of a first graph identifier. The first graph identifier may be a Quick-Response (QR) code, a bar code, etc.

The gateway ID of the Thread gateway is a gateway ID of the Thread gateway generated based on the gateway SN information when the client activates the Thread gateway by scanning

the first graph identifier. The gateway ID and the gateway SN information are unique identifiers of the Thread gateway being activated currently, and the gateway ID generated after the Thread gateway is activated is associated with user information corresponding to the client that is currently performing the activation operation.

It needs to be noted that before step S101, the Thread gateway is connected to the first platform after a power-on reset via a network (e.g., a cellular mobile network, such as, 5G, 4G, or Ethernet, etc.) to register the gateway information on the first platform.

In the embodiment, after the Thread gateway registers the gateway information on the first platform, the client parses the gateway SN information of the Thread gateway by scanning the QR code on the Thread gateway device and generates a product ID. The client sends the request information that contains the user information corresponding to the client and the gateway SN information of the Thread gateway to the first platform.

It needs to be noted that after the power-on reset, the Thread gateway sends the gateway SN information of the Thread gateway to the first platform for registration, so that the first platform stores the gateway information of the registered Thread gateway.

After receiving the gateway SN information of the Thread gateway in the request information sent by the client, the first platform can quickly find a corresponding Thread gateway based on the gateway SN information, from the gateway information of the registered Thread gateways stored on the first platform, and determine a Thread gateway corresponding to the gateway information sent by the client.

At step S103, the network information may include a gateway address, a subnet mask, etc. of the LAN established based on the user information.

If the first platform determines that the LAN established based on the user information has already existed, the first platform searches for a Thread gateway to be added to the LAN, from the stored gateway information of the registered Thread gateways, according to the gateway information of the Thread gateway, and sends the network information of the LAN established based on the user information to the Thread gateway. The Thread gateway joins the corresponding LAN according to the network information.

It needs to be noted that in this embodiment, the LAN established based on the user information may include a plurality of Thread gateways, so that stability is enhanced at a communication level by an architecture of using a plurality of Thread gateways to back up each

other, and services are not interrupted by a single-point failure of one gateway.

Further, determining whether the LAN established based on the user information has already existed at step S103 also includes: in response to determining that the LAN established based on the user information does not exist, sending a LAN establishment instruction to the gateway according to the gateway information, in which the LAN establishment instruction includes user information configured to establish a LAN for the gateway.

If the first platform determines that there is no LAN established based on the user information, the first platform sends the LAN establishment instruction to the Thread gateway. The LAN establishment instruction includes the user information. After receiving the LAN establishment instruction sent by the first platform, the Thread gateway establishes a LAN according to the user information and the gateway SN information of the Thread gateway, and sends network establishment success information to the first platform. The network establishment success information includes the network information of the LAN and the user information corresponding to the LAN.

It needs to be noted that in this embodiment, the first platform receives the request information including the gateway information and the user information from the client, and if it is determined that there is the LAN established based on the user information, the first platform sends the network information of the LAN to the gateway according to the gateway information, and configures the gateway to join the LAN, so that gateways corresponding to the same user information join the LAN established based on the user information, and there is no need to face the problem of choosing which LAN for the gateway to join when the gateway is added to the LAN. In this way, one piece of user information corresponds to only one LAN, thereby simplifying the process.

Further, the method also includes: receiving network accessing success information returned by the gateway after successfully joining the LAN; and sending a network accessing success prompt to the client according to the network accessing success information.

Further, sending the network accessing success prompt to the client according to the network accessing success information, includes: receiving a query request sent by the client every fourth preset time; and sending the network accessing success prompt to the client based on the query request and the network accessing success information.

The fourth preset time may be a user-defined duration, or a system default duration, which

is not limited herein. For example, the fourth preset time may be 3 seconds, 5 seconds, 10 seconds, or the like.

The client sends the query request to the first platform every fourth preset time after sending the request information. The query request is configured to determine whether the Thread gateway has successfully joined the LAN.

After the first platform receives the network accessing success information returned by the Thread gateway in response to successfully joining the LAN, if the first platform receives the query request sent by the client, the first platform sends the network accessing success prompt to the client based on the query request and the network access success information. If the client receives the network accessing success prompt, it means that the Thread gateway requested by the client has successfully joined the network and has been successfully bound with the user information.

Further, the method also includes: in response to not receiving the network accessing success information returned by the gateway within a first preset time period starting from a moment of receiving the request information sent by the client, sending a network accessing failure prompt to the client.

In some embodiments, the first preset time period may be a customized duration dynamically adjusted by the user, or a system default duration, which is not limited herein. The first preset time period may be 60 seconds, 120 seconds, 180 seconds, or the like.

If the first platform does not receive the network accessing success information returned by the Thread gateway within the first preset time period starting from the moment of receiving the request information sent by the client, when the first platform receives the query request sent by the client, the first platform sends the network accessing failure prompt to the client. If the client receives the network accessing failure prompt, it means that the Thread gateway requested by the client is failed to join the network and has not been successfully bound with the user information.

Further, the method also includes: receiving a network connection request of each user terminal sent by the client, in which the network connection request at least includes the user information and user terminal information of user terminals corresponding to the user information; and sending, according to the user information, a user terminal adding instruction including the user terminal information to the gateway that joins the LAN established based on the user information, in which the user terminal adding instruction is configured for the gateway to add,

according to the user terminal information, the user terminals corresponding to the user information into the LAN established based on the user information.

As the continuous improvement of people's material living standards, the demand for fire safety is also increasingly. On the basis, smoke detector devices have been popularized to a certain extent, and play a certain role in fire prevention and disaster mitigation. A smart smoke detection system is generally classified into two categories.

The first category is standalone smoke detector devices that connect directly to a platform via wireless networks such as WiFi, cellular mobile networks such as 5G or 4G or the like, and networking ways such as Narrow Band Internet of Things (NB-IoT).

The second category is smoke detector devices, which are connected to a gateway through local protocols such as Zigbee, Bluetooth, etc., and the gateway is connected to a platform through network cables and WiFi.

For a standalone smoke detector device, the device is directly connected to the platform, the architecture is relatively simple and more convenient to realize. However, most smoke detector devices nowadays are basically battery-powered, and have high requirements on power consumption. For example, since the smoke detector devices that connect to the platform through WiFi have high output power and high power consumption, the battery-powered smoke detector devices are very limited.

For the smoke detector devices that connect to the platform through 4G or 2G, in addition to the problem of high power consumption, those smoke detector devices also have the problem of increasing costs due to the use of 4G or 2G IOT card.

For the smoke detector devices connected to the platform using the NB-IoT networking way, those smoke detector devices have a long heartbeat cycle, generally more than 24 hours. Therefore, when the devices are abnormally offline, it takes a long time for the platform to know the offline situation, so that device anomalies cannot be handled in time. Moreover, when a large number of smoke detector devices need to be deployed in the same area, the smoke detector devices connected to the platform using the NB-IoT networking way are prone to concurrent congestion.

For the smoke detector devices connected through the gateway, the smoke detector devices need to be connected to the gateway through local short-range protocols such as Zigbee, Bluetooth, etc., and then the gateway is connected to the platform using WiFi, or wired Ethernet, etc.. Since data interaction between the smoke detector devices and the platform cannot be carried out

directly, and the smoke detector devices need to be connected to the platform via the gateway as an information terminal platform, the logical architecture is led to be complex. The gateway has a lot of additional capabilities that the gateway does not actually have, and these capabilities in fact belong to the smoke detector devices. In addition, the communication between the smoke detector devices and the platform depends on a single gateway, and if the single gateway is malfunctioned, the communication is interrupted and the services are abnormal.

In this embodiment, the user terminal is a Thread smoke detector terminal. The attribute information of the Thread smoke detector terminal includes smoke detector terminal SN information of the Thread smoke detector terminal, a 64-bit Extended Unique Identifier (EUI64) of the Thread smoke detector terminal, and version number information of the Thread smoke detector terminal, and the like.

The smoke detector terminal SN information of the Thread smoke detector terminal, the EUI64 of the Thread smoke detector terminal and the version number information of the Thread smoke detector terminal are fixed identifiers generated when the device is shipped from the factory, and attached to the Thread smoke detector terminal device in the preset form of a second graph identifier. The second graph identifier may be a QR code or a bar code. The user may obtain the Thread smoke detector terminal information by scanning the second graph identifier through the client.

The user terminal information is the Thread smoke detector terminal information, which includes the EUI64 of the Thread smoke detector terminal. The smoke detector terminal based on the Thread multithreaded network protocol has the characteristic of low power consumption, which solves the problem of high power consumption and high power of a standalone smoke detector device.

In the embodiment, the client parses the Thread smoke detector terminal information from the obtained attribute information of the Thread smoke detector terminal, by scanning the QR code on the Thread smoke detector terminal device, and sends to the first platform, a network connection request of the Thread smoke detector terminal, in which the network connection request contains the user information corresponding to the client and the Thread smoke detector terminal information corresponding to the user information.

The first platform sends according to the user information, a Thread smoke detector terminal adding instruction including the Thread smoke detector terminal information, to all Thread

gateways that join the LAN established based on the user information.

The Thread gateway, based on the Thread smoke detector terminal information in the Thread smoke detector terminal adding instruction, configures networks for the Thread smoke detector terminals according to the Thread protocol, and adds the Thread smoke detector terminals corresponding to the user information to the LAN established based on the user information.

Further, after the Thread smoke detector terminal is successfully added to the LAN by the Thread gateway, i.e., the network for the Thread smoke detector terminal is successfully configured, the Thread smoke detector terminal is connected to the first platform via the Thread gateway, and EUI64 of the Thread smoke detector terminal is registered on the first platform.

It needs to be noted that in this embodiment, the solution in which the Thread smoke detector terminals join the LAN by network connection via the Thread gateway based on the Thread protocol, simplifies the standalone smoke detector device at a service level. In view of the architectural complexity, the Thread smoke detector terminal communicates directly with the platform after registering its own information on the first platform, without the need of the gateway to forward the information at the service level.

In some embodiments, after the client sends the network connection request of the Thread smoke detector terminal, the client sends a network connection result request for the Thread smoke detector terminal to the first platform every fifth preset time.

The fifth preset time may be a user-defined duration, or a system default duration, which is not limited herein. The fifth preset time may be 3 seconds, 5 seconds, 10 seconds, or the like.

In the embodiment, the client sends the network connection result request for the Thread smoke detector terminal to the first platform every 5 seconds. After the first platform receives the Thread smoke detector terminal information registered by the Thread smoke detector terminal, if the first platform receives the network connection result request sent by the client, the first platform sends a network configuration success prompt for the Thread smoke detector terminal to the client. If the client receives the network configuration success prompt for the Thread smoke detector terminal, it means that the Thread smoke detector terminal requested by the client has successfully joined the LAN corresponding to the user information, and has successfully bound with the user information.

If the first platform does not receive the Thread smoke detector terminal information registered by the Thread smoke detector terminal within a sixth preset time period starting from

a moment when the client sends the network connection request for Thread smoke detector terminal, if the first platform receives the network connection result request sent by the client, the first platform sends a network configuration failure prompt for the Thread smoke detector terminal to the client, which means that the network connection for the Thread smoke detector terminal requested by the client is failed, i.e., its network configuration is failed, and the Thread smoke detector terminal is not successfully bound with the user information.

In some embodiments, the sixth preset time period may be a customized duration dynamically adjusted by the user, or a system default duration, which is not limited herein. The sixth preset time period may be 60 seconds, 120 seconds, 180 seconds, or the like.

Further, the method also includes: receiving network topology information reported by the gateway every second preset time period, in which the network topology information includes network topology structure information of the gateway and first terminal information of a first user terminal, and the first user terminal is a user terminal that is in an online state among the user terminals corresponding to the user information; monitoring a state change of each user terminal corresponding to the user information according to the network topology information of the gateway and the first terminal information; and in response to a state change of any user terminal existing among the user terminals corresponding to the user information, sending to the client, state change prompt information for the user terminal with the state change.

The second preset time period may be a customized duration dynamically adjusted by the user, or a system default duration, which is not limited herein. The second preset time period may be 30 seconds, 1 minute, 2 minutes, or the like.

The first user terminal is a smoke detector terminal that is in an online state among the Thread smoke detector terminals corresponding to the user information, i.e., an online Thread smoke detector terminal that joins the LAN established based on the user information. The Thread smoke detector terminal that has joined the LAN established based on the user information but is in an offline state is referred to as a second user terminal.

In the embodiment, the first platform receives the network topology information reported by each Thread gateway in the LAN corresponding to the user information every 1 minute. The network topology information includes network topology structure information of the Thread gateway and smoke detector terminal information (i.e., the first terminal information) of the Thread smoke detector terminal that has joined the LAN through the Thread gateway and is in an

online state. The first platform monitors the state change of the Thread smoke detector terminal corresponding to the user information according to the received network topology structure information reported by the Thread gateway and the first terminal information.

According to the received first terminal information, online time of the first user terminal is updated. The state of the Thread smoke detector terminal (i.e., the second user terminal) other than the first user terminal among the Thread smoke detector terminals corresponding to the user information, is updated to be in an offline state. When a state of any user terminal among the user terminals corresponding to the user information has changed, state change prompt information of the user terminal whose state has changed is sent to the client.

It needs to be noted that in the embodiment, timely updating of the online or offline state of the Thread smoke detector terminal connected to the first platform via the Thread gateway is realized by periodically updating the network topology structure of the Thread gateway, which solves the problems that the heartbeat cycle of the smoke detector terminal is long and the abnormal offline situation of the smoke detector terminal cannot be solved in time. Meanwhile, by dynamically adjusting a state synchronization cycle interval of the Thread smoke detector terminal and the Thread gateway, the effectiveness of synchronization of online or offline state of the Thread smoke detector terminal is greatly improved under the premise of satisfying the requirements on power consumption.

The embodiments of the disclosure provide another method for processing information, which is performed by a gateway. FIG. 2 is a schematic flowchart of another method for processing information according to the disclosure. As illustrated in FIG. 2, the method includes the following steps.

At step S201, network information of a LAN sent by a first platform is received, in which the LAN is established based on user information corresponding to a client that initiates request information.

At step S202, the LAN corresponding to the network information is joined according to the network information.

In the embodiment, the gateway is a Thread gateway. The gateway, which is based on a Thread multithreaded network protocol, can realize data transmission of low power consumption, and the mesh-shaped network structure has no single-point failure and supports multithreaded data transmission.

The network information may include a gateway address of the LAN established based on the user information, a subnet mask, and the like.

Before step S201, the Thread gateway is connected to the first platform after a power-on reset via a network (e.g., a cellular mobile network, such as, 5G, 4G, or Ethernet, etc.) to register the gateway information on the first platform.

The gateway information may be a gateway ID corresponding to the Thread gateway, or a gateway SN information of the Thread gateway, or the gateway ID corresponding to the Thread gateway and the gateway SN information of the Thread gateway. In this embodiment, the gateway information is the gateway SN information of the Thread gateway.

The gateway SN information of the Thread gateway is a unique identifier of the Thread gateway generated when the device is shipped from the factory and attached to the Thread gateway device in the form of a first graph identifier. The first graph identifier may be a QR code, a bar code, etc.

The gateway ID of the Thread gateway is a gateway ID of the Thread gateway generated based on the gateway SN information when the client activates the Thread gateway by scanning the first graph identifier. The gateway ID and the gateway SN information are unique identifiers of the Thread gateway being activated currently, and the gateway ID generated after the Thread gateway is activated is associated with the user information corresponding to the client that is currently performing the activation operation.

It needs to be noted that in the embodiment, the gateway joins the LAN corresponding to the network information, according to the network information of the LAN established based on the user information corresponding to the client that initiates the request information sent by the first platform, so that all the gateways corresponding to the same user information join the LAN established based on the user information, and there is no need to face the problem of choosing which LAN for the gateway to join when the gateway is added to the LAN. In this way, one piece of user information corresponds to only one LAN, thereby simplifying the process.

The method further includes: in response to receiving a LAN establishment instruction sent by the first platform, establishing a LAN according to the user information, in which the LAN establishment instruction includes the user information corresponding to the client that initiates the request information.

If the Thread gateway receives the LAN establishment instruction containing the user

information sent by the first platform, a LAN is established according to the user information and the SN information of the Thread gateway.

After joining the LAN established based on the user information corresponding to the network information according to the network information, the method further includes: sending network accessing success information to the first platform.

The method further includes: receiving a user terminal adding instruction sent by the first platform, in which the user terminal adding instruction includes user terminal information of user terminals corresponding to the user information; and adding, according to the user terminal information, the user terminals corresponding to the user information to the LAN established based on the user information.

In this embodiment, the user terminal is a Thread smoke detector terminal. The user terminal information is the Thread smoke detector terminal information, including the EUI64 of the Thread smoke detector terminal.

The attribute information of the Thread smoke detector terminal includes SN information of the Thread smoke detector terminal, a EUI64 of the Thread smoke detector terminal, and version number information of the Thread smoke detector terminal, and the like.

The SN information of the Thread smoke detector terminal, the EUI64 of the Thread smoke detector terminal and the version number information of the Thread smoke detector terminal are fixed identifiers generated when the device is shipped from the factory and attached to the Thread smoke detector terminal device in the preset form of a second graph identifier. The second graph identifier may be a QR code or a bar code. The user may obtain the Thread smoke detector terminal information by scanning the second graph identifier through the client.

All the Thread gateways in the LAN receive the Thread smoke detector terminal adding instruction sent by the first platform. The Thread smoke detector terminal adding instruction includes the Thread smoke detector terminal information corresponding to the user information. The Thread gateway in the LAN configures networks for the Thread smoke detector terminal according to the Thread protocol, and adds the Thread smoke detector terminals corresponding to the user information to the LAN established based on the user information.

Further, the method also includes: reporting network topology information to the first platform every second preset time period, in which the network topology information is configured for the first platform to monitor a state change of each user terminal corresponding to

the user information, the network topology information includes network topology structure information of the gateway and first terminal information of a first user terminal, and the first user terminal is a user terminal that is in an online state among the user terminals corresponding to the user information.

The second preset time period may be a customized duration dynamically adjusted by the user, or a system default duration, which is not limited herein. The second preset time period may be 30 seconds, 1 minute, 2 minutes, or the like.

In the embodiment, each Thread gateway in the LAN corresponding to the user information reports the network topology information to the first platform every 1 minute. The network topology information includes network topology structure information of the Thread gateway and the smoke detector terminal information (i.e., the first terminal information) of the Thread smoke detector terminal that has joined the LAN through the Thread gateway and is in an online state. The network topology information is configured for the first platform to monitor and update the state change of each user terminal corresponding to the user information in real time. The online time of the first user terminal is updated according to the first terminal information in the received network topology information.

It needs to be noted that in the embodiment, timely updating of the online or offline state of the Thread smoke detector terminal connected to the first platform via the Thread gateway is realized by periodically updating the network topology structure of the Thread gateway, which solves the problems that the heartbeat cycle of the smoke detector terminal is long and the abnormal offline situation of the smoke detector terminal cannot be solved in time. Meanwhile, by dynamically adjusting a state synchronization cycle interval of the Thread smoke detector terminal and the Thread gateway, the effectiveness of synchronization of online or offline state of the Thread smoke detector terminal is greatly improved under the premise of satisfying the requirements on power consumption.

Further, before reporting the network topology information to the first platform every second preset time period, the method also includes: receiving state information sent by the first user terminal every third preset time; and updating the network topology information according to the received first terminal information of the first user terminal.

The state information is information on whether the first user terminal is in an online state or in an offline state. The third preset time may be a customized duration dynamically adjusted

by the user, or a system default duration, which is not limited herein. For example, the third preset time may be 2 minutes, 5 minutes, 6 minutes, or the like.

In the embodiment, the first user terminal sends its own state information to the Thread gateway every 5 minutes, i.e., the Thread gateway receives the state information sent by the first user terminal every 5 minutes. If the first user terminal does not send its own state information to the Thread gateway within 5 minutes, it indicates that the Thread smoke detector terminal is in an offline state, and the smoke detector terminal in the offline state is denoted by the second user terminal. The Thread gateway updates the network topology structure information of the Thread gateway in the network topology information according to the state information of the first user terminal and the first terminal information.

The embodiments of the disclosure provide yet another method for processing information , which is performed by a client. FIG. 3 is a schematic flowchart of yet another method for processing information according to the disclosure. As illustrated in FIG. 3, the method includes the following steps.

At step S301, gateway information of a gateway and user information are obtained.

At step S302, request information is generated according to the user information and the gateway information of the gateway obtained.

At step S303, the request information is sent to the first platform, in which the request information is configured to request to add the gateway to a LAN established based on the user information.

The client is an application program in a terminal device. The user information is account information registered for use in case the user logs into the application program. The gateway information may be a gateway ID corresponding to the Thread gateway, or gateway SN information of the Thread gateway, or the gateway ID corresponding to the Thread gateway and the gateway SN information of the Thread gateway. In this embodiment, the gateway information is the gateway SN information of the Thread gateway.

Further, obtaining the gateway information of the gateway at step S301, includes: generating the gateway information of the gateway by scanning a first graph identifier of the gateway.

The gateway SN information of the Thread gateway is a unique identifier of the Thread gateway generated when the device is shipped from the factory and attached to the Thread gateway device in the form of a first graph identifier. The first graph identifier may be a QR code, a bar

code, etc.

The gateway SN information of the gateway can be obtained when the client scans the first graph identifier to activate the Thread gateway.

Further, the method also includes: sending a query request to the first platform every fourth preset time, in which the query request is configured to determine whether the gateway has successfully joined the LAN; and receiving a network accessing success prompt returned by the first platform based on the query request, in which the network accessing success prompt indicates that the gateway has successfully joined the LAN.

The fourth preset time may be a user-defined duration, or a system default duration, which is not limited herein. For example, the fourth preset time may be 3 seconds, 5 seconds, 10 seconds, or the like.

The client sends the query request to the first platform every fourth preset time after sending the request information, and the query request is configured to determine whether the Thread gateway has successfully joined the LAN.

After the first platform receives the network accessing success information returned by the Thread gateway in response to successfully joining the LAN, and receives the query request sent by the client, the first platform receives sends the network accessing success prompt to the client based on the query request and the network accessing success information. If the client receives the network accessing success prompt returned by the first platform based on the query request, receiving the network accessing success prompt means that the Thread gateway requested by the client has successfully joined the network and has been successfully bound with the user information.

Further, the method also includes: receiving a network accessing failure prompt returned by the first platform based on the query request.

If no network accessing success prompt is received from the first platform within the first preset time period starting from the moment when the client sends the request information, the client will receive the network accessing failure prompt returned by the first platform based on the query request, the network accessing failure prompt means that network accessing of the Thread gateway requested by the client has failed and the Thread gateway has not been successfully bound with the user information.

The first preset time period may be a customized duration dynamically adjusted by the user,

or a system default duration, which is not limited herein. The first preset time period may be 60 seconds, 120 seconds, 180 seconds, or the like.

Further, the method also includes: obtaining user terminal information of user terminals corresponding to the user information; and sending a network connection request of the user terminals to the first platform according to the user terminal information and the user information, in which the network connection request is configured for the first platform to send a user terminal adding instruction to the gateway that joins the LAN established based on the user information.

Further, obtaining the user terminal information of the user terminals corresponding to the user information, includes: obtaining the user terminal information of the user terminals corresponding to the user information by scanning a second graph identifier of the user terminal.

The user terminal is a Thread smoke detector terminal. The user terminal information is the Thread smoke detector terminal information, which includes the EUI64 of the Thread smoke detector terminal. The second graph identifier may be a QR code, a bar code, etc.

The attribute information of the Thread smoke detector terminal includes smoke detector terminal SN information of the Thread smoke detector terminal, a EUI64 of the Thread smoke detector terminal, and version number information of the Thread smoke detector terminal, and the like.

The smoke detector terminal SN information of the Thread smoke detector terminal, the EUI64 of the Thread smoke detector terminal and the version number information of the Thread smoke detector terminal are fixed identifiers generated when the device is shipped from the factory and attached to the Thread smoke detector terminal device in the preset form of a second graph identifier. The second graph identifier may be a QR code or a bar code, or the like. The user may obtain the Thread smoke detector terminal information by scanning the second graph identifier through the client.

In the embodiment, the client parses the Thread smoke detector terminal information from the attribute information of the Thread smoke detector terminal obtained by scanning the QR code on the Thread smoke detector terminal device, and sends to the first platform a network connection request of the Thread smoke detector terminal that contains the user information corresponding to the client and the Thread smoke detector terminal information corresponding to the user information. The network connection request is configured for the first platform to send, according to the user information, the Thread smoke detector terminal adding instruction

including the Thread smoke detector terminal information to all Thread gateways that have joined the LAN established based on the user information.

Further, in some embodiments, after the client sends the network connection request to the Thread smoke detector terminal, the client sends a network connection result request for the Thread smoke detector terminal to the first platform every fifth preset time.

The fifth preset time may be a user-defined duration, or a system default duration, which is not limited herein. The fifth preset time may be 3 seconds, 5 seconds, 10 seconds, or the like.

In the embodiment, the client sends the network connection result request for the Thread smoke detector terminal to the first platform every 5 seconds. After the first platform receives the Thread smoke detector terminal information registered by the Thread smoke detector terminal, if the first platform receives the network connection result request sent by the client, the first platform sends a network configuration success prompt for the Thread smoke detector terminal to the client. If the client receives the configuration success prompt Thread smoke detector terminal sent by the first platform, it means that the Thread smoke detector terminal requested by the client has successfully joined the LAN corresponding to the user information, and has successfully bound with the user information.

If the network configuration success prompt for the Thread smoke detector terminal sent by the first platform is not received within the sixth preset time period starting from the moment when the client sends a network connection request of the Thread smoke detector terminal, the network configuration failure prompt for the Thread smoke detector terminal sent by the first platform is received. The network configuration failure prompt for the Thread smoke detector terminal indicates that network connection of the Thread smoke detector terminal requested by the client has failed, i.e., the network configuration is failed, and the Thread smoke detector terminal has not been successfully bound with the user information.

The sixth preset time period may be a customized duration dynamically adjusted by the user, or a system default duration, which is not limited herein. The sixth preset time period may be 60 seconds, 120 seconds, 180 seconds, or the like.

Further, the method also includes: receiving state change prompt information for the user terminal with the state change from the first platform.

When the first platform detects that a state of the Thread smoke detector terminal has changed, for example, from an offline state to an online state or from an online state to an offline state, the

first platform sends to the client, the state change prompt information for the Thread smoke detector terminal whose state has changed. The client receives from the first platform, the state change prompt information for the Thread smoke detector terminal whose state has changed.

In this way, the client can monitor the state of the Thread smoke detector terminal in real time, and can resolve anomalies of the smoke detector terminal in time when it is detected that the smoke detector terminal abnormally goes offline, which solves the problem that the user is unable to resolve in time the situation in which the smoke detector terminal abnormally goes offline due to a long heartbeat cycle of the smoke detector terminal in the related art.

The method for processing information in the embodiments of the disclosure is illustrated below by way of an example. FIG. 4 is a schematic flowchart of a binding process for a Thread gateway device according to the embodiments of the disclosure. FIG. 5 is a schematic flowchart of establishing a LAN according to the embodiments of the disclosure. FIG. 6 is a schematic flowchart of a network configuration for a Thread smoke detector terminal according to the embodiments of the disclosure. FIG. 7 is a schematic flowchart of a state synchronization for the Thread smoke detector terminal according to the embodiments of the disclosure.

A, a client is binding with a Thread gateway device on a first platform.

At step 1, the client sends a network accessing request of a Thread gateway to the first platform.

At step 1.1, the Thread gateway registers gateway information on the first platform.

The gateway information includes a gateway ID and gateway SN information of the Thread gateway. The Thread gateway is connected to the first platform via 5G, 4G or wired Ethernet.

At step 1.2, the client obtains the gateway information of the Thread gateway.

The user uses the client to scan the QR code on the Thread gateway device, and to parse the product ID of the Thread gateway and the gateway SN information of the Thread gateway.

At step 1.3, the client sends a network accessing request of the Thread gateway to the first platform.

The client sends the request information containing the user information corresponding to the client, the product ID of the Thread gateway, and the gateway SN information of the Thread gateway to the first platform.

At step 2, the first platform determines whether there is any LAN corresponding to the user information.

If there is a LAN corresponding to the user information, Step 2.1 is executed. If there is no LAN corresponding to the user information, Step 2.2 is executed.

At step 2.1, according to the gateway information of the Thread gateway, dataset information of the LAN established based on the user information is sent to the Thread gateway and Step 3 is executed.

At step 2.2, a LAN establishment instruction including the user information is sent to the Thread gateway and Step 4 is executed.

At step 3, the Thread gateway joins the LAN based on the received dataset information of the LAN and sends network accessing success information to the first platform, and Step 5 is executed.

At step 4, the Thread gateway establishes the LAN based on the received user information, its own product ID and gateway SN information, and reports network establishment success information to the first platform, and Step 6 is executed. The network establishment success information includes the dataset information of the LAN.

At step 5, the client determines if it is successfully bound with the Thread gateway device.

At step 5.1, after sending the network accessing request of the Thread gateway, the client sends a query request for the Thread gateway to the first platform every 5 seconds.

At step 5.2, after receiving the network accessing success information from the Thread gateway and the query request from the client, the first platform returns a network accessing success prompt to the client, which indicates that network accessing of the Thread gateway requested by the client is successful and the Thread gateway has been successfully bound with the user information.

At step 5.3, if the network accessing success prompt sent by the first platform is not received within 180 seconds after the client sends the network accessing request of the Thread gateway, a network accessing failure prompt is sent to the client. If the network accessing failure prompt is received by the client, it means that network accessing of the Thread gateway requested by the client has failed and the Thread gateway has not been bound successfully with the user information.

At step 6, the client determines whether the Thread gateway has successfully established a LAN based on the user information.

At step 6.1, the client sends a LAN establishment result request to the first platform every 5 seconds after the client sends the network accessing request of the Thread gateway.

At step 6.2, after the first platform receives the network establishment success information sent by the Thread gateway and the LAN establishment result request sent by the client, the first platform sends a LAN establishment success prompt to the client, which indicates that the LAN established based on the user information has been successfully established.

At step 6.3, if the LAN establishment success prompt sent by the first platform is not received within 180 seconds after the client sends the network accessing request of the Thread gateway, a LAN establishment failure prompt is sent to the client. The LAN establishment failure prompt received by the client indicates that the Thread gateway fails to establish a LAN based on the user information.

B, the client adds a Thread smoke detector terminal to the LAN established based on the user information corresponding to the client, for network configuration and binds the Thread smoke detector terminal with the user information.

At step 7, if the first platform determines according to the user information corresponding to the client that there is a LAN established based on the user information, and the LAN at least includes one successfully bound Thread network, and Step8 is executed.

At step 8, the Thread smoke detector terminal is adjusted to be in a network configuration mode, and the client sends a network connection request of the Thread smoke detector terminal device to the first platform.

At step 8.1, the client obtains smoke detector terminal information of the Thread smoke detector terminal.

The client parses the Thread smoke detector terminal information by scanning the QR code on the Thread smoke detector terminal device. The Thread smoke detector terminal information at least includes a product ID of the Thread smoke detector terminal, SN information of the Thread smoke detector terminal, a EUI64 of the Thread smoke detector terminal, and version number information of the Thread smoke detector terminal.

At step 8.2, the client sends to the first platform, the network connection request of the Thread smoke detector terminal, including the user information corresponding to the client and the Thread smoke detector terminal information corresponding to the user information.

At step 9, the first platform sends according to the user information, a Thread smoke detector terminal adding instruction including the Thread smoke detector terminal information, to all Thread gateways that has joined the LAN established based on the user information.

At step 10, the Thread gateway adds the Thread smoke detector terminal to the LAN.

The Thread gateway, based on the Thread smoke detector terminal information in the Thread smoke detector terminal adding instruction, configures a network for the Thread smoke detector terminal according to the Thread protocol, and adds the Thread smoke detector terminal corresponding to the user information to the LAN established based on the user information, to complete the network configuration operation.

At step 11, after the Thread gateway adds the Thread smoke detector terminal to the LAN successfully, the Thread smoke detector terminal is connected to the first platform through the Thread gateway, and register the product ID of the Thread smoke detector terminal and the SN information of the Thread smoke detector terminal on the first platform.

At step 12, the client determines whether network configuration of the Thread smoke detector terminal is successful.

At step 12.1, the client sends a network connection result request of the Thread smoke detector terminal to the first platform every 5 seconds after sending the network connection request of the Thread smoke detector terminal.

At step 12.2, the first platform, after receiving the registered product ID of the Thread smoke detector terminal and the registered SN information of the Thread smoke detector terminal, if the first platform receives the network connection result request sent by the client, the first platform sends a network configuration success prompt for the Thread smoke detector terminal to the client. After the client receives the network configuration success prompt for the Thread smoke detector terminal, it means that the Thread smoke detector terminal requested by the client has been successfully joined the LAN corresponding to the user information, i.e., the network configuration for the Thread smoke detector terminal has been successful and the Thread smoke detector terminal has been successfully bound with the user information.

At step 12.3, if the first platform does not receive the registered product ID of the Thread smoke detector terminal and the registered SN information of the Thread smoke detector terminal within the sixth preset time period starting from the moment when the client sends the network connection request of the Thread smoke detector terminal, the first platform sends a network configuration failure prompt for the Thread smoke detector terminal to the client, which indicates that the Thread smoke detector terminal request by the client has not been successfully connected to the network, i.e., network configuration is failed. The Thread smoke detector terminal has not

been successfully bound with the user information.

C, the state of the Thread smoke detector terminal is synchronized in real time.

At step 13, the Thread smoke detector terminal synchronizes its own state information to the Thread gateway at a certain period.

The Thread smoke detector terminal joined to the LAN through the Thread gateway and being in an online state is represented by a first user terminal, the first user terminal sends its own state information to the Thread gateway every 5 minutes. If the first user terminal does not send its own state information to the Thread gateway within 5 minutes, it indicates that the Thread smoke detector terminal is in an offline state, and the Thread smoke detector terminal in the offline state is represented by a second user terminal.

At step 14, the Thread gateway reports network topology information to the first platform every 1 minute.

The network topology information includes the network topology information of the gateway and the first terminal information of the first user terminal. The first user terminal is a user terminal in an online state among the user terminals corresponding to the user information, i.e., a Thread smoke detector terminal that has joined the LAN through the Thread gateway and is in the online state.

At step 14. 1, the Thread gateway updates network topology structure information of the Thread gateway in the network topology information, according to the received state information of the Thread smoke detector terminal that has joined the LAN through the Thread gateway and is in the online state, and the smoke detector terminal information.

At step 14. 2, the Thread gateway reports to the first platform every 1 minute, the network topology structure information of the Thread gateway and the smoke detector terminal information of the Thread smoke detector terminal that has joined the LAN through the Thread gateway and is in the online state.

At step 15, the first platform monitors a state change of the Thread smoke detector terminals corresponding to the user information according to the network topology information reported by the Thread gateway.

At step 15. 1, an online time of each Thread smoke detector terminal in the network topology structure information of the Thread gateway is updated according to the network topology information reported by the Thread gateway.

The first platform traverses a smoke detector terminal list of all the Thread smoke detector terminals corresponding to the user information every 1 minute, and updates the online time of the first user terminal in the smoke detector terminal list according to the received first terminal information. If the online time of the Thread smoke detector terminal is still not updated after 5 minutes, it indicates that the Thread smoke detector terminal is in an offline state and it does not send its own state information to the Thread gateway.

At step 15. 2, if a state change of any user terminal exists among the user terminals corresponding to the user information, the first platform sends state change prompt information for the user terminal with the state change to the client.

As illustrated in FIG. 8, it is a schematic diagram of an apparatus for processing information according to the embodiments of the disclosure. The apparatus shall be configured as a first platform. The apparatus includes: a first receiving module 801, a determination module 802 and a first sending module 803.

The first receiving module 801 is configured to receive request information sent by a client, in which the request information at least includes gateway information of a gateway and user information, and the request information is configured to request to join a LAN established based on the user information.

The determination module 802 is configured to determine whether the LAN established based on the user information has already existed.

The first sending module 803 is configured to, in response to determining that the LAN established based on the user information has already existed, send network information of the LAN to the gateway according to the gateway information, in which the network information is configured for the gateway to join the LAN.

As illustrated in FIG. 9, FIG. 9 is a schematic diagram of another apparatus for processing information according to the embodiments of the disclosure. The apparatus shall be configured as a gateway. The apparatus includes: a second receiving module 901 and an adding module 902.

The second receiving module 901 is configured to receive network information of a LAN sent by a first platform, in which the LAN is established based on user information corresponding to a client that initiates request information.

The adding module 902 is configured to join the LAN corresponding to the network information according to the network information.

As illustrated in FIG. 10, FIG. 10 is a schematic diagram of another apparatus for processing information according to the embodiments of the disclosure. The apparatus shall be configured as a client. The apparatus includes: an obtaining module 1001, a generating module 1002 and a second sending module 1003.

The obtaining module 1001 is configured to obtain gateway information of a gateway and user information.

The generating module 1002 is configured to generate request information according to the user information and the gateway information of the gateway obtained.

The second sending module 1003 is configured to send the request information to the first platform, in which the request information is configured to request to add the gateway to a LAN established based on the user information.

To achieve the methods of the embodiments of the disclosure, FIG. 11 is a structural schematic diagram of a device for processing information according to the embodiments of the disclosure. The device 110 includes a processor 1101 and a memory 1102 configured to store computer programs capable of running on the processor.

When running the computer programs, the processor 1101 is configured to: receive request information sent by a client, in which the request information at least includes gateway information of a gateway and user information, and the request information is configured to request to join a LAN established based on the user information; determine whether the LAN established based on the user information has already existed; and in response to determining that the LAN established based on the user information has already existed, send network information of the LAN to the gateway according to the gateway information, in which the network information is configured for the gateway to join the LAN.

In an embodiment, when running the computer programs, the processor 1101 is configured to: in response to determining that the LAN established based on the user information does not exist, send a LAN establishment instruction to the gateway according to the gateway information, in which the LAN establishment instruction includes user information configured to establish a LAN for the gateway.

In an embodiment, when running the computer programs, the processor 1101 is configured to: receive network accessing success information returned by the gateway after successfully joining the LAN; and send a network accessing success prompt to the client according to the

network accessing success information.

In an embodiment, when running the computer programs, the processor 1101 is configured to: receive a query request sent by the client every fourth preset time; and send the network accessing success prompt to the client based on the query request and the network accessing success information.

In an embodiment, when running the computer programs, the processor 1101 is configured to: in response to not receiving the network accessing success information returned by the gateway within a first preset time period starting from a moment of receiving the request information sent by the client, send a network accessing failure prompt to the client.

In an embodiment, when running the computer programs, the processor 1101 is configured to: receive a network connection request of each user terminal sent by the client, in which the network connection request at least includes the user information and user terminal information of user terminals corresponding to the user information; and send, according to the user information, a user terminal adding instruction including the user terminal information to the gateway that joins the LAN established based on the user information, in which the user terminal adding instruction is configured for the gateway to add, according to the user terminal information, the user terminals corresponding to the user information into the LAN established based on the user information.

In an embodiment, when running the computer programs, the processor 1101 is configured to: receive network topology information reported by the gateway every second preset time period, in which the network topology information includes network topology structure information of the gateway and first terminal information of a first user terminal, and the first user terminal is a user terminal that is in an online state among the user terminals corresponding to the user information; monitor a state change of each user terminal corresponding to the user information according to the network topology information of the gateway and the first terminal information; and in response to a state change of any user terminal existing among the user terminals corresponding to the user information, send state change prompt information of the user terminal with the state change to the client.

In an embodiment, when running the computer programs, the processor 1101 is configured to: receive network information of a LAN sent by a first platform, in which the LAN is established based on user information corresponding to a client that initiates request information; and join the

LAN corresponding to the network information according to the network information.

In an embodiment, when running the computer programs, the processor 1101 is configured to: in response to receiving a LAN establishment instruction sent by the first platform, establish a LAN according to the user information, in which the LAN establishment instruction includes the user information corresponding to the client that initiates the request information.

In an embodiment, when running the computer programs, the processor 1101 is configured to: send network accessing success information to the first platform.

In an embodiment, when running the computer programs, the processor 1101 is configured to: receive a user terminal adding instruction sent by the first platform, in which the user terminal adding instruction includes user terminal information of user terminals corresponding to the user information; and add, according to the user terminal information, the user terminals corresponding to the user information to the LAN established based on the user information.

In an embodiment, when running the computer programs, the processor 1101 is configured to: report network topology information to the first platform every second preset time period, in which the network topology information is configured for the first platform to monitor a state change of each user terminal corresponding to the user information, the network topology information includes network topology structure information of the gateway and first terminal information of a first user terminal, and the first user terminal is a user terminal that is in an online state among the user terminals corresponding to the user information.

In an embodiment, when running the computer programs, the processor 1101 is configured to: receive state information sent by the first user terminal every third preset time; and update the network topology information according to the received first terminal information of the first user terminal.

In an embodiment, when running the computer programs, the processor 1101 is configured to: obtain gateway information of a gateway and user information; generate request information according to the user information and the gateway information of the gateway obtained; and send the request information to the first platform, in which the request information is configured to request to add the gateway to a LAN established based on the user information.

In an embodiment, when running the computer programs, the processor 1101 is configured to: generate the gateway information of the gateway by scanning a first graph identifier of the gateway.

In an embodiment, when running the computer programs, the processor 1101 is configured to: send a query request to the first platform every fourth preset time, in which the query request is configured to determine whether the gateway has successfully joined the LAN; and receive a network accessing success prompt returned by the first platform based on the query request, in which the network accessing success prompt indicates that the gateway has successfully joined the LAN.

In an embodiment, when running the computer programs, the processor 1101 is configured to: receive a network accessing failure prompt returned by the first platform based on the query request.

In an embodiment, when running the computer programs, the processor 1101 is configured to: obtain user terminal information of user terminals corresponding to the user information; and send a network connection request of each user terminal to the first platform according to the user terminal information and the user information, in which the network connection request is configured for the first platform to send a user terminal adding instruction to the gateway that joins the LAN established based on the user information.

In an embodiment, when running the computer programs, the processor 1101 is configured to: obtain the user terminal information of the user terminals corresponding to the user information by scanning a second graph identifier of each user terminal.

In an embodiment, when running the computer programs, the processor 1101 is configured to: receive state change prompt information of the user terminal with the state change from the first platform.

It is noted that the device for processing information provided in the above embodiments belongs to the same concept as the embodiments of the information processing method, and its implementation is detailed in the method embodiments, which will not be repeated here.

In practical applications, as illustrated in FIG. 11, the device 110 may further include: at least one network interface 1103. Various components in the device for processing information 110 are coupled together via a bus system 1104. It may be understood that the bus system 1104 is configured to enable connection and communication among these components. The bus system 1104 includes a power bus, a control bus, and a state signal bus, in addition to a data bus. However, for clarity of illustration, all the buses are labeled as the bus system 1104 in FIG. 11. The number of processors 1101 may be at least one. The network interface 1103 is configured for wired or

wireless communication between the device for processing information 110 and other devices.

The memory 1102 in the embodiments of the disclosure is configured to store various types of data to support operation of the device for processing information 110.

The methods disclosed in the above embodiments of the disclosure may be configured in the processor 1101 or implemented by the processor 1101. The processor 1101 may be an integrated circuit chip with signal processing capabilities. In the implementation, the steps of the above method may be accomplished by integrated logic circuits of hardware in the processor 1101 or by instructions in the form of software. The processor 1101 described above may be a general-purpose processor, a Digital Signal Processor (DSP), or other programmable logic devices, discrete gates, transistor logic devices or discrete hardware components, or the like. The processor 1101 may implement or perform the methods, steps, and logic block diagrams disclosed in the embodiments of the disclosure. The general-purpose processor may be a microprocessor or any conventional processor. The steps of the methods disclosed in combination with the embodiments of the disclosure may be directly implemented by a hardware decoding processor, or implemented by a combination of hardware and software modules in the decoding processor. The software module may be located in a storage medium, which is located in the memory 1102. The processor 1101 reads the information in the memory 1102 and completes the steps of the foregoing methods in combination with its hardware.

In the exemplary embodiments, the device for processing information 110 may be implemented by one or more Application Specific Integrated Circuits (ASICs), DSPs, Programmable Logic Devices (PLDs), Complex Programmable Logic Devices (CPLDs), Field-Programmable Gate Arrays (FPGAs), general-purpose processors, controllers, Micro Controller Units (MCUs), microprocessors or other electronic components, and may be configured to perform the foregoing methods.

In the exemplary embodiments, the embodiments of the disclosure also provide a computer-readable storage medium, such as the memory 1102 including computer programs. The computer programs are executed by the processor 1101 of the device for processing information 110 to complete the steps described in the above methods.

The embodiments of the disclosure also provide a computer readable storage medium having computer programs stored thereon. When the computer programs are run by a processor, the computer readable storage medium is configured to: receive request information sent by a client,

in which the request information at least includes gateway information of a gateway and user information, and the request information is configured to request to join a LAN established based on the user information; determine whether the LAN established based on the user information has already existed; and in response to determining that the LAN established based on the user information has already existed, send network information of the LAN to the gateway according to the gateway information, in which the network information is configured for the gateway to join the LAN.

In an embodiment, when the computer programs are run by the processor, the computer readable storage medium is configured to: in response to determining that the LAN established based on the user information does not exist, send a LAN establishment instruction to the gateway according to the gateway information, in which the LAN establishment instruction includes user information configured to establish a LAN for the gateway.

In an embodiment, when the computer programs are run by the processor, the computer readable storage medium is configured to: receive network accessing success information returned by the gateway after successfully joining the LAN; and send a network accessing success prompt to the client according to the network accessing success information.

In an embodiment, when the computer programs are run by the processor, the computer readable storage medium is configured to: receive a query request sent by the client every fourth preset time; and send the network accessing success prompt to the client based on the query request and the network accessing success information.

In an embodiment, when the computer programs are run by the processor, the computer readable storage medium is configured to: in response to not receiving the network accessing success information returned by the gateway within a first preset time period starting from a moment of receiving the request information sent by the client, send a network accessing failure prompt to the client.

In an embodiment, when the computer programs are run by the processor, the computer readable storage medium is configured to: receive a network connection request of each user terminal sent by the client, in which the network connection request at least includes the user information and user terminal information of user terminals corresponding to the user information; and send, according to the user information, a user terminal adding instruction including the user terminal information to the gateway that joins the LAN established based on the user information,

in which the user terminal adding instruction is configured for the gateway to add, according to the user terminal information, the user terminals corresponding to the user information into the LAN established based on the user information.

In an embodiment, when the computer programs are run by the processor, the computer readable storage medium is configured to: receive network topology information reported by the gateway every second preset time period, in which the network topology information includes network topology structure information of the gateway and first terminal information of a first user terminal, and the first user terminal is a user terminal that is in an online state among the user terminals corresponding to the user information; monitor a state change of each user terminal corresponding to the user information according to the network topology information of the gateway and the first terminal information; and in response to a state change of any user terminal existing among the user terminals corresponding to the user information, send to the client, state change prompt information of the user terminal with the state change.

In an embodiment, when the computer programs are run by the processor, the computer readable storage medium is configured to: receive network information of a LAN sent by a first platform, in which the LAN is established based on user information corresponding to a client that initiates request information; and join the LAN corresponding to the network information according to the network information.

In an embodiment, when the computer programs are run by the processor, the computer readable storage medium is configured to: in response to receiving a LAN establishment instruction sent by the first platform, establish a LAN according to the user information, in which the LAN establishment instruction includes user information corresponding to the client that initiates the request information.

In an embodiment, when the computer programs are run by the processor, the computer readable storage medium is configured to: send network accessing success information to the first platform.

In an embodiment, when the computer programs are run by the processor, the computer readable storage medium is configured to: receive a user terminal adding instruction sent by the first platform, in which the user terminal adding instruction includes user terminal information of user terminals corresponding to the user information; and add, according to the user terminal information, the user terminals corresponding to the user information to the LAN established

based on the user information.

In an embodiment, when the computer programs are run by the processor, the computer readable storage medium is configured to: report network topology information to the first platform every second preset time period, in which the network topology information is configured for the first platform to monitor a state change of each user terminal corresponding to the user information, the network topology information includes network topology structure information of the gateway and first terminal information of a first user terminal, and the first user terminal is a user terminal that is in an online state among the user terminals corresponding to the user information.

In an embodiment, when the computer programs are run by the processor, the computer readable storage medium is configured to: receive state information sent by the first user terminal every third preset time; and update the network topology information according to the received first terminal information of the first user terminal.

In an embodiment, when the computer programs are run by the processor, the computer readable storage medium is configured to: obtain gateway information of a gateway and user information; generate request information according to the user information and the gateway information of the gateway obtained; and send the request information to the first platform, in which the request information is configured to request to add the gateway to a LAN established based on the user information.

In an embodiment, when the computer programs are run by the processor, the computer readable storage medium is configured to: generate the gateway information of the gateway by scanning a first graph identifier of the gateway.

In an embodiment, when the computer programs are run by the processor, the computer readable storage medium is configured to: send a query request to the first platform every fourth preset time, in which the query request is configured to determine whether the gateway has successfully joined the LAN; and receive a network accessing success prompt returned by the first platform based on the query request, in which the network accessing success prompt indicates that the gateway has successfully joined the LAN.

In an embodiment, when the computer programs are run by the processor, the computer readable storage medium is configured to: receive a network accessing failure prompt returned by the first platform based on the query request.

In an embodiment, when the computer programs are run by the processor, the computer readable storage medium is configured to: obtain user terminal information of user terminals corresponding to the user information; and send a network connection request of each user terminal to the first platform according to the user terminal information and the user information, in which the network connection request is configured for the first platform to send a user terminal adding instruction to the gateway that joins the LAN established based on the user information.

In an embodiment, when the computer programs are run by the processor, the computer readable storage medium is configured to: obtain the user terminal information of the user terminals corresponding to the user information by scanning a second graph identifier of each user terminal.

In an embodiment, when the computer programs are run by the processor, the computer readable storage medium is configured to: receive state change prompt information of the user terminal with the state change from the first platform.

It needs to be noted that the computer-readable storage medium according to the embodiments of the disclosure may be a memory such as a ferroelectric Read-Only Memory (FRAM), a Read-Only Memory (ROM), a Programmable Read-Only Memory (PROM), an Erasable Programmable Read Only Memory (EPROM), an Electrically-Erasable Programmable Read Only Memory (EEPROM), a flash memory, a magnetic memory, an optical disk, or CD-ROM. Alternatively, the computer-readable storage medium may be a variety of devices including one of or any combination of the above memories thereof.

The foregoing are only embodiments of the disclosure and are not configured to limit the scope of protection of the disclosure. Any modifications, equivalent substitutions, and improvements made within the spirit and scope of the disclosure are included in the scope of protection of the disclosure.

INDUSTRIAL UTILITY

In this embodiment, after the platform receives the request information including the gateway information and the user information from the client, the platform determines whether or not a LAN established based on the user information has already existed. If the LAN established based on the user information has already existed, the platform sends according to the gateway information, the network information of the LAN to the gateway, where the network information

is configured for the gateway to join the LAN, so that all gateways corresponding to the same user information may join the LAN established based on the user information. In the case of joining the gateway to the LAN, there is no need to face the problem of choosing which LAN for the gateway to join, and the process is simplified by realizing that one piece of user information corresponds to only one LAN.

WHAT IS CLAIMED IS:

1. A method for processing information, performed by a first platform, the method comprising:

receiving request information sent by a client, wherein the request information at least comprises gateway information of a gateway and user information, and the request information is configured to request to join a local area network (LAN) established based on the user information;

determining whether the LAN established based on the user information has already existed; and

in response to determining that the LAN established based on the user information has already existed, sending network information of the LAN to the gateway according to the gateway information, wherein the network information is configured for the gateway to join the LAN.

2. The method of claim 1, wherein determining whether the LAN established based on the user information has already existed, further comprises:

in response to determining that the LAN established based on the user information does not exist, sending a LAN establishment instruction to the gateway according to the gateway information, wherein the LAN establishment instruction comprises user information configured to establish a LAN for the gateway.

3. The method of claim 1, further comprising:

receiving network accessing success information returned by the gateway after successfully joining the LAN; and

sending a network accessing success prompt to the client according to the network accessing success information.

4. The method of claim 3, wherein sending the network accessing success prompt to the client according to the network accessing success information, comprises:

receiving a query request sent by the client every fourth preset time; and

sending the network accessing success prompt to the client based on the query request and the network accessing success information.

5. The method of claim 3, further comprising:

in response to not receiving the network accessing success information returned by the gateway within a first preset time period starting from a moment of receiving the request information sent by the client, sending a network accessing failure prompt to the client.

6. The method of claim 1, further comprising:

receiving a network connection request of each user terminal sent by the client, wherein the network connection request at least comprises the user information and user terminal information of the user terminals corresponding to the user information; and

sending, according to the user information, a user terminal adding instruction comprising the user terminal information to the gateway that joins the LAN established based on the user information, wherein the user terminal adding instruction is configured for the gateway to add, according to the user terminal information, the user terminals corresponding to the user information into the LAN established based on the user information.

7. The method of claim 6, further comprising:

receiving network topology information reported by the gateway every second preset time period, wherein the network topology information comprises network topology structure information of the gateway and first terminal information of a first user terminal, and the first user terminal is a user terminal that is in an online state among the user terminals corresponding to the user information;

monitoring a state change of each user terminal corresponding to the user information according to the network topology information of the gateway and the first terminal information; and

in response to a state change of any user terminal existing among the user terminals corresponding to the user information, sending to the client, state change prompt information for the user terminal with the state change.

8. A method for processing information, performed by a gateway, the method comprising:

receiving network information of a local area network (LAN) sent by a first platform, wherein the LAN is established based on user information corresponding to a client that initiates request information; and

joining the LAN corresponding to the network information according to the network information.

9. The method of claim 8, further comprising:

in response to receiving a LAN establishment instruction sent by the first platform, establishing a LAN according to the user information, wherein the LAN establishment instruction comprises the user information corresponding to the client that initiates the request information.

10. The method of claim 8, wherein after joining the LAN established based on the user information corresponding to the network information according to the network information, the method further comprises:

sending network accessing success information to the first platform.

11. The method of claim 8, further comprising:

receiving a user terminal adding instruction sent by the first platform, wherein the user terminal adding instruction comprises user terminal information of user terminals corresponding to the user information; and

adding, according to the user terminal information, the user terminals corresponding to the user information to the LAN established based on the user information.

12. The method of claim 11, further comprising:

reporting network topology information to the first platform every second preset time period, wherein the network topology information is configured for the first platform to monitor a state change of each user terminal corresponding to the user information;

wherein the network topology information comprises network topology structure information of the gateway and first terminal information of a first user terminal, and the first user terminal is a user terminal that is in an online state among the user terminals corresponding to the user information.

13. The method of claim 12, wherein before reporting the network topology information to the first platform every second preset time period, the method further comprises:

receiving state information sent by the first user terminal every third preset time; and

updating the network topology information according to the received first terminal information of the first user terminal.

14. A method for processing information, performed by a client, the method comprising:

obtaining gateway information of a gateway and user information;

generating request information according to the user information and the gateway information of the gateway obtained; and

sending the request information to the first platform, wherein the request information is configured to request to add the gateway to a local area network (LAN) established based on the user information.

15. The method of claim 14, wherein obtaining the gateway information of the gateway,

comprises:

generating the gateway information of the gateway by scanning a first graph identifier of the gateway.

16. The method of claim 14, further comprising:

sending a query request to the first platform every fourth preset time, wherein the query request is configured to determine whether the gateway has successfully joined the LAN; and

receiving a network accessing success prompt returned by the first platform based on the query request, wherein the network accessing success prompt indicates that the gateway has successfully joined the LAN.

17. The method of claim 16, further comprising:

receiving a network accessing failure prompt returned by the first platform based on the query request.

18. The method of claim 14, further comprising:

obtaining user terminal information of user terminals corresponding to the user information; and

sending a network connection request of each user terminal to the first platform according to the user terminal information and the user information, wherein the network connection request is configured for the first platform to send a user terminal adding instruction to the gateway that joins the LAN established based on the user information.

19. The method of claim 18, wherein obtaining the user terminal information of the user terminals corresponding to the user information, comprises:

obtaining the user terminal information of the user terminals corresponding to the user information by scanning a second graph identifier of each user terminal.

20. The method of claim 18, further comprising:

receiving state change prompt information for the user terminal with the state change from the first platform.

21. An apparatus for processing information, configured as a first platform, the apparatus comprising:

a first receiving module, configured to receive request information sent by a client, wherein the request information at least comprises gateway information of a gateway and user information, and the request information is configured to request to join a local area network (LAN) established

based on the user information;

a determination module, configured to determine whether the LAN established based on the user information has already existed; and

a first sending module, configured to, in response to determining that the LAN established based on the user information has already existed, send network information of the LAN to the gateway according to the gateway information, wherein the network information is configured for the gateway to join the LAN.

22. An apparatus for processing information, configured as a gateway, the apparatus comprising:

a second receiving module, configured to receive network information of a local area network (LAN) sent by a first platform, wherein the LAN is established based on user information corresponding to a client that initiates request information; and

an adding module, configured to join the LAN corresponding to the network information according to the network information.

23. An apparatus for processing information, configured as a client, the apparatus comprising:

an obtaining module, configured to obtain gateway information of a gateway and user information;

a generating module, configured to generate request information according to the user information and the gateway information of the gateway obtained; and

a second sending module, configured to send the request information to the first platform, wherein the request information is configured to request to add the gateway to a local area network (LAN) established based on the user information.

24. A device for processing information, comprising: a processor and a memory configured to store computer programs capable of running on the processor;

wherein the processor is configured to perform the steps of the method of any one of claims 1-7, or the steps of the method of any one of claims 8-13, or the steps of the method of any one of claims 14-20 when running the computer programs.

25. A computer-readable storage medium having computer programs stored thereon, wherein when the computer programs are executed by a processor, the steps of the method of any one of claims 1-7, or the steps of the method of any one of claims 8-13, or the steps of the method of any one of claims 14-20 are implemented.