

AUTHORIZATION METHOD AND DEVICE FOR JOINT ACCOUNT, AND AUTHENTICATION METHOD AND DEVICE FOR JOINT ACCOUNT

TECHNICAL FIELD

5 **[0001]** The present application relates to the field of network communications technologies, and in particular, to an authorization method and device for a joint account, and an authentication method and device for a joint account.

BACKGROUND

10 **[0002]** A joint account is an account jointly managed by two or more joint managers, and the joint managers can be natural persons or legal persons. The joint account is applicable to the following scenario: Joint managers need to share the same account due to various reasons, but one of the joint managers cannot obtain all rights (e.g., money transfer and withdrawal) to the account for security or trustworthiness reasons.

15 **[0003]** Because some rights to the joint account are subject to the consent of all the joint managers, the bank that provides the joint account usually requires that all the joint managers go to the counter to process a service to be authenticated. Consequently, it is inconvenient to perform an operation on the joint account. In the existing technology, each account that can be operated over the network has only one
20 owner. After operation permission of the owner is authenticated, the owner can perform various operations on the electronic account. In other words, in the existing technology, a plurality of owners cannot jointly manage one account over the network.

SUMMARY

25 **[0004]** In view of this, the present application provides an authorization method for a joint account, applied to client software, where the joint account is jointly

managed by N joint managers, N is a natural number greater than 1, and the method includes the following: obtaining a user-side authentication parameter of the joint account, where the user-side authentication parameter is the same as or corresponding to a network-side authentication parameter of the joint account, and is used to perform authentication on operation permission for the joint account; dividing the user-side authentication parameter into N parts, and generating a corresponding joint management authentication parameter based on each part; and writing each joint management authentication parameter into a device controlled by each joint manager.

[0005] The present application provides an authorization method for a joint account, applied to a server, where the joint account is jointly managed by N joint managers, N is a natural number greater than 1, and the method includes the following: obtaining a user-side authentication parameter and a network-side authentication parameter of the joint account, and storing the network-side authentication parameter, where the user-side authentication parameter is the same as or corresponding to the network-side authentication parameter, and is used to perform authentication on operation permission for the joint account; dividing the user-side authentication parameter into N parts, and generating a corresponding joint management authentication parameter based on each part; and separately sending joint management authentication parameters to client software of different joint managers.

[0006] The present application provides an authorization method for a joint account, applied to client software of a joint manager of the joint account, where the joint account is jointly managed by N joint managers, N is a natural number greater than 1, and the method includes the following: receiving a joint management authentication parameter sent by a server, where the joint management authentication parameter is generated based on one part after the server divides a user-side authentication parameter into N parts, and the user-side authentication parameter is used to perform authentication on operation permission for the joint account; and storing the joint management authentication parameter.

[0007] The present application provides an authentication method for a joint account, applied to client software, where the joint account is jointly managed by N joint managers, N is a natural number greater than 1, and the method includes the following: obtaining N joint management authentication parameters of the joint account; restoring one part of a user-side authentication parameter based on each joint management authentication parameter, and combining N parts into the user-side

authentication parameter; and initiating an authentication request to a server by using the user-side authentication parameter, so the server performs authentication on operation permission for the joint account based on a network-side authentication parameter, where the network-side authentication parameter is the same as or corresponding to the user-side authentication parameter.

[0008] The present application provides an authentication method for a joint account, applied to a server, where the joint account is jointly managed by N joint managers, N is a natural number greater than 1, and the method includes the following: receiving N joint management authentication parameters uploaded by client software; restoring one part of a user-side authentication parameter based on each joint management authentication parameter, and combining N parts into the user-side authentication parameter; and performing authentication on operation permission for the joint account based on a network-side authentication parameter, where the network-side authentication parameter is the same as or corresponding to the user-side authentication parameter.

[0009] The present application provides an authentication method for a joint account, applied to client software, where the joint account is jointly managed by N joint managers, N is a natural number greater than 1, and the method includes the following: obtaining a joint management authentication parameter of a joint manager; and uploading the joint management authentication parameter to a server, so the server restores one part of a user-side authentication parameter based on the joint management authentication parameter, combines the part with $(N-1)$ other parts into the user-side authentication parameter, and then performs authentication on operation permission for the joint account by using a network-side authentication parameter that is the same as or corresponding to the user-side authentication parameter.

[0010] The present application further provides an authorization device for a joint account, applied to client software, where the joint account is jointly managed by N joint managers, N is a natural number greater than 1, and the device includes the following: a user-side parameter acquisition unit, configured to obtain a user-side authentication parameter of the joint account, where the user-side authentication parameter is the same as or corresponding to a network-side authentication parameter of the joint account, and is used to perform authentication on operation permission for the joint account; and a joint management parameter writing unit, configured to divide the user-side authentication parameter into N parts, generate a corresponding joint

management authentication parameter based on each part, and write each joint management authentication parameter into a device controlled by each joint manager.

[0011] The present application provides an authorization device for a joint account, applied to a server, where the joint account is jointly managed by N joint managers, N is a natural number greater than 1, and the device includes the following: an authentication parameter acquisition unit, configured to obtain a user-side authentication parameter and a network-side authentication parameter of the joint account, and store the network-side authentication parameter, where the user-side authentication parameter is the same as or corresponding to the network-side authentication parameter, and is used to perform authentication on operation permission for the joint account; a joint management parameter delivery unit, configured to divide the user-side authentication parameter into N parts, and generate a corresponding joint management authentication parameter based on each part; and separately send joint management authentication parameters to client software of different joint managers.

[0012] The present application provides an authorization device for a joint account, applied to client software of a joint manager of the joint account, where the joint account is jointly managed by N joint managers, N is a natural number greater than 1, and the device includes the following: a joint management parameter receiving unit, configured to receive a joint management authentication parameter sent by a server, where the joint management authentication parameter is generated based on one part after the server divides a user-side authentication parameter into N parts, and the user-side authentication parameter is used to perform authentication on operation permission for the joint account; and a joint management parameter storage unit, configured to store the joint management authentication parameter.

[0013] The present application provides an authentication device for a joint account, applied to client software, where the joint account is jointly managed by N joint managers, N is a natural number greater than 1, and the device includes the following: a joint management parameter acquisition unit, configured to obtain N joint management authentication parameters of the joint account; a user-side parameter combination unit, configured to restore one part of a user-side authentication parameter based on each joint management authentication parameter, and combine N parts into the user-side authentication parameter; and an authentication request initiation unit, configured to initiate an authentication request to a server by using the

user-side authentication parameter, so the server performs authentication on operation permission for the joint account based on a network-side authentication parameter, where the network-side authentication parameter is the same as or corresponding to the user-side authentication parameter.

5 **[0014]** The present application provides an authentication device for a joint account, applied to a server, where the joint account is jointly managed by N joint managers, N is a natural number greater than 1, and the device includes the following: a joint management parameter receiving unit, configured to receive N joint management authentication parameters uploaded by client software; a user-side
10 parameter combination unit, configured to restore one part of a user-side authentication parameter based on each joint management authentication parameter, and combine N parts into the user-side authentication parameter; and an operation permission authentication unit, configured to perform authentication on operation permission for the joint account based on a network-side authentication parameter,
15 where the network-side authentication parameter is the same as or corresponding to the user-side authentication parameter.

[0015] The present application provides an authentication device for a joint account, applied to client software, where the joint account is jointly managed by N joint managers, N is a natural number greater than 1, and the device includes the
20 following: a single joint management parameter acquisition unit, configured to obtain a joint management authentication parameter of a joint manager; and a joint management parameter upload unit, configured to upload the joint management authentication parameter to a server, so the server restores one part of a user-side authentication parameter based on the joint management authentication parameter,
25 combines the part with $(N-1)$ other parts into the user-side authentication parameter, and then performs authentication on operation permission for the joint account by using a network-side authentication parameter that is the same as or corresponding to the user-side authentication parameter.

[0016] It can be seen from the previous technical solutions that, in the
30 implementations of the present application, the user-side authentication parameter used to perform authentication on the operation permission for the joint account is divided into the N parts, the corresponding joint management authentication parameter is generated based on each part, and the joint management authentication parameter is sent to one joint manager for control, so the joint manager can perform

an operation on the joint account after providing the joint management authentication parameter over a network. Therefore, the network-based joint account can be implemented, and the joint manager can manage the joint account very conveniently.

[0017] In the implementations of the present application, during authentication performed on the operation permission for the joint account, the N joint managers provide the joint management authentication parameters controlled by themselves, the N joint management authentication parameters are combined into the user-side authentication parameter, and then the server performs permission authentication, so the joint managers can perform the operation on the joint account after providing the joint management authentication parameters. Therefore, the network-based joint account can be implemented, and the joint manager can manage the joint account very conveniently.

BRIEF DESCRIPTION OF DRAWINGS

[0018] FIG. 1 is a flowchart illustrating an authorization method for a joint account that is applied to client software, according to Implementation 1 of the present application;

[0019] FIG. 2 is a schematic diagram illustrating a network structure of an application scenario, according to Implementation 1 of the present application;

[0020] FIG. 3 is a flowchart illustrating an authorization method for a joint account that is applied to a server, according to Implementation 2 of the present application;

[0021] FIG. 4 is a flowchart illustrating an authorization method for a joint account that is applied to client software, according to Implementation 2 of the present application;

[0022] FIG. 5 is a schematic diagram illustrating a network structure of an application scenario, according to Implementation 2 of the present application;

[0023] FIG. 6 is a flowchart illustrating an authentication method for a joint account that is applied to client software, according to Implementation 3 of the present application;

[0024] FIG. 7 is a flowchart illustrating an authentication method for a joint account that is applied to client software, according to Implementation 4 of the present application;

[0025] FIG. 8 is a flowchart illustrating an authentication method for a joint account that is applied to a server, according to Implementation 4 of the present application;

5 [0026] FIG. 9 is a structural hardware diagram illustrating a device including client software or a server;

[0027] FIG. 10 is a logical structural diagram illustrating an authorization device for a joint account that is applied to client software, according to Implementation 5 of the present application;

10 [0028] FIG. 11 is a logical structural diagram illustrating an authorization device for a joint account that is applied to a server, according to Implementation 6 of the present application;

[0029] FIG. 12 is a logical structural diagram illustrating an authorization device for a joint account that is applied to client software, according to Implementation 6 of the present application;

15 [0030] FIG. 13 is a logical structural diagram illustrating an authorization device for a joint account that is applied to client software, according to Implementation 7 of the present application;

[0031] FIG. 14 is a logical structural diagram illustrating an authorization device for a joint account that is applied to a server, according to Implementation 8 of the present application; and

20 [0032] FIG. 15 is a logical structural diagram illustrating an authorization device for a joint account that is applied to client software, according to Implementation 8 of the present application.

DESCRIPTION OF IMPLEMENTATIONS

25 [0033] Implementations of the present application provide a new authorization method for a joint account and a new authentication method for a joint account. A user-side authentication parameter of the joint account jointly managed by N (N is a natural number greater than 1) joint managers is divided into N parts, and then one joint management authentication parameter is generated based on each part. N joint management authentication parameters are respectively controlled by the N joint managers. Operation permission can be authenticated by a server after all the joint managers provide the joint management authentication parameters and after the joint

management authentication parameters are combined into the user-side authentication parameter. Therefore, the joint manager can manage the joint account over a network, which is more convenient for the joint manager.

[0034] In the implementations of the present application, a user-side authentication parameter is the same as or corresponding to a network-side authentication parameter, and is used to perform authentication on operation permission for a joint account. The user-side authentication parameter is kept by a user, and the network-side authentication parameter is stored on a server. The server uses the network-side authentication parameter to perform authentication on the user-side authentication parameter provided by client software, or an operation request initiated by client software by using the user-side authentication parameter. The user can perform an operation requested after the user-side authentication parameter or the operation request is authenticated. In the present application, because the user-side authentication parameter is held by N joint managers, for the interest of each joint manager, a certain joint manager or some joint managers should be prevented from knowing or holding a complete user-side authentication parameter. Therefore, in the implementations of the present application, the user-side authentication parameter and the network-side authentication parameter are usually generated automatically by the client software or the server instead of being determined manually.

[0035] In the implementations of the present application, the client software runs on a user-side device. The client software can be a device of one joint manager or a device shared by the N joint managers, and the server runs on a service provider device of the joint account. The devices including the client software and the server can access each other over a network. The device including the client software can be a mobile phone, a tablet computer, a personal computer (PC), a notebook computer, a server, etc. The device including the server can be a PC, a notebook computer, a server, etc. The server can be one physical or logical server, or can be two or more physical or logical servers that take different responsibilities and cooperate with each other to perform various functions in the implementations of the present application. Types of the devices including the client software and the server, and a type, a protocol, etc. of communication between the devices are not limited in the implementations of the present application.

[0036] Implementation 1 of the present application describes an authorization

method for a joint account. Client software is responsible for generating a joint management authentication parameter based on a user-side network parameter and sending the joint management authentication parameter to a joint manager. A process of the method applied to the client software is shown in FIG. 1.

5 **[0037]** Step 110: The client software obtains a user-side authentication parameter of the joint account.

10 **[0038]** As described above, the user-side authentication parameter and a network-side authentication parameter are usually generated automatically. For example, the client software can generate the user-side authentication parameter and the network-side authentication parameter that are the same as or corresponding to each other by using an algorithm, and upload the generated network-side authentication parameter to a server, so the server can use the parameter for authentication. For another example, a server can generate the user-side authentication parameter and the network-side authentication parameter that are the same as or corresponding to each other by using an algorithm, store the network-side authentication parameter, and send the user-side authentication parameter to the client software.

15 **[0039]** The client software or the server can generate the user-side authentication parameter and the network-side authentication parameter by using various algorithms for generating a key and a password in the existing technology. For example, the client software generates a private key and a public key by using an asymmetric encryption algorithm, uses the private key as the user-side authentication parameter, and uses the public key as the network-side authentication parameter. For another example, the server generates same keys by using a symmetric encryption algorithm, and uses the keys as the user-side authentication parameter and the network-side authentication parameter.

20 **[0040]** Step 120: The client software divides the user-side authentication parameter into N parts, generates a corresponding joint management authentication parameter based on each part, and writes each joint management authentication parameter into a device controlled by each joint manager.

30 **[0041]** The client software divides the user-side authentication parameter into the N parts. The N parts do not overlap each other, and can be combined into the complete user-side authentication parameter. The client software generates the corresponding joint management authentication parameter by using each part.

[0042] A specific method for dividing the user-side authentication parameter can be determined based on an actual application scenario, an algorithm for generating the joint management authentication parameter, etc. The method is not limited in this implementation of the present application. For example, the user-side authentication parameter can be divided into N segments, and each segment and a corresponding segment sequence number is used as one joint management authentication parameter. The segment sequence number indicates a ranking of the segment in the user-side authentication parameter (for the purpose that all the segments can be sorted in a correct order when being combined into the user-side authentication parameter). For another example, the user-side authentication parameter can be divided into $2N$ segments, and the k th segment, the $(k+N)$ th segment, and k (k is a natural number ranging from 1 to N) are used as inputs to a mapping algorithm and encrypted to obtain corresponding joint management authentication parameters. In addition, a reverse algorithm of the mapping algorithm can use values obtained by decrypting the joint management authentication parameters as inputs, and output the k th segment, the $(k+N)$ th segment, and k corresponding to the joint management authentication parameters.

[0043] The client software writes each of generated N joint management authentication parameters into the device controlled by each joint manager, so the joint manager can use the joint management authentication parameter to grant permission for the joint account. The device where the joint management authentication parameter is written can be a device including the client software of the joint manager, or can be a storage medium that can be separated from a device including the client software of the joint manager.

[0044] It is worthwhile to note that, in this implementation, the client software that runs the authorization method for the joint account can be one of client software of N joint managers, or can be client software different from client software of N joint managers. If the joint management authentication parameters are sent by client software of a joint manager to other client software, $(N-1)$ joint management authentication parameters sent to other joint managers cannot exist on client software that generates these parameters.

[0045] In an implementation, the client software different from the client software of the N joint managers (e.g., client software of a service organization that starts the joint account) writes each of the generated N common management authentication

parameters into a near field communication (NFC) chip of each joint manager. A network structure of an application scenario thereof is shown in FIG. 2. Because the NFC chip supports contactless reading, the joint management authentication parameter is more convenient to use if it is stored in the NFC chip.

5 **[0046]** Implementation 2 of the present application describes an authorization method for a joint account. A server is responsible for generating a joint management authentication parameter based on a user-side network parameter and sending the joint management authentication parameter to a joint manager. A process of the method applied to the server is shown in FIG. 3, and a process of the method applied to client
10 software is shown in FIG. 4.

[0047] Step 310: The server obtains a user-side authentication parameter and a network-side authentication parameter of the joint account, and stores the network-side authentication parameter.

[0048] The server can generate the user-side authentication parameter and the
15 network-side authentication parameter that are the same as or corresponding to each other by using an algorithm, or can obtain the user-side authentication parameter and the network-side authentication parameter that are the same as or corresponding to each other from another server that generates a key or a password in a network.

[0049] The server can generate the user-side authentication parameter and the
20 network-side authentication parameter by using various algorithms for generating a key and a password in the existing technology. For example, the server can generate same keys by using a symmetric encryption algorithm, and use the keys as the user-side authentication parameter and the network-side authentication parameter.

[0050] The server stores the obtained network-side authentication parameter
25 locally or in a storage location accessible in the network.

[0051] Step 320: The server divides the user-side authentication parameter into N parts, and generates a corresponding joint management authentication parameter based on each part; and separately sends joint management authentication parameters to client software of different joint managers.

30 **[0052]** For detailed descriptions of dividing the user-side authentication parameter and generating the joint management authentication parameter by the server, reference can be made to descriptions of the same functions performed by the client software in Implementation 1. Details are omitted here again. In an implementation, the user-side authentication parameter can be divided into N segments, and each segment and a

corresponding segment sequence number are used as one joint management authentication parameter.

[0053] The server separately sends generated N joint management authentication parameters to client software of different joint managers. A network structure of an application scenario thereof is shown in FIG. 5.

[0054] Step 410: The client software receives a joint management authentication parameter sent by a server.

[0055] A joint management authentication parameter that the server sends to client software of a joint manager is generated by the server based on one part after the server divides a user-side authentication parameter into N parts. In an implementation, the joint management authentication parameter includes one of N segments of the user-side authentication parameter and a corresponding segment sequence number.

[0056] Step 420: The client software stores the received joint management authentication parameter.

[0057] The client software can store the received joint management authentication parameter in a device including the client software or in a storage medium that can be separated from a device including the client software, such as an NFC chip, a Universal Serial Bus (USB) flash drive, etc.

[0058] It can be seen that, in Implementation 1 and Implementation 2 of the present application, the user-side network parameter is divided into the N parts, and then one joint management authentication parameter is generated based on each part. The N joint management authentication parameters are controlled by the N joint managers, and an operation can be performed on the joint account after all the joint managers provide the joint management authentication parameters. In the two previous implementations of the present application, the network-based joint account can be implemented, and the joint manager can manage the account very conveniently.

[0059] Implementation 3 of the present application describes an authentication method for a joint account. Client software is responsible for generating a user-side network parameter based on N joint management authentication parameters. A process of the method applied to the client software is shown in FIG. 6.

[0060] Step 610: Obtain N joint management authentication parameters of the joint account.

[0061] Each of N joint managers of the joint account controls one joint management authentication parameter. After each of the N joint managers agrees to perform an operation to be authenticated on the joint account, each joint manager can provide the joint management authentication parameter, controlled by the joint manager, to the client software that runs the authentication method for the joint account in this implementation.

[0062] If the joint manager stores the joint management authentication parameter, controlled by the joint manager, in a device including client software of the joint manager, the client software that runs the authentication method for the joint account in this implementation can read the N joint management authentication parameters from devices of client software of the N joint managers, or receive the joint management authentication parameters sent by client software of the N joint managers. If the joint manager stores the joint management authentication parameter controlled by the joint manager in a storage medium of the joint manager (e.g., an NFC chip or a USB flash drive of each joint manager), the client software that runs the authentication method for the joint account can read the N joint management authentication parameters from these storage media.

[0063] It is worthwhile to note that, in this implementation, the client software that runs the authentication method for the joint account can be client software of a joint manager, or can be client software of a non-joint manager. When the client software that runs the authentication method for the joint account is client software of a joint manager, and a joint management authentication parameter of the joint manager is stored in a device including the client software, the client software can simply read the stored joint management authentication parameter locally.

[0064] Step 620: Restore one part of a user-side authentication parameter based on each joint management authentication parameter, and combine N parts into the user-side authentication parameter.

[0065] After obtaining the N joint management authentication parameters, the client software restores one corresponding part (that is, a part used to generate a joint management authentication parameter) of the user-side authentication parameter from each joint management authentication parameter inversely by using a method for generating the joint management authentication parameter. N parts are combined to obtain the user-side authentication parameter.

[0066] In an example of the previous application scenario that the N segments of

the user-side authentication parameters and the corresponding segment sequence numbers are used as the N joint management authentication parameters, one segment of the user-side authentication parameter and a corresponding segment sequence number can be obtained by parsing each joint management authentication parameter, and N segments can be connected sequentially based on corresponding segment sequence numbers, to generate the user-side authentication parameter.

[0067] Step 630: Initiate an authentication request to a server by using the user-side authentication parameter, so the server performs authentication on operation permission for the joint account based on a network-side authentication parameter.

[0068] The authentication request can be initiated in different forms by using the user-side authentication parameter based on specific implementations of permission authentication between the client software and the server in an actual application scenario. For example, the client software can add the user-side authentication parameter to the authentication request, and the server compares the user-side authentication parameter in the authentication request with the network-side authentication parameter stored on the server. If the user-side authentication parameter is the same as or corresponding to the network-side authentication parameter, the authentication request is authenticated, and the client software can perform an operation requested for the joint account. Otherwise, the request of the client software is rejected.

[0069] For another example, when the user-side authentication parameter and the network-side authentication parameter are respectively a private key and a public key of an asymmetric encryption algorithm, the client software can perform digital signature on the authentication request or a certain field or some fields in the authentication request by using the private key (that is, the user-side authentication parameter), and send the authentication request with a digital signature to the server. The server performs signature authentication on the authentication request by using the public key (that is, the network-side authentication parameter) to the joint account that the authentication request requests to operate. If the authentication request is authenticated, the client software is allowed to perform an operation requested for the joint account. Otherwise, the request of the client software is rejected.

[0070] Implementation 4 of the present application describes an authentication method for a joint account. A server is responsible for generating a user-side network parameter based on N joint management authentication parameters. A process of the

method applied to the server is shown in FIG. 7, and a process of the method applied to client software is shown in FIG. 8.

[0071] Step 810: The client software obtains a joint management authentication parameter of a joint manager.

5 **[0072]** Based on a storage location of the joint management authentication parameter, the client software can read the joint management authentication parameter from a device including the client software, or can receive the joint management authentication parameter sent by client software that stores the joint management authentication parameter, or can read the joint management authentication parameter
10 from a storage medium of the joint manager.

[0073] Step 820: The client software uploads the joint management authentication parameter to a server, so the server restores one part of a user-side authentication parameter based on the joint management authentication parameter, combines the part with $(N-1)$ other parts into the user-side authentication parameter, and then performs
15 authentication on operation permission for the joint account by using a network-side authentication parameter that is the same as or corresponding to the user-side authentication parameter.

[0074] Step 710: The server receives N joint management authentication parameters uploaded by client software.

20 **[0075]** Based on different actual application scenarios, the client software can upload the joint management authentication parameter to the server by using a plurality of methods. In this implementation, the client software and the server can support one method, or can support a plurality of methods. Four examples are described below.

25 **[0076]** In the first example, after all joint managers agree to perform an operation on the joint account, each joint manager instructs client software of the joint manager to obtain a joint management authentication parameter of the joint manager, and send the joint management authentication parameter to the server by using a joint account operation request. The client software can further add joint account operation content
30 to the joint account operation request, to notify the server of the operation that the request requests the server to allow.

[0077] In the second example, a joint manager can send a joint account authorization request to client software of other joint managers by using client software of the joint manager. The joint account authorization request includes joint

account operation content. Each joint manager (including the joint manager that initiates the authorization request to the other joint managers) that agrees to perform the operation sends a joint account operation request to the server. The joint account operation request includes a joint management authentication parameter of the joint manager (and can also include the operation content).

[0078] In the third example, a joint manager sends a joint account operation request to the server. The joint account operation request includes requested operation content. After receiving the joint account operation request, the server sends a joint management authentication parameter upload request to client software of each joint manager of the joint account. The upload request includes operation content that the joint manager initiating the operation request needs to perform. After the client software receives the joint account operation request, if the joint manager agrees to perform the operation, the client software returns its joint management authentication parameter to the server in response to the joint account operation request.

[0079] In the fourth example, a joint manager sends a joint account operation request to the server. The joint account operation request includes requested operation content and a joint management authentication parameter of the joint manager. After receiving the joint account operation request, the server sends a joint management authentication parameter upload request to client software of each other joint manager (joint managers other than the joint manager initiating the operation request) of the joint account. The upload request includes the operation content that the joint manager initiating the operation request needs to perform. After the client software of another joint manager receives the joint account operation request, if the joint manager agrees to perform the operation, the client software returns its joint management authentication parameter to the server in response to the joint account operation request.

[0080] In the previous examples, when all the joint managers agree to perform the operation requested on the joint account, the server can receive the N joint management authentication parameters uploaded by client software of the N joint managers.

[0081] Step 720: The server restores one part of a user-side authentication parameter based on each joint management authentication parameter, and combines N parts into the user-side authentication parameter.

[0082] After obtaining the N joint management authentication parameters, the

server restores one corresponding part (that is, a part used to generate a joint management authentication parameter) of the user-side authentication parameter from each joint management authentication parameter inversely by using a method for generating the joint management authentication parameter. The N parts are combined to obtain the user-side authentication parameter.

[0083] In an example of the previous application scenario that, the N segments of the user-side authentication parameters and the corresponding segment sequence numbers are used as the N joint management authentication parameters, one segment of the user-side authentication parameter and a corresponding segment sequence number can be obtained by parsing each joint management authentication parameter, and N segments can be connected sequentially based on corresponding segment sequence numbers, to generate the user-side authentication parameter.

[0084] Step 730: The server performs authentication on operation permission for the joint account based on a network-side authentication parameter.

[0085] After generating the user-side authentication parameter, the server matches the network-side authentication parameter stored on the server with the user-side authentication parameter. If the two parameters are the same as or corresponding to each other, the operation permission is authenticated, and the client software is allowed to perform the operation requested for the joint account. Otherwise, the joint account operation request of the client software is rejected.

[0086] It can be seen that, in Implementation 3 and Implementation 4 of the present application, after the N joint managers provide the joint management authentication parameters controlled by themselves to the server by using the client software, the server obtains the user-side authentication parameter by using the N joint management authentication parameters, and performs authentication on the operation permission for the joint account by using the network-side authentication parameter. The joint manager can provide the joint management authentication parameter of the joint manager over a network to perform the operation on the joint account. Therefore, the network-based joint account can be implemented, and the joint manager can manage the joint account very conveniently.

[0087] A network structure of an application example of the present application is shown in FIG. 2. A device including client software is a mobile device with an NFC function. There are three joint managers ($N=3$) for a joint account in total, and each joint manager has one NFC tag.

[0088] When granting operation permission for the joint account, the mobile device with the NFC function generates a pair of RSA keys to the joint account: a public key and a private key by using an RSA algorithm (an asymmetric encryption algorithm). The public key is uploaded by the mobile device to a server, and stored as a network-side authentication parameter of the joint account. The mobile device divides the private key into three segments, and generates a segment sequence number for each segment. The mobile device uses each segment and a corresponding segment sequence number as a joint management authentication parameter of one joint manager, and writes the joint management authentication parameter into an NFC tag of the joint manager by using an NFC card reader. Three NFC tags where different joint management authentication parameters are written are respectively held by three joint managers.

[0089] When expecting to perform an operation to be authenticated on the joint account, the three joint managers provide the NFC tags held by themselves. The mobile device with the NFC function reads the three joint management authentication parameters stored in the three NFC tags by using the NFC card reader. The mobile device obtains one segment and a corresponding segment sequence number by parsing each joint management authentication parameter, and connects three segments based on segment sequence numbers to obtain the private key to the joint account. The mobile device performs digital signature on any data by using the user-side authentication parameter, and uploads the data to the server. The server performs signature authentication on the uploaded data by using the public key to the joint account, to determine whether the data is authenticated. After the data is authenticated, the mobile device can perform the operation on the joint account.

[0090] Corresponding to the previous processes, the implementations of the present application further provide two authorization devices for a joint account that are applied to client software; one authorization device for a joint account that is applied to a server; two authentication devices for a joint account that are applied to client software; and one authentication device for a joint account that is applied to a server. The devices can be implemented by using software, or can be implemented by using hardware or a combination of software and hardware. Software implementation is used as an example. A central processing unit (CPU) of a device including client software or a server reads a corresponding computer program instruction into a memory and the instruction runs to form a logical device. In terms of hardware

implementation, in addition to a CPU, a memory, and a nonvolatile memory shown in FIG. 9, the device including the client software or the server generally includes other hardware such as a chip sending and receiving radio signals, and/or other hardware such as a card performing network communication.

5 **[0091]** FIG. 10 shows an authorization device for a joint account that is applied to client software, according to Implementation 5 of the present application. The joint account is jointly managed by N joint managers, and N is a natural number greater than 1. The device includes a user-side parameter acquisition unit and a joint management parameter writing unit. The user-side parameter acquisition unit is
10 configured to obtain a user-side authentication parameter of the joint account. The user-side authentication parameter is the same as or corresponding to a network-side authentication parameter of the joint account, and is used to perform authentication on operation permission for the joint account. The joint management parameter writing unit is configured to divide the user-side authentication parameter into N parts, and
15 generate a corresponding joint management authentication parameter based on each part; and write each joint management authentication parameter into a device controlled by each joint manager.

[0092] For example, the user-side parameter acquisition unit is configured to generate the user-side authentication parameter and the network-side authentication
20 parameter of the joint account, and upload the network-side authentication parameter to a server.

[0093] In the previous example, the user-side authentication parameter and the network-side authentication parameter can include a private key and a public key of an asymmetric encryption algorithm.

25 **[0094]** Optionally, the user-side parameter acquisition unit is configured to receive the user-side authentication parameter generated by a server from the server.

[0095] Optionally, the joint management parameter writing unit is configured to divide the user-side authentication parameter into N segments, use each segment and a corresponding segment sequence number as one joint management authentication
30 parameter, and write each joint management authentication parameter into the device controlled by each joint manager.

[0096] Optionally, the device controlled by each joint manager includes a near field communication (NFC) chip of each joint manager.

[0097] FIG. 11 shows an authorization device for a joint account that is applied to

a server, according to Implementation 6 of the present application. The joint account is jointly managed by N joint managers, and N is a natural number greater than 1. The device includes an authentication parameter acquisition unit and a joint management parameter delivery unit. The authentication parameter acquisition unit is configured to obtain a user-side authentication parameter and a network-side authentication parameter of the joint account, and store the network-side authentication parameter. The user-side authentication parameter is the same as or corresponding to the network-side authentication parameter, and is used to perform authentication on operation permission for the joint account. The joint management parameter delivery unit is configured to divide the user-side authentication parameter into N parts, and generate a corresponding joint management authentication parameter based on each part; and separately send joint management authentication parameters to client software of different joint managers.

[0098] Optionally, the joint management parameter delivery unit is configured to divide the user-side authentication parameter into N segments, use each segment and a corresponding segment sequence number as one joint management authentication parameter, and separately send the joint management authentication parameters to the client software of the different joint managers.

[0099] Optionally, the authentication parameter acquisition unit is configured to generate symmetric keys or passwords based on a predetermined algorithm, and use the symmetric keys or passwords as the user-side authentication parameter and the network-side authentication parameter.

[0100] FIG. 12 shows an authorization device for a joint account that is applied to client software of a joint manager of the joint account, according to Implementation 6 of the present application. The joint account is jointly managed by N joint managers, and N is a natural number greater than 1. The device includes a joint management parameter receiving unit and a joint management parameter storage unit. The joint management parameter receiving unit is configured to receive a joint management authentication parameter sent by a server. The joint management authentication parameter is generated based on one part after the server divides a user-side authentication parameter into N parts, and the user-side authentication parameter is used to perform authentication on operation permission for the joint account. The joint management parameter storage unit is configured to store the joint management authentication parameter.

[0101] Optionally, the joint management authentication parameter includes one of N segments of the user-side authentication parameter and a corresponding segment sequence number.

5 **[0102]** Optionally, the joint management parameter storage unit is configured to store the joint management authentication parameter in a device including the client software, or store the joint management authentication parameter in a storage medium separated from a device including the client software.

10 **[0103]** FIG. 13 shows an authentication device for a joint account that is applied to client software, according to Implementation 7 of the present application. The joint account is jointly managed by N joint managers, and N is a natural number greater than 1. The device includes a joint management parameter acquisition unit, a user-side parameter combination unit, and an authentication request initiation unit. The joint management parameter acquisition unit is configured to obtain N joint management authentication parameters of the joint account. The user-side parameter combination unit is configured to restore one part of a user-side authentication parameter based on each joint management authentication parameter, and combine N parts into the user-side authentication parameter. The authentication request initiation unit is configured to initiate an authentication request to a server by using the user-side authentication parameter, so the server performs authentication on operation permission for the joint account based on a network-side authentication parameter. The network-side authentication parameter is the same as or corresponding to the user-side authentication parameter.

20 **[0104]** For example, the joint management parameter acquisition unit is configured to obtain the N joint management authentication parameters of the joint account from devices including client software of the N joint managers; or read the N joint management authentication parameters of the joint account from storage media of the N joint managers.

[0105] In the previous example, the storage media of the N joint managers include a near field communication (NFC) chip of each joint manager.

30 **[0106]** Optionally, the user-side parameter combination unit is configured to restore one segment of the user-side authentication parameter and a corresponding segment sequence number based on each joint management authentication parameter, and connect N segments based on corresponding segment sequence numbers to obtain the user-side authentication parameter.

[0107] Optionally, the user-side authentication parameter and the network-side authentication parameter include a private key and a public key of an asymmetric encryption algorithm. The authentication request initiation unit is configured to perform digital signature on the authentication request initiated to the server by using the private key, so the server performs signature authentication on the authentication request by using the public key.

[0108] FIG. 14 shows an authentication device for a joint account that is applied to a server, according to Implementation 8 of the present application. The joint account is jointly managed by N joint managers, and N is a natural number greater than 1. The device includes a joint management parameter receiving unit, a user-side parameter combination unit, and an operation permission authentication unit. The joint management parameter receiving unit is configured to receive N joint management authentication parameters uploaded by client software. The user-side parameter combination unit is configured to restore one part of a user-side authentication parameter based on each joint management authentication parameter, and combine N parts into the user-side authentication parameter. The operation permission authentication unit is configured to perform authentication on operation permission for the joint account based on a network-side authentication parameter. The network-side authentication parameter is the same as or corresponding to the user-side authentication parameter.

[0109] Optionally, the user-side parameter combination unit is configured to restore one segment of the user-side authentication parameter and a corresponding segment sequence number based on each joint management authentication parameter, and connect N segments based on corresponding segment sequence numbers to obtain the user-side authentication parameter.

[0110] Optionally, the joint management parameter receiving unit is configured to receive the N joint management authentication parameters respectively uploaded by client software of the N joint managers.

[0111] Optionally, the device further includes an operation request receiving unit and a parameter upload request sending unit. The operation request receiving unit is configured to receive a joint account operation request sent by client software of a joint manager. The joint account operation request includes operation content. The parameter upload request sending unit is configured to send a joint management authentication parameter upload request to client software of $(N-1)$ other joint

managers. The joint management authentication parameter upload request includes the operation content.

[0112] FIG. 15 shows an authentication device for a joint account that is applied to client software, according to Implementation 8 of the present application. The joint account is jointly managed by N joint managers, and N is a natural number greater than 1. The device includes a single joint management parameter acquisition unit and a joint management parameter upload unit. The single joint management parameter acquisition unit is configured to obtain a joint management authentication parameter of a joint manager. The joint management parameter upload unit is configured to upload the joint management authentication parameter to a server, so the server restores one part of a user-side authentication parameter based on the joint management authentication parameter, combines the part with $(N-1)$ other parts into the user-side authentication parameter, and then performs authentication on operation permission for the joint account by using a network-side authentication parameter that is the same as or corresponding to the user-side authentication parameter.

[0113] Optionally, the single joint management parameter acquisition unit is configured to obtain the joint management authentication parameter from a device including client software of the joint manager; or read the joint management authentication parameter from a storage medium of the joint manager.

[0114] Optionally, the device further includes an operation request sending unit, configured to send a joint account operation request to the server. The joint account operation request includes operation content.

[0115] Optionally, the device further includes a parameter upload request receiving unit, configured to receive a joint management authentication parameter upload request sent by the server. The joint management authentication parameter upload request includes operation content in a joint account operation request initiated by the joint manager. The joint management parameter upload unit is configured to upload the joint management authentication parameter to the server in response to the joint management authentication parameter upload request.

[0116] The previous descriptions are merely example implementations of the present application, but are not intended to limit the present application. Any modification, equivalent replacement, or improvement made without departing from the spirit and principle of the present application shall fall within the protection scope of the present application.

[0117] In a typical configuration, a computing device includes one or more central processing units (CPU), an input/output interface, a network interface, and a memory.

[0118] The memory can include a non-persistent memory, a random access memory (RAM), and/or a nonvolatile memory in a computer readable medium, for example, a read-only memory (ROM) or a flash memory. The memory is an example of the computer readable medium.

[0119] The computer readable medium includes persistent, non-persistent, movable, and unmovable media that can store information by using any method or technology. The information can be a computer readable instruction, a data structure, a program module, or other data. An example of the computer storage medium includes but is not limited to a phase-change random access memory (PRAM), a static random access memory (SRAM), a dynamic random access memory (DRAM), a random access memory (RAM) of another type, a read-only memory (ROM), an electrically erasable programmable read-only memory (EEPROM), a flash memory or another memory technology, a compact disc read-only memory (CD-ROM), a digital versatile disc (DVD) or other optical storage, a cassette magnetic tape, tape and disk storage or another magnetic storage device or any other non-transmission media that can be configured to store information that can be accessed by the computing device. As described in the present specification, the computer readable medium does not include a transitory computer readable medium (transitory media) such as a modulated data signal and a carrier.

[0120] It is worthwhile to further note that the term "include", "contain", or any other variant thereof is intended to cover a non-exclusive inclusion, so a process, a method, an article, or a device that includes a list of elements not only includes those elements but also includes other elements which are not expressly listed, or further includes elements inherent to such a process, method, article, or device. An element preceded by "includes a ..." does not, without more constraints, preclude the existence of additional identical elements in the process, method, article, or device that includes the element.

[0121] A person skilled in the art should understand that the implementations of the present application can be provided as a method, a system, or a computer program product. Therefore, the present application can use a form of hardware only implementations, software only implementations, or implementations with a combination of software and hardware. Moreover, the present application can use a

form of a computer program product that is implemented on one or more computer-usable storage media (including but not limited to a magnetic disk storage, a CD-ROM, an optical memory, etc.) that include computer-usable program code.

CLAIMS

1. A computer-implemented method, comprising:

receiving, by a server, N joint management authentication parameters uploaded by client software of N joint managers, wherein each of the N joint management authentication parameters comprises a corresponding part of a private key and a corresponding sequence number different from other sequence numbers, wherein the N joint managers jointly manage a joint account, and wherein N is a natural number greater than 1;

restoring one part of a user-side authentication parameter based on each joint management authentication parameter;

combining, according to each corresponding sequence number, N parts of the private key into the user-side authentication parameter; and

performing authentication on operation permission for the joint account based on a network-side authentication parameter, wherein the network-side authentication parameter is a public key that corresponds to the user-side authentication parameter.

2. The computer-implemented method according to claim 1, wherein restoring one part of the user-side authentication parameter based on each joint management authentication parameter, and combining N parts of the private key into the user-side authentication parameter comprises:

restoring one segment of the user-side authentication parameter and a corresponding segment sequence number based on each joint management authentication parameter, and connecting N segments based on corresponding segment sequence numbers to obtain the user-side authentication parameter.

3. The computer-implemented method according to claim 1, wherein receiving N joint management authentication parameters uploaded by client software of N joint managers comprises:

receiving the N joint management authentication parameters respectively uploaded by client software of the N joint managers.

4. The computer-implemented method according to claim 1, further comprising:

receiving a joint account operation request sent by client software of a joint manager,

wherein the joint account operation request comprises operation content; and

sending a joint management authentication parameter upload request to client software of $(N-1)$ other joint managers, wherein the joint management authentication parameter upload request comprises the operation content.

5. The computer-implemented method according to claim 1, further comprising:

obtaining the user-side authentication parameter and the network-side authentication parameter, wherein the user-side authentication parameter is the same as or corresponding to the network-side authentication parameter;

storing the network-side authentication parameter;

dividing the user-side authentication parameter into N parts of the user-side authentication parameter, and generating a corresponding joint management authentication parameter based on each part of the user-side authentication parameter; and

separately sending joint management authentication parameters to client software of the N joint managers.

6. The computer-implemented method according to claim 5, wherein generating the corresponding joint management authentication parameter based on each part of the user-side authentication parameter comprises:

using each part of the user-side authentication parameter and a corresponding part sequence number as the corresponding joint management authentication parameter.

7. The computer-implemented method according to claim 5, wherein obtaining the user-side authentication parameter and the network-side authentication parameter comprises:

generating symmetric keys or passwords based on a predetermined algorithm, and using the symmetric keys or passwords as the user-side authentication parameter and the network-side authentication parameter.

8. A non-transitory, computer-readable medium storing one or more instructions executable by a computer system to perform operations according to the computer-implemented method of any one of claims 1 to 7.