

# CROSS-BLOCKCHAIN TRANSACTION SYNCHRONIZATION METHOD AND APPARATUS

## TECHNICAL FIELD

[0001] This specification relates to the field of blockchain technologies, and in particular, to  
5 a cross-blockchain transaction synchronization method and apparatus.

## BACKGROUND

[0002] In a related technology, a transaction consensus may be achieved between blockchain  
nodes in a blockchain system to ensure data consistency. However, if data consistency needs to  
be ensured between a plurality of blockchain systems, the consensus method cannot be used to  
10 implement data consistency. Based on this, how to synchronize transactions across blockchain  
systems has become a focus of attention in the industry.

## SUMMARY

[0003] In view of this, this specification provides a method and an apparatus for  
cross-blockchain transaction synchronization.

15 [0004] Specifically, this specification is implemented by using the following technical  
solutions: A cross-blockchain transaction synchronization method is provided, which is used to  
implement transaction synchronization between a first blockchain system and a second  
blockchain system based on a bridging system. The method is applied to any blockchain node in  
the first blockchain system and includes: receiving a first freeze transaction, where the first  
20 freeze transaction carries to-be-synchronized transaction information; executing the first freeze  
transaction, so as to invoke first freeze logic in a smart contract to perform a freeze operation on  
a corresponding account on a current blockchain based on the transaction information, to obtain  
a first freeze result; receiving a first transfer transaction sent by the bridging system, where the  
first transfer transaction carries a second freeze result obtained by performing, by the second  
25 blockchain system when the second blockchain system determines that the first freeze result is  
"succeed", a freeze operation on an account corresponding to the transaction information on a  
blockchain of the second blockchain system, and the first freeze result is obtained through  
monitoring by the bridging system; executing the first transfer transaction, so as to invoke first

transfer logic in the smart contract to perform an unfreeze operation on the corresponding account on the current blockchain based on the transaction information and transfer a balance to obtain a first transfer result when it is determined that the second freeze result is "succeed"; receiving a confirm transaction sent by the bridging system, where the confirm transaction carries a second transfer result obtained by performing an unfreeze operation on the account corresponding to the transaction information on the blockchain of the second blockchain system and transferring a balance by the second blockchain system when the second blockchain system determines that the first transfer result is "succeed", and the first transfer result is obtained through monitoring by the bridging system; and executing the confirm transaction, so as to invoke confirm logic in the smart contract to determine, when it is determined that the second transfer result is "succeed", that synchronization of the to-be-synchronized transaction information is completed.

**[0005]** A cross-blockchain transaction synchronization method is provided, which is used to implement transaction synchronization between a first blockchain system and a second blockchain system based on a bridging system. The method is applied to any blockchain node in the second blockchain system and includes: receiving a second freeze transaction sent by the bridging system, where the second freeze transaction carries to-be-synchronized transaction information and a first freeze result obtained by performing, by the first blockchain system, a freeze operation on an account corresponding to the transaction information on a blockchain of the first blockchain system; executing the second freeze transaction, so as to invoke second freeze logic in a smart contract to perform, when it is determined that the first freeze result is "succeed", a freeze operation on a corresponding account on a current blockchain based on the transaction information, to obtain a second freeze result; receiving a second transfer transaction sent by the bridging system, where the second transfer transaction carries a first transfer result obtained by performing an unfreeze operation on the account corresponding to the transaction information on the blockchain of the first blockchain system and transferring a balance by the first blockchain system when the first blockchain system determines that the second freeze result is "succeed", and the second freeze result is obtained through monitoring by the bridging system; and executing the second transfer transaction, so as to invoke second transfer logic in the smart contract to perform an unfreeze operation on the corresponding account on the current blockchain based on the transaction information and transfer a balance to obtain a second transfer result when it is determined that the first transfer result is "succeed", so that the first blockchain system determines, when the second transfer result is "succeed", that synchronization of the to-be-synchronized transaction information is completed.

**[0006]** A cross-blockchain transaction synchronization method is provided, which is used to

implement transaction synchronization between a first blockchain system and a second blockchain system based on a bridging system. The method is applied to the bridging system and includes: obtaining, through monitoring, a first freeze result obtained by performing, by the first blockchain system, a freeze operation on an account corresponding to to-be-synchronized transaction information on a blockchain of the first blockchain system; generating a second freeze transaction based on the to-be-synchronized transaction information and the first freeze result, and sending the second freeze transaction to the second blockchain system; obtaining a second freeze result of the second blockchain system through monitoring, where the second freeze result is obtained after the second blockchain system executes the second freeze transaction, and performs, when determining that the first freeze result is "succeed", a freeze operation on a corresponding account on a blockchain of the second blockchain system based on the transaction information; generating a first transfer transaction based on the second freeze result, and sending the first transfer transaction to the first blockchain system; obtaining a first transfer result of the first blockchain system through monitoring, where the first transfer result is obtained after the first blockchain system executes the first transfer transaction, and performs an unfreeze operation on the corresponding account on the blockchain of the first blockchain system based on the transaction information and transfers a balance when determining that the second freeze result is "succeed"; generating a second transfer transaction based on the first transfer result, and sending the second transfer transaction to the second blockchain system; obtaining a second transfer result of the second blockchain system through monitoring, where the second transfer result is obtained after the second blockchain system executes the second transfer transaction, and performs an unfreeze operation on the corresponding account on the blockchain of the second blockchain system based on the transaction information and transfers a balance when determining that the first transfer result is "succeed"; and generating a confirm transaction based on the second transfer result, and sending the confirm transaction to the first blockchain system, so that the first blockchain determines, when the second transfer result is "succeed", that synchronization of the to-be-synchronized transaction information is completed.

**[0007]** A cross-blockchain transaction synchronization apparatus is provided, where the apparatus includes: a first freeze transaction receiving unit, configured to receive a first freeze transaction, where the first freeze transaction carries to-be-synchronized transaction information; a first freeze transaction execution unit, configured to execute the first freeze transaction, so as to invoke first freeze logic in a smart contract to perform a freeze operation on a corresponding account on a current blockchain based on the transaction information, to obtain a first freeze result; a first transfer transaction receiving unit, configured to receive a first transfer transaction sent by a bridging system, where the first transfer transaction carries a second freeze result

obtained by performing, by a second blockchain system when the second blockchain system determines that the first freeze result is "succeed", a freeze operation on an account corresponding to the transaction information on a blockchain of the second blockchain system, and the first freeze result is obtained through monitoring by the bridging system; a first transfer transaction execution unit, configured to execute the first transfer transaction, so as to invoke first transfer logic in the smart contract to perform an unfreeze operation on the corresponding account on the current blockchain based on the transaction information and transfer a balance to obtain a first transfer result when it is determined that the second freeze result is "succeed"; a confirm transaction receiving unit, configured to receive a confirm transaction sent by the bridging system, where the confirm transaction carries a second transfer result obtained by performing, by the second blockchain system when the second blockchain system determines that the first transfer result is "succeed", an unfreeze operation on the account corresponding to the transaction information on the blockchain of the second blockchain system, and the first transfer result is obtained through monitoring by the bridging system; and a confirm transaction execution unit, configured to execute the confirm transaction, so as to invoke confirm logic in the smart contract to determine, when it is determined that the second transfer result is "succeed", that synchronization of the to-be-synchronized transaction information is completed.

**[0008]** A cross-blockchain transaction synchronization apparatus is provided, where the apparatus includes: a second freeze transaction receiving unit, configured to receive a second freeze transaction sent by a bridging system, where the second freeze transaction carries to-be-synchronized transaction information and a first freeze result obtained by performing, by a first blockchain system, a freeze operation on an account corresponding to the transaction information on a blockchain of the first blockchain system; a second freeze transaction execution unit, configured to execute the second freeze transaction, so as to invoke second freeze logic in a smart contract to perform, when it is determined that the first freeze result is "succeed", a freeze operation on a corresponding account on a current blockchain based on the transaction information, to obtain a second freeze result; a second transfer transaction receiving unit, configured to receive a second transfer transaction sent by the bridging system, where the second transfer transaction carries a first transfer result obtained by performing an unfreeze operation on the account corresponding to the transaction information on the blockchain of the first blockchain system and transferring a balance by the first blockchain system when the first blockchain system determines that the second freeze result is "succeed", and the second freeze result is obtained through monitoring by the bridging system; and a second transfer transaction execution unit, configured to execute the second transfer transaction, so as to invoke second transfer logic in the smart contract to perform an unfreeze operation on the corresponding

account on the current blockchain based on the transaction information and transfer a balance to obtain a second transfer result when it is determined that the first transfer result is "succeed", so that the first blockchain system determines, when the second transfer result is "succeed", that synchronization of the to-be-synchronized transaction information is completed.

5     **[0009]**     A cross-blockchain transaction synchronization apparatus is provided, where the apparatus includes: a first freeze result monitoring unit, configured to obtain, through monitoring, a first freeze result obtained by performing, by a first blockchain system, a freeze operation on an account corresponding to to-be-synchronized transaction information on a blockchain of the first blockchain system; a second freeze transaction sending unit, configured to: generate a  
10     second freeze transaction based on the to-be-synchronized transaction information and the first freeze result, and send the second freeze transaction to a second blockchain system; a second freeze result monitoring unit, configured to obtain a second freeze result of the second blockchain system through monitoring, where the second freeze result is obtained after the second blockchain system executes the second freeze transaction, and performs, when  
15     determining that the first freeze result is "succeed", a freeze operation on a corresponding account on a blockchain of the second blockchain system based on the transaction information; a first transfer transaction sending unit, configured to: generate a first transfer transaction based on the second freeze result, and send the first transfer transaction to the first blockchain system; a first transfer result monitoring unit, configured to obtain a first transfer result of the first  
20     blockchain system through monitoring, where the first transfer result is obtained after the first blockchain system executes the first transfer transaction, and performs an unfreeze operation on the corresponding account on the blockchain of the first blockchain system based on the transaction information and transfers a balance when determining that the second freeze result is "succeed"; a second transfer transaction sending unit, configured to: generate a second transfer  
25     transaction based on the first transfer result, and send the second transfer transaction to the second blockchain system; a second transfer result monitoring unit, configured to obtain a second transfer result of the second blockchain system through monitoring, where the second transfer result is obtained after the second blockchain system executes the second transfer transaction, and performs an unfreeze operation on the corresponding account on the blockchain  
30     of the second blockchain system based on the transaction information and transfers a balance when determining that the first transfer result is "succeed"; and a confirm transaction sending unit, configured to: generate a confirm transaction based on the second transfer result, and send the confirm transaction to the first blockchain system, so that the first blockchain determines, when the second transfer result is "succeed", that synchronization of the to-be-synchronized  
35     transaction information is completed.

**[0010]** A cross-blockchain transaction synchronization apparatus is provided, including: a processor, and a memory configured to store machine-executable instructions. The processor reads and executes the machine-executable instructions stored in the memory that correspond to cross-blockchain transaction synchronization logic to: receive a first freeze transaction, where  
5 the first freeze transaction carries to-be-synchronized transaction information; execute the first freeze transaction, so as to invoke first freeze logic in a smart contract to perform a freeze operation on a corresponding account on a current blockchain based on the transaction information, to obtain a first freeze result; receive a first transfer transaction sent by a bridging system, where the first transfer transaction carries a second freeze result obtained by performing,  
10 by a second blockchain system when the second blockchain system determines that the first freeze result is "succeed", a freeze operation on an account corresponding to the transaction information on a blockchain of the second blockchain system, and the first freeze result is obtained through monitoring by the bridging system; execute the first transfer transaction, so as to invoke first transfer logic in the smart contract to perform an unfreeze operation on the  
15 corresponding account on the current blockchain based on the transaction information and transfer a balance to obtain a first transfer result when it is determined that the second freeze result is "succeed"; receive a confirm transaction sent by the bridging system, where the confirm transaction carries a second transfer result obtained by performing an unfreeze operation on the account corresponding to the transaction information on the blockchain of the second blockchain  
20 system and transferring a balance by the second blockchain system when the second blockchain system determines that the first transfer result is "succeed", and the first transfer result is obtained through monitoring by the bridging system; and execute the confirm transaction, so as to invoke confirm logic in the smart contract to determine, when it is determined that the second transfer result is "succeed", that synchronization of the to-be-synchronized transaction  
25 information is completed.

**[0011]** A cross-blockchain transaction synchronization apparatus is provided, including: a processor, and a memory configured to store machine-executable instructions. The processor reads and executes the machine-executable instructions stored in the memory that correspond to cross-blockchain transaction synchronization logic to: receive a second freeze transaction sent by  
30 a bridging system, where the second freeze transaction carries to-be-synchronized transaction information and a first freeze result obtained by performing, by a first blockchain system, a freeze operation on an account corresponding to the transaction information on a blockchain of the first blockchain system; execute the second freeze transaction, so as to invoke second freeze logic in a smart contract to perform, when it is determined that the first freeze result is "succeed",  
35 a freeze operation on a corresponding account on a current blockchain based on the transaction

information, to obtain a second freeze result; receive a second transfer transaction sent by the bridging system, where the second transfer transaction carries a first transfer result obtained by performing an unfreeze operation on the account corresponding to the transaction information on the blockchain of the first blockchain system and transferring a balance by the first blockchain system when the first blockchain system determines that the second freeze result is "succeed", and the second freeze result is obtained through monitoring by the bridging system; and execute the second transfer transaction, so as to invoke second transfer logic in the smart contract to perform an unfreeze operation on the corresponding account on the current blockchain based on the transaction information and transfer a balance to obtain a second transfer result when it is determined that the first transfer result is "succeed", so that the first blockchain system determines, when the second transfer result is "succeed", that synchronization of the to-be-synchronized transaction information is completed.

**[0012]** A cross-blockchain transaction synchronization apparatus is provided, including: a processor, and a memory configured to store machine-executable instructions. The processor reads and executes the machine-executable instructions stored in the memory that correspond to cross-blockchain transaction synchronization logic to: obtain, through monitoring, a first freeze result obtained by performing, by a first blockchain system, a freeze operation on an account corresponding to to-be-synchronized transaction information on a blockchain of the first blockchain system; generate a second freeze transaction based on the to-be-synchronized transaction information and the first freeze result, and send the second freeze transaction to a second blockchain system; obtain a second freeze result of the second blockchain system through monitoring, where the second freeze result is obtained after the second blockchain system executes the second freeze transaction, and performs, when determining that the first freeze result is "succeed", a freeze operation on a corresponding account on a blockchain of the second blockchain system based on the transaction information; generate a first transfer transaction based on the second freeze result, and send the first transfer transaction to the first blockchain system; obtain a first transfer result of the first blockchain system through monitoring, where the first transfer result is obtained after the first blockchain system executes the first transfer transaction, and performs an unfreeze operation on the corresponding account on the blockchain of the first blockchain system based on the transaction information and transfers a balance when determining that the second freeze result is "succeed"; generate a second transfer transaction based on the first transfer result, and send the second transfer transaction to the second blockchain system; obtain a second transfer result of the second blockchain system through monitoring, where the second transfer result is obtained after the second blockchain system executes the second transfer transaction, and performs an unfreeze operation on the

corresponding account on the blockchain of the second blockchain system based on the transaction information and transfers a balance when determining that the first transfer result is "succeed"; and generate a confirm transaction based on the second transfer result, and send the confirm transaction to the first blockchain system, so that the first blockchain determines, when the second transfer result is "succeed", that synchronization of the to-be-synchronized transaction information is completed.

**[0013]** According to some embodiments of this specification, the following is implemented: Any blockchain node on the first blockchain may receive the first freeze transaction that carries the to-be-synchronized transaction information, and execute the first freeze transaction to invoke the first freeze logic in the smart contract to freeze the corresponding account on the current blockchain based on the transaction information, to obtain the first freeze result. The bridging system may obtain the first freeze result through monitoring, generate the second freeze transaction based on the first freeze result and the to-be-synchronized transaction information, and send the second freeze transaction to the second blockchain system, so that the second blockchain system executes the second freeze transaction, so as to invoke the second freeze logic in the smart contract to freeze, when it is determined that the first freeze result is "succeed", the account corresponding to the transaction information on the blockchain of the second blockchain system to obtain the second freeze result. The bridging system may obtain the second freeze result through monitoring, generate the first transfer transaction based on the second freeze result, and send the first transfer transaction to the first blockchain system. After receiving the first transfer transaction, the first blockchain system may invoke the first transfer logic in the smart contract to unfreeze the corresponding account on the current blockchain based on the transaction information and transfer a balance to obtain the first transfer result when it is determined that the second freeze result is "succeed". The bridging system may obtain the first transfer result through monitoring, generate the second transfer transaction based on the first transfer result, and send the second transfer transaction to the second blockchain system, so that the second blockchain system executes the second transfer transaction, so as to invoke the second transfer logic in the smart contract to unfreeze the account corresponding to the transaction information on the blockchain of the second blockchain system and transfer a balance to obtain a second transfer result when it is determined that the first transfer result is "succeed". The bridging system may obtain the second transfer result through monitoring, generate the confirm transaction based on the second transfer result, and send the confirm transaction to the first blockchain system. The first blockchain system may execute the confirm transaction, so as to invoke the confirm logic in the smart contract to determine, when it is determined that the second transfer result is "succeed", that synchronization of the to-be-synchronized transaction

information is completed.

**[0014]** In the foregoing method, the first blockchain system may synchronize the to-be-synchronized transaction information based on the bridging system and the second blockchain system. The bridging system may generate corresponding transactions based on types of transactions currently executed by the first blockchain system and the second blockchain system, and promote the first blockchain system and the second blockchain system to execute a corresponding procedure by using these transactions. In the entire process, data synchronization is implemented on the blockchain, which can avoid a problem that transaction information is tampered with due to off-chain processing of transaction information. In addition, the first blockchain system and the second blockchain system each perform next-step processing after determining that the other party succeeds in execution, which can avoid a problem that transaction information that needs to be synchronized is missing and synchronization fails due to a failure of a certain party in execution, thereby greatly improving security and reliability of transaction synchronization.

## **BRIEF DESCRIPTION OF DRAWINGS**

**[0015]** FIG. 1 is a schematic diagram of a scenario of a cross-blockchain transaction synchronization method according to some example embodiments of this specification;

**[0016]** FIG. 2 is a schematic flowchart of a cross-blockchain transaction synchronization method according to some example embodiments of this specification;

**[0017]** FIG. 3 is a schematic flowchart of another cross-blockchain transaction synchronization method according to some example embodiments of this specification;

**[0018]** FIG. 4 is a schematic flowchart of another cross-blockchain transaction synchronization method according to some example embodiments of this specification;

**[0019]** FIG. 5 is a schematic diagram of multi-party interaction in a cross-blockchain transaction synchronization method according to some example embodiments of this specification;

**[0020]** FIG. 6 is a diagram of a hardware structure of an electronic device in which a cross-blockchain transaction synchronization apparatus is located according to some example embodiments of this specification;

**[0021]** FIG. 7 is a block diagram of a cross-blockchain transaction synchronization apparatus according to some example embodiments of this specification;

**[0022]** FIG. 8 is a block diagram of another cross-blockchain transaction synchronization apparatus according to some example embodiments of this specification; and

**[0023]** FIG. 9 is a block diagram of another cross-blockchain transaction synchronization apparatus according to some example embodiments of this specification.

## **DESCRIPTION OF EMBODIMENTS**

**[0024]** Example embodiments are described herein in detail, and examples of the  
5       embodiments are shown in the accompanying drawings. When the following description relates to the accompanying drawings, unless specified otherwise, same numbers in different accompanying drawings represent same or similar elements. Implementations described in the following example embodiments do not represent all implementations consistent with this specification. On the contrary, the embodiments are merely examples of apparatuses and  
10       methods that are described in the appended claims in details and consistent with some aspects of this specification.

**[0025]** The terms used in this specification are merely for illustrating specific embodiments, and are not intended to limit this specification. The terms "a" and "the" of singular forms used in this specification and the appended claims are also intended to include plural forms, unless  
15       otherwise specified in the context clearly. It should be further understood that the term "and/or" used in this specification refers to and includes any or all possible combinations of one or more associated listed items.

**[0026]** It should be understood that although terms "first", "second", "third", etc. may be used in this specification to describe various types of information, the information should not be  
20       limited to the terms. These terms are merely used to differentiate between information of the same type. For example, without departing from the scope of this specification, first information may also be referred to as second information, and similarly, the second information may be referred to as the first information. Depending on the context, for example, the word "if" used herein can be explained as "while", "when", or "in response to determining".

**[0027]** The blockchain technology, also referred to as the distributed ledger technology, is an  
25       emerging technology that several computing devices participate in "accounting" to jointly maintain a complete distributed database. The blockchain technology features decentralization and transparency. In addition, each computing device can participate in database recording, and data synchronization between the computing devices can be fast implemented. Therefore, the  
30       blockchain technology has been widely used in many fields.

**[0028]** In the blockchain technology, real data generated in a physical world may be formed into a transaction format of a standard supported by a blockchain, and then published to the blockchain, and node devices on the blockchain perform consensus processing on the received

transaction. Through the consensus, transactions stored on node devices on the blockchain may be synchronized, to ensure that the transactions stored on the node devices are the same, thereby implementing data consistency.

**[0029]** However, through the foregoing consensus method, only transaction synchronization between node devices inside a blockchain system can be implemented. If cross-blockchain transaction synchronization needs to be implemented between a plurality of blockchain systems, cross-blockchain transaction synchronization cannot be implemented by using the foregoing consensus method. In a related technology, transaction synchronization between cross-blockchain systems may be implemented by using "notary schemes". Specifically, transactions between cross-blockchains are confirmed and forwarded by using a centralized third-party system. However, in this method, there is a risk that transactions are tampered with and omitted, and security is low.

**[0030]** Based on this, this specification provides a cross-blockchain transaction synchronization method, which can synchronize transactions between cross-blockchain systems, ensure that transactions are not tampered with and are prevented from being omitted in a synchronization process, thereby improving security and reliability of transaction synchronization.

**[0031]** First, a scenario of the cross-blockchain transaction synchronization method in this specification is described. FIG. 1 is a schematic diagram of a scenario of a cross-blockchain transaction synchronization method according to some example embodiments of this specification.

**[0032]** FIG. 1 includes a first blockchain system 10, a second blockchain system 20, and a bridging system 30. The first blockchain system 10 may maintain one blockchain, including a plurality of blockchain nodes configured to carry the blockchain, which are respectively a blockchain node 11, a blockchain node 12, a blockchain node 13, a blockchain node 14, ..., and a blockchain node 1i. The second blockchain system 20 may maintain one blockchain, including a plurality of blockchain nodes configured to carry the blockchain, which are respectively a blockchain node 21, a blockchain node 22, a blockchain node 23, a blockchain node 24, ..., and a blockchain node 2j.

**[0033]** A quantity of blockchain nodes in the first blockchain system may be the same as or different from a quantity of nodes in the second blockchain system. The first blockchain system 10 and the second blockchain system 20 may respectively interact with the bridging system 30, and implement transaction synchronization between the two blockchain systems by using the bridging system 30. Details are described in the following embodiments.

**[0034]** Certainly, the scenario shown in FIG. 1 is merely an example for description, and is

not intended to limit this specification.

**[0035]** After the foregoing scenario is clarified, the following describes some embodiments of a cross-blockchain transaction synchronization method provided in this specification. FIG. 2 is a schematic flowchart of a cross-blockchain transaction synchronization method according to some example embodiments of this specification. The method may be applied to any blockchain node in a first blockchain system, such as the blockchain node 11 in the first blockchain system 10 in FIG. 1. The method may include the following steps: Step 202: Receive a first freeze transaction, where the first freeze transaction carries to-be-synchronized transaction information.

**[0036]** Some embodiments may implement transaction synchronization between the first blockchain system and a second blockchain system for the to-be-synchronized transaction information. For example, the to-be-synchronized transaction information may be transfer transaction information and remittance transaction information. The transaction information may include a transaction amount and a corresponding transfer-out account and a transfer-in account. For example, the transaction information may be "Zhang San remits 500 yuan to Li Si", where the transfer-out account is an account of Zhang San, the transfer-in account is an account of Li Si, and the transaction amount is 500 yuan.

**[0037]** In an example, a bridging system may be interconnected to a service system. A user may initiate a transaction based on the service system, such as the remittance transaction in the foregoing example. Then, the service system may determine whether the transaction needs to be synchronized. If the transaction needs to be synchronized, the service system may provide information about the transaction to the bridging system, and the bridging system may provide the information about the transaction to the first blockchain system and the second blockchain system for synchronization.

**[0038]** There may be a plurality of methods for determining whether a transaction is to-be-synchronized transaction information, for example, determining whether a transaction type meets a type specified by a to-be-synchronized transaction. For example, the specified type may be a cross-border remittance. In a cross-border remittance scenario, an internal blockchain and an external blockchain exist, and therefore, the remittance transaction needs to be synchronized on the two blockchains. Certainly, this example is merely an example for description, and another method may be used in an actual service scenario. This is not specifically limited in some embodiments.

**[0039]** In another example, a user may also directly initiate a transaction to any blockchain node in the first blockchain system. The first blockchain system may determine information about the transaction as to-be-synchronized transaction information, and synchronize the to-be-synchronized transaction information with the second blockchain system based on the

bridging system.

**[0040]** For example, the bridging system may monitor a block event of any blockchain node in the first blockchain system, obtain these blocks, obtain transactions from these blocks, and then provide these transactions to the second blockchain system. Several target user IDs that require transaction synchronization may be preset. The second blockchain system may determine whether user IDs corresponding to these transactions belong to the target user IDs. If the user IDs corresponding to these transactions belong to the target user IDs, it indicates that the transactions need to be synchronized. Alternatively, a keyword may be preset when a smart contract is deployed. In this case, after executing a to-be-synchronized transaction, the first blockchain system may include the keyword in an execution result, and the bridging system or the second blockchain system may determine, based on the keyword, the transaction that needs to be synchronized.

**[0041]** Certainly, a user may directly initiate a transaction to any blockchain node in the second blockchain system. The second blockchain system may determine transaction information of the transaction as to-be-synchronized transaction information, and synchronize the to-be-synchronized transaction information with the first blockchain system based on the bridging system. This is not specially limited.

**[0042]** In some embodiments, the blockchain node in the first blockchain system may receive the first freeze transaction, where the first freeze transaction may carry the to-be-synchronized transaction information. The first freeze transaction may be sent by the bridging system, or may be sent by another party.

**[0043]** In an example, for the foregoing example in which the user initiates the to-be-synchronized transaction information based on the service system, after the service system sends the transaction information of the transaction to the bridging system, the bridging system may generate the first freeze transaction based on the to-be-synchronized transaction information, and send the first freeze transaction to any blockchain node in the first blockchain system.

**[0044]** In another example, in the foregoing example in which the user directly initiates the to-be-synchronized transaction to any blockchain node in the first blockchain system, the blockchain node may directly receive the first freeze transaction.

**[0045]** Step 204: Execute the first freeze transaction, so as to invoke first freeze logic in a smart contract to perform a freeze operation on a corresponding account on a current blockchain based on the transaction information, to obtain a first freeze result.

**[0046]** In some embodiments, after receiving the first freeze transaction, the blockchain node on the first blockchain may execute the first freeze transaction, so as to invoke the first freeze logic in the smart contract to find the corresponding account on the current blockchain

based on the transaction information, and perform a freeze operation on the account.

**[0047]** There may be a plurality of freeze operations. For example, balances in a transfer-in account and a transfer-out account corresponding to a transaction amount can be frozen, that is, no one is allowed to transfer the balances in the two accounts. Still using the foregoing example in which Zhang San remits 500 yuan to Li Si as an example, it can be found that corresponding accounts are the account of Zhang San and the account of Li Si, and the two accounts can be frozen. For another example, only the balance in the transfer-out account may be frozen. Still using the foregoing example as an example, an account balance of Zhang San may be frozen, and account balance information of Li Si does not need to be frozen. For another example, a transaction amount may be frozen in the transfer-out account. Still using the foregoing example as an example, 500 yuan may be frozen in only the account of Zhang San. After such freezing, other parties can be prevented from operating the account balance of Zhang San, resulting in a balance of less than 500 yuan.

**[0048]** In some embodiments, the first freeze result may be obtained after the freezing, and the first freeze result may be "succeed" or "fail".

**[0049]** Step 206: Receive a first transfer transaction sent by the bridging system, where the first transfer transaction carries a second freeze result obtained by performing, by the second blockchain system when the second blockchain system determines that the first freeze result is "succeed", a freeze operation on an account corresponding to the transaction information on a blockchain of the second blockchain system, and the first freeze result is obtained through monitoring by the bridging system.

**[0050]** Step 208: Execute the first transfer transaction, so as to invoke first transfer logic in the smart contract to perform an unfreeze operation on the corresponding account on the current blockchain based on the transaction information and transfer a balance to obtain a first transfer result when it is determined that the second freeze result is "succeed".

**[0051]** In some embodiments, the bridging system may obtain the first freeze result from the first blockchain system through monitoring. For a specific monitoring method, refer to a related technology. The specific monitoring method is not specifically limited. The bridging system may generate a second freeze transaction based on the first freeze result and the to-be-processed transaction information, and then send the second freeze transaction to any blockchain node in the second blockchain system. After receiving the second freeze transaction, the blockchain node may invoke second freeze logic in the smart contract to find, when it is determined that the first freeze result is "succeed", a corresponding account on a blockchain of the blockchain node based on the transaction information carried in the second freeze transaction, and perform a freeze operation on the account to obtain a second freeze result, where the second freeze result may be

"succeed" or "fail". For details of the freeze operation, refer to the freeze operation performed by any blockchain node on the first blockchain. Details are not described herein again.

**[0052]** The bridging system may obtain the second freeze result from the second blockchain system through monitoring, generate the first transfer transaction based on the second freeze result, and then send the first transfer transaction to any blockchain node in the first blockchain system. After receiving the first transfer transaction, the blockchain node may invoke the first transfer logic in the smart contract to perform an unfreeze operation on the corresponding account on the current blockchain based on the transaction information and transfer a balance when it is determined that the second freeze result is "succeed".

**[0053]** The unfreeze operation may correspond to the freeze operation. Still using the foregoing example in which Zhang San remits 500 yuan to Li Si as an example. If the freeze operation is to freeze balances in the accounts of both Zhang San and Li Si, the unfreeze operation may be to unfreeze the balances in the two accounts. For another example, if the freeze operation is to freeze 500 yuan in only the account of Zhang San, the unfreeze operation may be to unfreeze 500 yuan in the account of Zhang San. Then, a balance transfer may be performed on the transfer-out account and the transfer-in account of the transaction amount.

**[0054]** Still using the foregoing example as an example, 500 yuan may be deducted from the account of Zhang San and 500 yuan may be transferred to the account of Li Si. After the balance transfer, the first transfer result may be obtained, and the first transfer result may be "succeed" or "fail".

**[0055]** Step 210: Receive a confirm transaction sent by the bridging system, where the confirm transaction carries a second transfer result obtained by performing an unfreeze operation on the account corresponding to the transaction information on the blockchain of the second blockchain system and transferring a balance by the second blockchain system when the second blockchain system determines that the first transfer result is "succeed", and the first transfer result is obtained through monitoring by the bridging system.

**[0056]** Step 212: Execute the confirm transaction, so as to invoke confirm logic in the smart contract to determine, when it is determined that the second transfer result is "succeed", that synchronization of the to-be-synchronized transaction information is completed.

**[0057]** In some embodiments, the bridging system may obtain the first transfer result from the first blockchain system through monitoring, generate a second transfer transaction based on the first transfer result, and then send the second transfer transaction to any blockchain node in the second blockchain system. After receiving the second transfer transaction, the blockchain node may invoke second transfer logic in the smart contract to perform an unfreeze operation on the corresponding account on the blockchain of the blockchain node based on the transaction

information, and transfer a balance to obtain a second transfer result when it is determined that the first transfer result is "succeed", where the second transfer result may be "succeed" or "fail". For specific methods of the unfreeze operation and the balance transfer, refer to the methods of the unfreeze operation and the balance transfer performed by any blockchain node on the first blockchain. Details are not described herein again.

**[0058]** The bridging system may obtain the second transfer result from the second blockchain system through monitoring, generate the confirm transaction based on the second transfer result, and then send the confirm transaction to any blockchain node in the first blockchain system. After receiving the confirm transaction, the blockchain node may invoke the confirm logic in the smart contract to determine, when determining that the second transfer result is "succeed", that synchronization of the to-be-synchronized transaction information is completed.

**[0059]** It may be learned from the foregoing description that, in some embodiments of this specification, any blockchain node on the first blockchain may receive the first freeze transaction that carries the to-be-synchronized transaction information, and execute the first freeze transaction to invoke the first freeze logic in the smart contract to freeze the corresponding account on the current blockchain based on the transaction information, to obtain the first freeze result. The bridging system may obtain the first freeze result through monitoring, generate the second freeze transaction based on the first freeze result and the to-be-synchronized transaction information, and send the second freeze transaction to the second blockchain system, so that the second blockchain system executes the second freeze transaction, so as to invoke the second freeze logic in the smart contract to freeze, when it is determined that the first freeze result is "succeed", the account corresponding to the transaction information on the blockchain of the second blockchain system to obtain the second freeze result. The bridging system may obtain the second freeze result through monitoring, generate the first transfer transaction based on the second freeze result, and send the first transfer transaction to the first blockchain system. After receiving the first transfer transaction, the first blockchain system may invoke the first transfer logic in the smart contract to unfreeze the corresponding account on the current blockchain based on the transaction information and transfer a balance to obtain the first transfer result when it is determined that the second freeze result is "succeed". The bridging system may obtain the first transfer result through monitoring, generate the second transfer transaction based on the first transfer result, and send the second transfer transaction to the second blockchain system, so that the second blockchain system executes the second transfer transaction, so as to invoke the second transfer logic in the smart contract to unfreeze the account corresponding to the transaction information on the blockchain of the second blockchain system and transfer a balance

to obtain a second transfer result when it is determined that the first transfer result is "succeed". The bridging system may obtain the second transfer result through monitoring, generate the confirm transaction based on the second transfer result, and send the confirm transaction to the first blockchain system. The first blockchain system may execute the confirm transaction, so as to invoke the confirm logic in the smart contract to determine, when it is determined that the second transfer result is "succeed", that synchronization of the to-be-synchronized transaction information is completed.

**[0060]** In the foregoing method, the first blockchain system may synchronize the to-be-synchronized transaction information based on the bridging system and the second blockchain system. The bridging system may generate corresponding transactions based on types of transactions currently executed by the first blockchain system and the second blockchain system, and promote the first blockchain system and the second blockchain system to execute a corresponding procedure by using these transactions. In the entire process, data synchronization is implemented on the blockchain, which can avoid a problem that transaction information is tampered with due to off-chain processing of transaction information. In addition, the first blockchain system and the second blockchain system each perform next-step processing after determining that the other party succeeds in execution, which can avoid a problem that transaction information that needs to be synchronized is missing and synchronization fails due to a failure of a certain party in execution, thereby greatly improving security and reliability of transaction synchronization.

**[0061]** The following describes some embodiments of another cross-blockchain transaction synchronization method provided in this specification.

**[0062]** FIG. 3 is a schematic flowchart of another cross-blockchain transaction synchronization method according to some example embodiments of this specification. The method may be applied to any blockchain node in a second blockchain system, such as the blockchain node 21 in the second blockchain system 20 in FIG. 1.

**[0063]** The method may include the following steps: Step 302: Receive a second freeze transaction sent by a bridging system, where the second freeze transaction carries to-be-synchronized transaction information and a first freeze result obtained by performing, by a first blockchain system, a freeze operation on an account corresponding to the transaction information on a blockchain of the second freeze transaction. Step 304: Execute the second freeze transaction, so as to invoke second freeze logic in a smart contract to perform, when it is determined that the first freeze result is "succeed", a freeze operation on a corresponding account on a current blockchain based on the transaction information, to obtain a second freeze result. Step 306: Receive a second transfer transaction sent by the bridging system, where the second

transfer transaction carries a first transfer result obtained by performing an unfreeze operation on the account corresponding to the transaction information on the blockchain of the first blockchain system and transferring a balance by the first blockchain system when the first blockchain system determines that the second freeze result is "succeed", and the second freeze result is obtained through monitoring by the bridging system. Step 308: Execute the second transfer transaction, so as to invoke second transfer logic in the smart contract to perform an unfreeze operation on the corresponding account on the current blockchain based on the transaction information and transfer a balance to obtain a second transfer result when it is determined that the first transfer result is "succeed", so that the first blockchain system determines, when the second transfer result is "succeed", that synchronization of the to-be-synchronized transaction information is completed.

**[0064]** The foregoing steps are described in detail below.

**[0065]** In some embodiments, any blockchain node in the second blockchain system may receive the second freeze transaction sent by the bridging system, where the second freeze transaction includes the to-be-synchronized transaction information and the first freeze result obtained by the first blockchain system by freezing the account corresponding to the transaction information on the blockchain of the first blockchain system. For a method for obtaining the first freeze result by the first blockchain, refer to the foregoing embodiment. Details are not described herein again.

**[0066]** After receiving the second freeze transaction, any blockchain node in the second blockchain system may execute the second freeze transaction, so as to invoke the second freeze logic in the smart contract to determine whether the first freeze result carried in the transaction is "freezing succeeds", and when determining that the first freeze result is "succeed", perform a freeze operation on the corresponding account on the current blockchain based on the transaction information, to obtain the second freeze result. The second freeze result may be "succeed" or "fail". For details of the freeze operation, refer to the foregoing embodiment. Details are not described herein again.

**[0067]** The bridging system may obtain the second freeze result through monitoring, generate a first transfer transaction based on the second freeze result, and send the first transfer transaction to any blockchain node on the first blockchain, so that when determining that the second freeze result is "succeed", the blockchain node performs an unfreeze operation on the account corresponding to the transaction information on the blockchain of the first blockchain, and transfer a balance to obtain the first transfer result. For a method for obtaining the first transfer result by the first blockchain, refer to the foregoing embodiment. Details are not described herein again.

**[0068]** The bridging system may obtain the first transfer result through monitoring, generate the second transfer transaction based on the first transfer result, and send the second transfer transaction to any blockchain node on the second blockchain, where the second transfer transaction includes the first transfer result.

5 **[0069]** After receiving the second transfer transaction, any blockchain node in the second blockchain system may execute the second transfer transaction, so as to invoke the second transfer logic in the smart contract to determine whether the first transfer result carried in the transaction is "freezing succeeds", and when it is that the first transfer result is "succeed", perform an unfreeze operation on the corresponding account on the current blockchain based on  
10 the transaction information, and transfer a balance to obtain the second transfer result. The second freeze result may be "succeed" or "fail". For specific methods of unfreeze operation and the balance transfer, refer to the foregoing embodiment. Details are not described herein again.

**[0070]** The bridging system may obtain the second transfer result through monitoring, generate a confirm transaction based on the first transfer result, and send the confirm transaction  
15 to any blockchain node on the first blockchain, so that the blockchain node determines, when the second transfer result is "succeed", that synchronization of the to-be-synchronized transaction information is completed. For a specific method for determining, by the first blockchain system, whether the to-be-synchronized transaction information is synchronized, refer to the foregoing embodiment. Details are not described herein again.

20 **[0071]** The second blockchain system may determine, when the second transfer result is "succeed", that synchronization of the to-be-synchronized transaction information is completed, and determine, when the transfer result "fail", that synchronization of the to-be-synchronized transaction information fails. Certainly, other methods may be adopted. This is not specially limited.

25 **[0072]** It can be learned from the foregoing description that, in some embodiments of this specification, the second blockchain system may perform transaction synchronization with the first blockchain system based on the bridging system. In the entire process, data synchronization is implemented on the blockchain, which can avoid a problem that transaction information is tampered with due to off-chain processing of transaction information. In addition, the first  
30 blockchain system and the second blockchain system each perform next-step processing after determining that the other party succeeds in execution, which can avoid a problem that transaction information that needs to be synchronized is missing and synchronization fails due to a failure of a certain party in execution, thereby greatly improving security and reliability of transaction synchronization.

35 **[0073]** The following describes some embodiments of another cross-blockchain transaction

synchronization method provided in this specification.

**[0074]** FIG. 4 is a schematic flowchart of another cross-blockchain transaction synchronization method according to some example embodiments of this specification. The method may be applied to a bridging system, such as the bridging system 30 in FIG. 1. The method may include the following steps: Step 402: Obtain, through monitoring, a first freeze result obtained by performing, by the first blockchain system, a freeze operation on an account corresponding to to-be-synchronized transaction information on a blockchain of the first blockchain system.

**[0075]** Step 404: Generate a second freeze transaction based on the to-be-synchronized transaction information and the first freeze result, and send the second freeze transaction to a second blockchain system. Step 406: Obtain a second freeze result of the second blockchain system through monitoring, where the second freeze result is obtained after the second blockchain system executes the second freeze transaction, and performs, when determining that the first freeze result is "succeed", a freeze operation on a corresponding account on a blockchain of the second blockchain system based on the transaction information. Step 408: Generate a first transfer transaction based on the second freeze result, and send the first transfer transaction to the first blockchain system. Step 410: Obtain a first transfer result of the first blockchain system through monitoring, where the first transfer result is obtained after the first blockchain system executes the first transfer transaction, and performs an unfreeze operation on the corresponding account on the blockchain of the first blockchain system based on the transaction information and transfers a balance when determining that the second freeze result is "succeed". Step 412: Generate a second transfer transaction based on the first transfer result, and send the second transfer transaction to the second blockchain system. Step 414: Obtain a second transfer result of the second blockchain system through monitoring, where the second transfer result is obtained after the second blockchain system executes the second transfer transaction, and performs an unfreeze operation on the corresponding account on the blockchain of the second blockchain system based on the transaction information and transfers a balance when determining that the first transfer result is "succeed". Step 416: Generate a confirm transaction based on the second transfer result, and sending the confirm transaction to the first blockchain system, so that the first blockchain determines, when the second transfer result is "succeed", that synchronization of the to-be-synchronized transaction information is completed.

**[0076]** The foregoing steps are described in detail below.

**[0077]** In some embodiments, the bridging system may obtain the first freeze result on the first blockchain through monitoring. The first freeze result may be obtained by the first blockchain system by freezing the account corresponding to the to-be-synchronized transaction

on the blockchain of the first blockchain system. The first freeze result may be "succeed" or "fail".

**[0078]** For method for performing by the bridging system, refer to a related technology. This is not specially limited in some embodiments.

5 **[0079]** A first freeze transaction may be generated by the bridging system and sent to the first blockchain system. To be specific, the bridging system may obtain the to-be-synchronized transaction information, generate the first freeze transaction based on the transaction information, and send the transaction to any blockchain node in the first blockchain system. Alternatively, the first freeze transaction may be sent by another party. For details, refer to the foregoing  
10 embodiment. Details are not described herein again.

**[0080]** After obtaining the first freeze result through monitoring, the bridging system may generate the second freeze transaction based on the to-be-synchronized transaction information and the first freeze result, and send the second freeze transaction to any blockchain node on the second blockchain system, so that the blockchain node executes the second freeze transaction,  
15 and when determining that the first freeze result "succeed", freezes the account corresponding to the transaction information on the blockchain of the blockchain node, to obtain the second freeze result.

**[0081]** The bridging system may obtain the second freeze result from the second blockchain through monitoring, generate the first transfer transaction based on the second freeze result, and  
20 send the first transfer transaction to the first blockchain system, so that the first blockchain system executes the first transfer transaction, and when determining that the second freeze result is "succeed", unfreezes the account corresponding to the transaction information on the blockchain of the first blockchain system, and transfers a balance to obtain the first transfer result.

25 **[0082]** The bridging system may obtain the first transfer result from the first blockchain through monitoring, generate the second transfer transaction based on the first transfer result, send the second transfer transaction to the second blockchain system, so that the second blockchain system executes the second transfer transaction, and when determining that the first freeze result is "succeed", unfreezes the account corresponding to the transaction information on  
30 the blockchain of the second blockchain system, and transfers a balance to obtain the second transfer result.

**[0083]** The bridging system may obtain the second transfer result from the second blockchain through monitoring, generate the confirm transaction based on the second transfer result, and send the confirm transaction to the first blockchain system, so that the first blockchain  
35 determines, when the second transfer result is "succeed", that synchronization of the

to-be-synchronized transaction information is completed.

**[0084]** It can be learned from the foregoing description that, in some embodiments of this specification, the second blockchain system may perform transaction synchronization with the first blockchain system based on the bridging system. In the entire process, data synchronization is implemented on the blockchain, which can avoid a problem that transaction information is tampered with due to off-chain processing of transaction information. In addition, the first blockchain system and the second blockchain system each perform next-step processing after determining that the other party succeeds in execution, which can avoid a problem that transaction information that needs to be synchronized is missing and synchronization fails due to a failure of a certain party in execution, thereby greatly improving security and reliability of transaction synchronization.

**[0085]** The following describes some embodiments of another cross-blockchain transaction synchronization method provided in this specification.

**[0086]** In some embodiments, a smart contract may be deployed. The smart contract may include different types of interfaces, and different interfaces may correspond to different logic to implement different functions. References may be made to Table 1 below:

| Smart contract |                       |                        |                         |                          |                  |
|----------------|-----------------------|------------------------|-------------------------|--------------------------|------------------|
| Interface      | start                 | prehandle              | handle                  | confirm                  | end              |
| Logic          | first freeze<br>logic | second freeze<br>logic | first transfer<br>logic | second transfer<br>logic | confirm<br>logic |

Table 1

**[0087]** As shown in the foregoing Table 1, the smart contract may include five interfaces: the start, the prehandle, the handle, the confirm, and the end, and different interfaces may correspond to different logic. For example, the start interface may correspond to the first freeze logic, the prehandle interface may correspond to the second freeze logic, the handle interface may correspond to the first transfer logic, the end interface may correspond to the second transfer logic, and the end interface may correspond to the confirm logic. Different logic may be used to implement different functions. Details are described in the following embodiments.

**[0088]** The foregoing Table 1 is merely an example for description, and is not intended to limit this specification. For example, in other embodiments, a corresponding smart contract may be generated for each type of logic, that is, five smart contracts may be generated. This is not specifically limited.

**[0089]** In addition, in some embodiments, the first blockchain system and the second blockchain system may further have their respective public and private key pairs, and the public and private key pairs may be applied for from an authentication authority. For details, refer to a

related technology. In some embodiments, the first blockchain system and the second blockchain system may verify received data by using the public and private keys, to verify whether the data is tampered with, thereby improving security of transaction synchronization between the two. Details are described in the following embodiments. Blockchain systems may exchange a public key with each other in advance, or may carry the public key in a transaction execution result, so that the bridging system transfers the public key to a corresponding blockchain system. This is not specially limited.

**[0090]** Certainly, in addition to the foregoing verification method based on public and private keys, another method may be used to verify whether information is tampered with. For example, symmetric keys may be used for verification. This is not specifically limited in this specification.

**[0091]** FIG. 5 is a schematic diagram of multi-party interaction in a cross-blockchain transaction synchronization method according to some example embodiments of this specification.

**[0092]** The method may include the following steps: Step 502: A bridging system generates a first freeze transaction.

**[0093]** In some embodiments, the bridging system may obtain to-be-synchronized transaction information, and then generate the first freeze transaction, where the first freeze transaction includes the to-be-synchronized transaction information.

**[0094]** Step 504: The bridging system sends the first freeze transaction to a first blockchain system.

**[0095]** Step 506: The first blockchain system executes the first freeze transaction to obtain a first freeze result.

**[0096]** In some embodiments, the bridging system may send the first freeze transaction to any blockchain node on the first blockchain, and the first freeze transaction may be used to invoke a start interface in a smart contract. After receiving the first freeze transaction, the blockchain node may determine, based on the start interface, to invoke first freeze logic in the smart contract, and freeze a corresponding account on a current blockchain based on the transaction information to obtain the first freeze result. The first freeze result may be "succeed" or "fail".

**[0097]** Step 508: The bridging system obtains the first freeze result through monitoring.

**[0098]** Step 510: The bridging system generates a second freeze transaction.

**[0099]** Step 512: The bridging system sends the second freeze transaction to a second blockchain system.

**[0100]** In some embodiments, the bridging system may obtain the first freeze result from the

first blockchain through monitoring, and the first freeze result may be encrypted by using a private key of the first blockchain. For example, the first freeze result may be obtained from a world state through monitoring, and all results obtained after the blockchain system subsequently executes transactions may be obtained from the world state through monitoring. For a specific monitoring method, refer to a related technology. Details are not described in some embodiments.

**[0101]** In addition, the bridging system may further hold an invoking sequence of interfaces. For example, the invoking sequence may be: the start, the prehandle, the handle, the confirm, and the end. After obtaining the first freeze result through monitoring, the bridging system may further learn, through monitoring, that the first freeze result is obtained by invoking the start interface. In this case, the bridging system may determine, based on the foregoing sequence, that a next interface that needs to be invoked is the prehandle. Therefore, the bridging system may generate the second freeze transaction, where the second freeze transaction may include the first freeze result and the to-be-synchronized transaction information, and the information may be encrypted by using the private key of the first blockchain. Then, the bridging system may send the second freeze transaction to any blockchain node on the second blockchain, and the second freeze transaction is used to invoke the prehandle interface in the smart contract.

**[0102]** Step 514: The second blockchain system executes the second freeze transaction to obtain a second freeze result.

**[0103]** In some embodiments, after receiving the second freeze transaction, any blockchain node in the second blockchain system may determine, based on the prehandle interface, to invoke second freeze logic in the smart contract. The second freeze logic may determine whether the first freeze result is "succeed" and verify whether the first freeze result is tampered with (for example, data encrypted by using a private key carried in the transaction is decrypted based on the public key of the first blockchain system and is verified, and if the verification succeeds, it indicates that the first freeze result is not tampered with), and freeze the account corresponding to the transaction information on the current blockchain when the first freeze result is "succeed" and the first freeze result is not tampered with, to obtain the second freeze result.

**[0104]** If the first freeze result is "fail" and/or the second freeze result is tampered with, the second blockchain system may not freeze the account corresponding to the blockchain of the second blockchain system, and may further end the current synchronization or re-initiate synchronization. In addition, the second freeze result "freezing fails" may be further obtained. In this case, after the bridging system subsequently provides the result to the first blockchain system, the first blockchain system may learn that the second blockchain system fails to execute the freeze operation, and end the current synchronization or re-initiate synchronization.

**[0105]** Step 516: The bridging system obtains the second freeze result through monitoring.

**[0106]** Step 518: The bridging system generates a first transfer transaction.

**[0107]** Step 520: The bridging system sends the first transfer transaction to the first blockchain system.

5 **[0108]** In some embodiments, the bridging system may obtain the second freeze result from the second blockchain, and the second freeze result may be encrypted by using a private key of the second blockchain system. In addition, if the bridging system may further obtain through monitoring that the second freeze result is obtained by invoking the prehandle interface. In this case, the bridging system may determine, based on the foregoing sequence, that a next interface  
10 that needs to be invoked is the handle. The bridging system may generate the first transfer transaction, where the first transfer transaction may include the second freeze result encrypted based on the private key of the second blockchain. Then, the bridging system may send the first transfer transaction to any blockchain node in the first blockchain system, the first transfer transaction is used to invoke the handle interface in the smart contract.

15 **[0109]** Step 522: The first blockchain system executes the first transfer transaction to obtain a first transfer result.

**[0110]** In some embodiments, after receiving the first transfer transaction, any blockchain node in the first blockchain system may determine, based on the handle interface, to invoke first transfer logic in the smart contract. The first transfer logic may determine whether the second  
20 freeze result is "succeed" and verify whether the second freeze result is tampered with, and when the second freeze result is "succeed" and the second freeze result is not tampered with, unfreeze the account corresponding to the transaction information on the current blockchain, and transfers a balance to obtain the first transfer result.

**[0111]** Similarly, if the second freeze result is "fail" and/or the second freeze result is  
25 tampered with, the first blockchain system may not unfreeze the corresponding account on the blockchain of the first blockchain system or transfer a balance, end the current synchronization or re-initiate synchronization. In addition, the first transfer result "transfer fails" may alternatively be obtained. In this case, after the bridging system subsequently provides the result to the second blockchain system, the second blockchain system may learn that the first  
30 blockchain system fails to transfer a balance, and end the current synchronization or re-initiate synchronization.

**[0112]** In some embodiments, after the first blockchain system executes the first freeze logic, the first freeze logic may further determine whether the first transfer transaction sent by the bridging system is received in first preset duration. If no, a rollback operation may be performed,  
35 for example, unfreezing the account, and the current synchronization can be ended or

synchronization is re-initiated. The first preset duration may be preset. For example, the first preset duration may be preset based on a block generation frequency on the blockchain. Assuming that the block generation frequency on the blockchain is approximately once in three seconds, the first preset duration may be generating 20 blocks, that is, one minute.

5   **[0113]**     Step 524: The bridging system obtains the first transfer result through monitoring.

**[0114]**     Step 526: The bridging system generates a second transfer transaction.

**[0115]**     Step 528: The bridging system sends the second transfer transaction to the second blockchain system.

**[0116]**     In some embodiments, the bridging system may obtain the first transfer result from  
10   the first blockchain through monitoring, and the first transfer result may be encrypted by the  
private key of the first blockchain system. In addition, the bridging system may further obtain  
through monitoring that the first transfer result is obtained by invoking the handle interface. In  
this case, the bridging system may determine, based on the foregoing sequence, that a next  
interface that needs to be invoked is the confirm. The bridging system may generate the second  
15   transfer transaction, where the second transfer transaction may include the first transfer result  
encrypted based on the private key of the first blockchain. Then, the bridging system may send  
the second transfer transaction to any blockchain node in the second blockchain system, and the  
second transfer transaction is used to invoke the confirm interface in the smart contract.

**[0117]**     Step 530: The first blockchain system executes the second transfer transaction to  
20   obtain a second transfer result.

**[0118]**     In some embodiments, after receiving the second transfer transaction, any blockchain  
node in the second blockchain system may determine, based on the confirm interface, to invoke  
second transfer logic in the smart contract. The second transfer logic may determine whether the  
first transfer result is "succeed" and verify whether the first transfer result is tampered with, and  
25   when the first transfer result is "succeed" and the first transfer result is not tampered with,  
unfreeze the account corresponding to the transaction information on the current blockchain, and  
transfer a balance to obtain the second transfer result.

**[0119]**     Similarly, if the first transfer result is "fail" and/or the first transfer result is tampered  
with, the second blockchain system may not unfreeze the corresponding account on the  
30   blockchain of the second blockchain system or transfer a balance, and end the current  
synchronization or re-initiate synchronization. In addition, the second transfer result "transfer  
fails" may alternatively be obtained. In this case, after the bridging system subsequently provides  
the result to the first blockchain system, the first blockchain system may learn that the second  
blockchain system fails to transfer a balance, and end the current synchronization or re-initiate  
35   synchronization.

**[0120]** In some embodiments, after the second blockchain system executes the second freeze logic, the second freeze logic may further determine whether the second transfer transaction sent by the bridging system is received in third preset duration. If no, a rollback operation may be performed, for example, unfreezing the account, and the current synchronization can be ended or synchronization is re-initiated. The third preset duration may also be preset. For details, refer to the foregoing embodiment.

**[0121]** Step 532: The bridging system obtains the second transfer result through monitoring.

**[0122]** Step 524: The bridging system generates a confirm transaction.

**[0123]** Step 526: The bridging system sends the confirm transaction to the first blockchain system.

**[0124]** In some embodiments, the bridging system may obtain the second transfer result from the second blockchain through monitoring, and the second transfer result may be encrypted by using the private key of the second blockchain system. In addition, if the bridging system may further obtain through monitoring that the second transfer result is obtained by invoking the confirm interface. In this case, the bridging system may determine, based on the foregoing sequence, that the next interface that needs to be invoked is the end. The bridging system may generate the confirm transaction, and the confirm transaction may include the second transfer result encrypted based on the private key of the second blockchain. Then, the bridging system may send the confirm transaction to any blockchain node in the first blockchain system, and the confirm transaction is used to invoke the end interface in the smart contract.

**[0125]** Step 528: The first blockchain system executes the confirm transaction.

**[0126]** In some embodiments, after receiving the confirm transaction, any blockchain node in the first blockchain system may determine, based on the end interface, to invoke confirm logic in the smart contract. The confirm logic may determine whether the second transfer result is "succeed" and verify whether the second transfer result is tampered with, and when the second transfer result is "succeed" and the second transfer result is not tampered with, determine that synchronization of the to-be-synchronized transaction information is completed.

**[0127]** Similarly, if the second transfer result "fail" and/or the second transfer result is tampered with, the first blockchain system may determine that the to-be-synchronized transaction information is not successfully synchronized, and may end the current synchronization or re-initiate synchronization. In addition, after the bridging system provides the message to the second blockchain system, the second blockchain learns the message, and then may end the current synchronization procedure or re-initiate synchronization.

**[0128]** It may be learned from the foregoing description that, in some embodiments of this specification, the first blockchain system and the second blockchain system may further have

their respective public and private key pairs, verify received information based on the public and private key pairs to verify whether the information is tampered with, and perform subsequent processing when the information is not tampered with, thereby improving security of information synchronization.

5     **[0129]**     In addition, after executing the first freeze transaction, the first blockchain system may further determine whether the first transfer transaction is received in preset duration, and if no, may perform a rollback operation, that is, unfreezing a corresponding account. Similarly, after the first blockchain system executes the first transfer transaction, if the confirm transaction is not received in preset duration, the first blockchain system may perform a rollback operation

10    After the second blockchain system executes the second freeze transaction, if the second transfer transaction is not received in preset duration, the second blockchain system may perform a rollback operation. The foregoing method can be used to avoid missing or loss of transaction information in a synchronization process, thereby improving reliability of transaction synchronization.

15    **[0130]**     Certainly, if the first blockchain receives, after the preset duration, the confirm transaction sent by the bridging system, the first blockchain system has performed the rollback operation. In this case, a balance in the account corresponding to the transaction information is a balance remained before the transfer, and the bridging system may continue to monitor an execution result in the first blockchain system. In addition, when learning, through monitoring,

20    that an account balance changes to an initial value due to the rollback operation of the first blockchain system, the bridging system may send the result obtained through monitoring to the second blockchain system, so that the second blockchain system also performs a rollback operation to ensure data synchronization between the two parties.

**[0131]**     In other embodiments of this specification, a plurality of bridging systems may exist.

25    Each bridging system may monitor results of executing transactions by the first blockchain system and the second blockchain system, generate a corresponding transaction based on the result, and send the corresponding transaction to a corresponding blockchain system, and may carry a bridging system identifier of the bridging system, so that the blockchain system determines, based on the identifier, the bridging system from which the transaction is sent.

30    **[0132]**     In addition, after verifying that information carried in the transaction is not tampered with, the blockchain system may further send a reward to the bridging system that sends the transaction. For example, when the first blockchain receives the first transfer transaction sent by a bridging system and executes the first transfer transaction, if the second freeze result carried in the transaction is not tampered with, when transferring a balance, the first transfer logic may

35    deduct a reward amount from a specified account in the account corresponding to the transaction

information and transfer the reward amount to a corresponding account of the bridging system. The reward amount may be preset, for example, may be 0.1% of a transaction amount. The specified account may be, for example, a transfer-out account corresponding to a transaction amount.

5   **[0133]**     For example, if the transaction information is that Zhang San remits 500 yuan to Li Si, the reward amount may be  $500 \times 0.1\% = 0.5$  yuan. Therefore, during a balance transfer, 500.5 yuan may be deducted from an account of Zhang San, 500 yuan may be transferred to an account of Li Si, and 0.5 yuan may be transferred to the account of the bridging system.

10   **[0134]**     For another example, the specified account may be a transfer-out account corresponding to a transaction amount. For example, the transaction information is that Zhang San remits 500 yuan to Li Si, where the reward amount is 0.5 yuan. During a balance transfer, 500 yuan may be deducted from an account of Zhang San, 499.5 yuan may be transferred to an account of Li Si, and 0.5 yuan may be transferred to the account of the bridging system.

15   **[0135]**     Certainly, the foregoing examples are merely examples for description. In actual application, other balance transfer methods may also be used. For example, the specified account may be both a transfer-out account and a transfer-in account. Examples are not listed one by one herein.

20   **[0136]**     Similarly, when the second blockchain system receives the second transfer transaction sent by a bridging system and executes the second transfer transaction, if the first transfer result carried in the transaction is not tampered with, the second transfer logic may deduct a reward amount from a specified account in the account corresponding to the transaction information and transfer the reward amount to a corresponding account of the bridging system. The reward amount is the same as the reward amount transferred when the first blockchain system transfers a balance.

25   **[0137]**     For another example, when the first blockchain system receives the confirm transaction sent by a bridging system and executes the confirm transaction, if the second transfer result carried in the transaction is not tampered with, the confirm logic may also deduct a reward amount from a specified account in the account corresponding to the transaction information and transfer the reward amount to a corresponding account of the bridging system. There may be a plurality of specific implementation methods, which are not described one by one herein in some embodiments.

30   **[0138]**     Similarly, when the second blockchain system receives the second freeze transaction sent by a bridging system and executes the second freeze transaction, if the first freeze result carried in the transaction is not tampered with, the second freeze logic may also deduct a reward amount from a specified account in the account corresponding to the transaction information and

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transfer the reward amount to a corresponding account of the bridging system. There may be a plurality of specific implementation methods, which are not described one by one herein in some embodiments.

**[0139]** In the foregoing method, a plurality of bridging systems may contend with each other to monitor an execution result of a related transaction on a blockchain node, generate a corresponding transaction, and send the corresponding transaction to a corresponding blockchain system. If the blockchain system verifies that information in the transaction is not tampered with, based on a reward for the bridging system, the bridging system is enabled to transfer information between the first blockchain system and the second blockchain system, so as to improve information synchronization efficiency, and prevent, to some extent, the bridging system from maliciously tampering with related information in a transaction process, thereby improving security and reliability of transaction synchronization.

**[0140]** Corresponding to the foregoing embodiments of the cross-blockchain transaction synchronization method, this specification further provides embodiments of a cross-blockchain transaction synchronization apparatus.

**[0141]** The embodiments of the cross-blockchain transaction synchronization apparatus in this specification may be applied to a server. The apparatus embodiments may be implemented by software, or may be implemented by hardware or a combination of software and hardware. Software implementation is used as an example. As a logical apparatus, the apparatus is formed by reading a corresponding computer program instruction in a non-volatile memory to a memory by a processor of an electronic device where the apparatus is located. In terms of hardware, FIG. 6 is a diagram of a hardware structure of an electronic device in which the cross-blockchain transaction synchronization apparatus is located in the this specification. In addition to a processor, a memory, a network interface, and a non-volatile memory shown in FIG. 6, the electronic device in which the apparatus is located in the embodiments can usually include other hardware based on an actual function of the electronic device. Details are omitted here.

**[0142]** FIG. 7 is a block diagram of a cross-blockchain transaction synchronization apparatus according to some example embodiments of this specification. Referring to FIG. 7, the cross-blockchain transaction synchronization apparatus 700 may be applied to the electronic device shown in FIG. 6 and include: a first freeze transaction receiving unit 710, a first freeze transaction execution unit 720, a first transfer transaction receiving unit 730, a first transfer transaction execution unit 740, a confirm transaction receiving unit 750, and a confirm transaction execution unit 760.

**[0143]** The first freeze transaction receiving unit 710 receives a first freeze transaction, where the first freeze transaction carries to-be-synchronized transaction information. The first

freeze transaction execution unit 720 executes the first freeze transaction, so as to invoke first freeze logic in a smart contract to perform a freeze operation on a corresponding account on a current blockchain based on the transaction information, to obtain a first freeze result. The first transfer transaction receiving unit 730 receives a first transfer transaction sent by a bridging system, where the first transfer transaction carries a second freeze result obtained by performing, by a second blockchain system when the second blockchain system determines that the first freeze result is "succeed", a freeze operation on an account corresponding to the transaction information on a blockchain of the second blockchain system, and the first freeze result is obtained through monitoring by the bridging system. The first transfer transaction execution unit 740 executes the first transfer transaction, so as to invoke first transfer logic in the smart contract to perform an unfreeze operation on the corresponding account on the current blockchain based on the transaction information and transfer a balance to obtain a first transfer result when it is determined that the second freeze result is "succeed". The confirm transaction receiving unit 750 receives a confirm transaction sent by the bridging system, where the confirm transaction carries a second transfer result obtained by performing an unfreeze operation on the account corresponding to the transaction information on the blockchain of the second blockchain system and transferring a balance by the second blockchain system when the second blockchain system determines that the first transfer result is "succeed", and the first transfer result is obtained through monitoring by the bridging system. The confirm transaction execution unit 760 executes the confirm transaction, so as to invoke confirm logic in the smart contract to determine, when it is determined that the second transfer result is "succeed", that synchronization of the to-be-synchronized transaction information is completed.

**[0144]** Optionally, the first transfer logic is further configured to verify whether the second freeze result is tampered with, so as to perform an unfreeze operation on the corresponding account on the current blockchain based on the transaction information and transfer a balance when the second freeze result is not tampered with and the second freeze result is "succeed".

**[0145]** Optionally, if the second freeze result is not tampered with, when performing an unfreeze operation on the corresponding account on the current blockchain based on the transaction information and transferring a balance, the first transfer transaction execution unit 740 unfreezes an account corresponding to the transaction information; and transfers a balance between an account corresponding to the bridging system and the account corresponding to the transaction information, so as to deduct a reward amount from a specified account in the account corresponding to the transaction information, and transfer the reward amount to the account corresponding to the bridging system.

**[0146]** Optionally, the confirm logic is further configured to verify whether the second

transfer result is tampered with, so as to determine, when the second transfer result is not tampered with and the second transfer result is "succeed", that synchronization of the to-be-synchronized transaction information is completed.

[0147] Optionally, the confirm logic is further configured to verify whether the second transfer result is tampered with, so as to determine, when the second transfer result is not tampered with and the second transfer result is "succeed", that synchronization of the to-be-synchronized transaction information is completed.

[0148] Optionally, the first freeze logic is further configured to: after performing a freeze operation on the corresponding account on the current blockchain based on the transaction information, determine whether the first transfer transaction sent by the bridging system is received in first preset duration; and if no, perform an unfreeze operation on the account.

[0149] Optionally, the first transfer logic is further configured to: after performing an unfreeze operation on the corresponding account on the current blockchain based on the transaction information and transferring a balance, determine whether the confirm transaction sent by the bridging system is received in second preset duration; and if no, cancel the transfer of the account balance.

[0150] Optionally, the first freeze transaction is generated based on the to-be-synchronized transaction information and sent to a first blockchain system after the bridging system obtains the to-be-synchronized transaction information.

[0151] Optionally, the transaction information includes a transaction amount and a corresponding transfer-out account and transfer-in account, and that the first freeze transaction execution unit 720 performs a freeze operation on a corresponding account on a current blockchain based on the transaction information includes: freezing the transaction amount in the transfer-out account on the current blockchain.

[0152] FIG. 8 is a block diagram of a cross-blockchain transaction synchronization apparatus according to some example embodiments of this specification.

[0153] Referring to FIG. 8, the cross-blockchain transaction synchronization apparatus 800 may be applied to the electronic device shown in FIG. 6, and includes a second freeze transaction receiving unit 810, a second freeze transaction execution unit 820, a second transfer transaction receiving unit 830, and a second transfer transaction execution unit 840.

[0154] The second freeze transaction receiving unit 810 receives a second freeze transaction sent by a bridging system, where the second freeze transaction carries to-be-synchronized transaction information and a first freeze result obtained by performing, by a first blockchain system, a freeze operation on an account corresponding to the transaction information on a blockchain of the first blockchain system. The second freeze transaction execution unit 820

executes the second freeze transaction, so as to invoke second freeze logic in a smart contract to perform, when it is determined that the first freeze result is "succeed", a freeze operation on a corresponding account on a current blockchain based on the transaction information, to obtain a second freeze result. The second transfer transaction receiving unit 830 receives a second transfer transaction sent by the bridging system, where the second transfer transaction carries a first transfer result obtained by performing an unfreeze operation on the account corresponding to the transaction information on the blockchain of the first blockchain system and transferring a balance by the first blockchain system when the first blockchain system determines that the second freeze result is "succeed", and the second freeze result is obtained through monitoring by the bridging system. The second transfer transaction execution unit 840 executes the second transfer transaction, so as to invoke second transfer logic in the smart contract to perform an unfreeze operation on the corresponding account on the current blockchain based on the transaction information and transfer a balance to obtain a second transfer result when it is determined that the first transfer result is "succeed", so that the first blockchain system determines, when the second transfer result is "succeed", that synchronization of the to-be-synchronized transaction information is completed.

**[0155]** Optionally, the second freeze logic is further configured to verify whether the first freeze result is tampered with, so as to perform a freeze operation on the corresponding account on the current blockchain based on the transaction information when the first freeze result is not tampered with and the first freeze result is "succeed".

**[0156]** Optionally, the second transfer logic is further configured to verify whether the first transfer result is tampered with, so as to perform an unfreeze operation on the corresponding account on the current blockchain based on the transaction information and transfer a balance when the first transfer result is not tampered with and the first transfer result is "succeed".

**[0157]** Optionally, if the first transfer result is not tampered with, when performing an unfreeze operation on the corresponding account on the current blockchain based on the transaction information and transferring a balance, the second transfer transaction execution unit 840 unfreezes an account corresponding to the transaction information; and transfers a balance between an account corresponding to the bridging system and the account corresponding to the transaction information, so as to deduct a reward amount from a specified account in the account corresponding to the transaction information, and transfer the reward amount to the account corresponding to the bridging system.

**[0158]** Optionally, the second freeze logic is further configured to: after performing a freeze operation on the corresponding account on the current blockchain based on the transaction information, determine whether the second transfer transaction sent by the bridging system is

received in third preset duration; and if no, perform an unfreeze operation on the account.

**[0159]** Optionally, the transaction information includes a transaction amount and a corresponding transfer-out account and transfer-in account. When performing a freeze operation on a corresponding account on a current blockchain based on the transaction information, the second freeze transaction execution unit 820 freezes the transaction amount in the transfer-out account on the current blockchain.

**[0160]** FIG. 9 is a block diagram of a cross-blockchain transaction synchronization apparatus according to some example embodiments of this specification. Referring to FIG. 9, the cross-blockchain transaction synchronization apparatus 900 may be applied to the electronic device shown in FIG. 6, and includes: a first freeze transaction sending unit 910, a first freeze result monitoring unit 920, a second freeze transaction sending unit 930, a second freeze result monitoring unit 940, a first transfer transaction sending unit 950, a first transfer result monitoring unit 960, a second transfer transaction sending unit 970, a second transfer result monitoring unit 980, and a confirm transaction sending unit 990.

**[0161]** The first freeze result monitoring unit 920 obtains, through monitoring, a first freeze result obtained by performing, by a first blockchain system, a freeze operation on an account corresponding to to-be-synchronized transaction information on a blockchain of the first blockchain system. The second freeze transaction sending unit 930 generates a second freeze transaction based on the to-be-synchronized transaction information and the first freeze result, and sends the second freeze transaction to a second blockchain system. The second freeze result monitoring unit 940 obtains a second freeze result of the second blockchain system through monitoring, where the second freeze result is obtained after the second blockchain system executes the second freeze transaction, and performs, when determining that the first freeze result is "succeed", a freeze operation on a corresponding account on a blockchain of the second blockchain system based on the transaction information. The first transfer transaction sending unit 950 generates a first transfer transaction based on the second freeze result, and sends the first transfer transaction to the first blockchain system. The first transfer result monitoring unit 960 obtains a first transfer result of the first blockchain system through monitoring, where the first transfer result is obtained after the first blockchain system executes the first transfer transaction, and performs an unfreeze operation on the corresponding account on the blockchain of the first blockchain system based on the transaction information and transfers a balance when determining that the second freeze result is "succeed". The second transfer transaction sending unit 970 generates a second transfer transaction based on the first transfer result, and sends the second transfer transaction to the second blockchain system. The second transfer result monitoring unit 980 obtains a second transfer result of the second blockchain system through

monitoring, where the second transfer result is obtained after the second blockchain system executes the second transfer transaction, and performs an unfreeze operation on the corresponding account on the blockchain of the second blockchain system based on the transaction information and transfers a balance when determining that the first transfer result is "succeed". The confirm transaction sending unit 990 generates a confirm transaction based on the second transfer result, and sends the confirm transaction to the first blockchain system, so that the first blockchain determines, when the second transfer result is "succeed", that synchronization of the to-be-synchronized transaction information is completed.

**[0162]** Optionally, a first freeze transaction sending unit 910 is further included, which obtains the to-be-synchronized transaction information; generates a first freeze transaction, where the first freeze transaction carries the transaction information; and sends the first freeze transaction to the first blockchain system.

**[0163]** For an implementation process of functions and roles of each unit in the apparatus, refer to an implementation process of corresponding steps in the foregoing method. Details are not described herein again.

**[0164]** Because an apparatus embodiment corresponds to a method embodiment, for related parts, references can be made to related descriptions in the method embodiment. The apparatus embodiments described above are merely examples. The units described as separate parts may or may not be physically separate, and parts displayed as units may or may not be physical units, that is, may be located in one position, or may be distributed on a plurality of network units. Some or all of the modules may be selected based on actual requirements to achieve the objectives of the solutions in this specification. A person of ordinary skill in the art can understand and implement the embodiments without creative efforts.

**[0165]** The system, apparatus, module, or unit illustrated in the foregoing embodiments can be implemented by using a computer chip or an entity, or can be implemented by using a product having a certain function. A typical implementation device is a computer, and a specific form of the computer may be a personal computer, a laptop computer, a cellular phone, a camera phone, a smartphone, a personal digital assistant, a media player, a navigation device, an e-mail transceiver device, a game console, a tablet computer, a wearable device, or any combination of several devices in these devices.

**[0166]** Corresponding to the foregoing embodiments of the cross-blockchain transaction synchronization method, this specification further provides embodiments of a cross-blockchain transaction synchronization apparatus. The apparatus includes a processor and a memory configured to store machine-executable instructions. The processor and the memory are generally connected to each other by using an internal bus. In another possible implementation,

the device may further include an external interface capable of communicating with another device or component.

**[0167]** In some embodiments, the processor reads and executes the machine-executable instructions stored in the memory that correspond to cross-blockchain transaction synchronization logic to: receive a first freeze transaction, where the first freeze transaction carries to-be-synchronized transaction information; execute the first freeze transaction, so as to invoke first freeze logic in a smart contract to perform a freeze operation on a corresponding account on a current blockchain based on the transaction information, to obtain a first freeze result; receive a first transfer transaction sent by a bridging system, where the first transfer transaction carries a second freeze result obtained by performing, by a second blockchain system when the second blockchain system determines that the first freeze result is "succeed", a freeze operation on an account corresponding to the transaction information on a blockchain of the second blockchain system, and the first freeze result is obtained through monitoring by the bridging system; execute the first transfer transaction, so as to invoke first transfer logic in the smart contract to perform an unfreeze operation on the corresponding account on the current blockchain based on the transaction information and transfer a balance to obtain a first transfer result when it is determined that the second freeze result is "succeed"; receive a confirm transaction sent by the bridging system, where the confirm transaction carries a second transfer result obtained by performing an unfreeze operation on the account corresponding to the transaction information on the blockchain of the second blockchain system and transferring a balance by the second blockchain system when the second blockchain system determines that the first transfer result is "succeed", and the first transfer result is obtained through monitoring by the bridging system; and execute the confirm transaction, so as to invoke confirm logic in the smart contract to determine, when it is determined that the second transfer result is "succeed", that synchronization of the to-be-synchronized transaction information is completed.

**[0168]** Optionally, the first transfer logic is further configured to verify whether the second freeze result is tampered with, so as to perform an unfreeze operation on the corresponding account on the current blockchain based on the transaction information and transfer a balance when the second freeze result is not tampered with and the second freeze result is "succeed".

**[0169]** Optionally, if the second freeze result is not tampered with, when performing an unfreeze operation on the corresponding account on the current blockchain based on the transaction information and transferring a balance, the processor is enabled to: unfreeze an account corresponding to the transaction information; and transfer a balance between an account corresponding to the bridging system and the account corresponding to the transaction information, so as to deduct a reward amount from a specified account in the account

corresponding to the transaction information, and transfer the reward amount to the account corresponding to the bridging system.

[0170] Optionally, the confirm logic is further configured to verify whether the second transfer result is tampered with, so as to determine, when the second transfer result is not tampered with and the second transfer result is "succeed", that synchronization of the to-be-synchronized transaction information is completed.

[0171] Optionally, the first freeze logic is further configured to: after performing a freeze operation on the corresponding account on the current blockchain based on the transaction information, determine whether the first transfer transaction sent by the bridging system is received in first preset duration; and if no, perform an unfreeze operation on the account.

[0172] Optionally, the first transfer logic is further configured to: after performing an unfreeze operation on the corresponding account on the current blockchain based on the transaction information and transferring a balance, determine whether the confirm transaction sent by the bridging system is received in second preset duration; and if no, cancel the transfer of the account balance.

[0173] Optionally, the first freeze transaction is generated based on the to-be-synchronized transaction information and sent to a first blockchain system after the bridging system obtains the to-be-synchronized transaction information.

[0174] Optionally, the transaction information includes a transaction amount and a corresponding transfer-out account and transfer-in account, and the performing a freeze operation on a corresponding account on a current blockchain based on the transaction information includes: freezing the transaction amount in the transfer-out account on the current blockchain.

[0175] Corresponding to the foregoing embodiments of the cross-blockchain transaction synchronization method, this specification further provides embodiments of a cross-blockchain transaction synchronization apparatus. The apparatus includes a processor and a memory configured to store machine-executable instructions. The processor and the memory are generally connected to each other by using an internal bus. In another possible implementation, the device may further include an external interface capable of communicating with another device or component.

[0176] In some embodiments, the processor reads and executes the machine-executable instructions stored in the memory that correspond to cross-blockchain transaction synchronization logic to: receive a second freeze transaction sent by a bridging system, where the second freeze transaction carries to-be-synchronized transaction information and a first freeze result obtained by performing, by a first blockchain system, a freeze operation on an

account corresponding to the transaction information on a blockchain of the first blockchain system; execute the second freeze transaction, so as to invoke second freeze logic in a smart contract to perform, when it is determined that the first freeze result is "succeed", a freeze operation on a corresponding account on a current blockchain based on the transaction information, to obtain a second freeze result; receive a second transfer transaction sent by the bridging system, where the second transfer transaction carries a first transfer result obtained by performing an unfreeze operation on the account corresponding to the transaction information on the blockchain of the first blockchain system and transferring a balance by the first blockchain system when the first blockchain system determines that the second freeze result is "succeed", and the second freeze result is obtained through monitoring by the bridging system; and execute the second transfer transaction, so as to invoke second transfer logic in the smart contract to perform an unfreeze operation on the corresponding account on the current blockchain based on the transaction information and transfer a balance to obtain a second transfer result when it is determined that the first transfer result is "succeed", so that the first blockchain system determines, when the second transfer result is "succeed", that synchronization of the to-be-synchronized transaction information is completed.

**[0177]** Optionally, the second freeze logic is further configured to verify whether the first freeze result is tampered with, so as to perform a freeze operation on the corresponding account on the current blockchain based on the transaction information when the first freeze result is not tampered with and the first freeze result is "succeed".

**[0178]** Optionally, the second transfer logic is further configured to verify whether the first transfer result is tampered with, so as to perform an unfreeze operation on the corresponding account on the current blockchain based on the transaction information and transfer a balance when the first transfer result is not tampered with and the first transfer result is "succeed".

**[0179]** Optionally, if the first transfer result is not tampered with, when performing an unfreeze operation on the corresponding account on the current blockchain based on the transaction information and transferring a balance, the processor is enabled to: unfreeze an account corresponding to the transaction information; and transfer a balance between an account corresponding to the bridging system and the account corresponding to the transaction information, so as to deduct a reward amount from a specified account in the account corresponding to the transaction information, and transfer the reward amount to the account corresponding to the bridging system.

**[0180]** Optionally, the second freeze logic is further configured to: after performing a freeze operation on the corresponding account on the current blockchain based on the transaction information, determine whether the second transfer transaction sent by the bridging system is

received in third preset duration; and if no, perform an unfreeze operation on the account.

**[0181]** Optionally, the transaction information includes a transaction amount and a corresponding transfer-out account and transfer-in account, and when performing a freeze operation on a corresponding account on a current blockchain based on the transaction information, the processor is enabled to freeze the transaction amount in the transfer-out account on the current blockchain.

**[0182]** Corresponding to the foregoing embodiments of the cross-blockchain transaction synchronization method, this specification further provides embodiments of a cross-blockchain transaction synchronization apparatus. The apparatus includes a processor and a memory configured to store machine-executable instructions. The processor and the memory are generally connected to each other by using an internal bus. In another possible implementation, the device may further include an external interface capable of communicating with another device or component.

**[0183]** In some embodiments, the processor reads and executes the machine-executable instructions stored in the memory that correspond to cross-blockchain transaction synchronization logic to: obtain, through monitoring, a first freeze result obtained by performing, by a first blockchain system, a freeze operation on an account corresponding to to-be-synchronized transaction information on a blockchain of the first blockchain system; generate a second freeze transaction based on the to-be-synchronized transaction information and the first freeze result, and send the second freeze transaction to a second blockchain system; obtain a second freeze result of the second blockchain system through monitoring, where the second freeze result is obtained after the second blockchain system executes the second freeze transaction, and performs, when determining that the first freeze result is "succeed", a freeze operation on a corresponding account on a blockchain of the second blockchain system based on the transaction information; generate a first transfer transaction based on the second freeze result, and send the first transfer transaction to the first blockchain system; obtain a first transfer result of the first blockchain system through monitoring, where the first transfer result is obtained after the first blockchain system executes the first transfer transaction, and performs an unfreeze operation on the corresponding account on the blockchain of the first blockchain system based on the transaction information and transfers a balance when determining that the second freeze result is "succeed"; generate a second transfer transaction based on the first transfer result, and send the second transfer transaction to the second blockchain system; obtain a second transfer result of the second blockchain system through monitoring, where the second transfer result is obtained after the second blockchain system executes the second transfer transaction, and performs an unfreeze operation on the corresponding account on the blockchain of the second

blockchain system based on the transaction information and transfers a balance when determining that the first transfer result is "succeed"; and generate a confirm transaction based on the second transfer result, and send the confirm transaction to the first blockchain system, so that the first blockchain determines, when the second transfer result is "succeed", that synchronization of the to-be-synchronized transaction information is completed.

**[0184]** Optionally, the processor is further enabled to: obtain the to-be-synchronized transaction information; generate a first freeze transaction, where the first freeze transaction carries the transaction information; and send the first freeze transaction to the first blockchain system.

**[0185]** Corresponding to the foregoing embodiments of the cross-blockchain transaction synchronization method, this specification further provides a computer-readable storage medium. The computer-readable storage medium stores a computer program. When the program is executed by a processor, the following steps are implemented: receiving a first freeze transaction, where the first freeze transaction carries to-be-synchronized transaction information; executing the first freeze transaction, so as to invoke first freeze logic in a smart contract to perform a freeze operation on a corresponding account on a current blockchain based on the transaction information, to obtain a first freeze result; receiving a first transfer transaction sent by a bridging system, where the first transfer transaction carries a second freeze result obtained by performing, by a second blockchain system when the second blockchain system determines that the first freeze result is "succeed", a freeze operation on an account corresponding to the transaction information on a blockchain of the second blockchain system, and the first freeze result is obtained through monitoring by the bridging system; executing the first transfer transaction, so as to invoke first transfer logic in the smart contract to perform an unfreeze operation on the corresponding account on the current blockchain based on the transaction information and transfer a balance to obtain a first transfer result when it is determined that the second freeze result is "succeed"; receiving a confirm transaction sent by the bridging system, where the confirm transaction carries a second transfer result obtained by performing an unfreeze operation on the account corresponding to the transaction information on the blockchain of the second blockchain system and transferring a balance by the second blockchain system when the second blockchain system determines that the first transfer result is "succeed", and the first transfer result is obtained through monitoring by the bridging system; and executing the confirm transaction, so as to invoke confirm logic in the smart contract to determine, when it is determined that the second transfer result is "succeed", that synchronization of the to-be-synchronized transaction information is completed.

**[0186]** Optionally, the first transfer logic is further configured to verify whether the second

freeze result is tampered with, so as to perform an unfreeze operation on the corresponding account on the current blockchain based on the transaction information and transfer a balance when the second freeze result is not tampered with and the second freeze result is "succeed".

**[0187]** Optionally, if the second freeze result is not tampered with, the performing an unfreeze operation on the corresponding account on the current blockchain based on the transaction information and transferring a balance includes: unfreezing an account corresponding to the transaction information; and transferring a balance between an account corresponding to the bridging system and the account corresponding to the transaction information, so as to deduct a reward amount from a specified account in the account corresponding to the transaction information, and transfer the reward amount to the account corresponding to the bridging system.

**[0188]** Optionally, the confirm logic is further configured to verify whether the second transfer result is tampered with, so as to determine, when the second transfer result is not tampered with and the second transfer result is "succeed", that synchronization of the to-be-synchronized transaction information is completed.

**[0189]** Optionally, the first freeze logic is further configured to: after performing a freeze operation on the corresponding account on the current blockchain based on the transaction information, determine whether the first transfer transaction sent by the bridging system is received in first preset duration; and if no, perform an unfreeze operation on the account.

**[0190]** Optionally, the first transfer logic is further configured to: after performing an unfreeze operation on the corresponding account on the current blockchain based on the transaction information and transferring a balance, determine whether the confirm transaction sent by the bridging system is received in second preset duration; and if no, cancel the transfer of the account balance.

**[0191]** Optionally, the first freeze transaction is generated based on the to-be-synchronized transaction information and sent to a first blockchain system after the bridging system obtains the to-be-synchronized transaction information.

**[0192]** Optionally, the transaction information includes a transaction amount and a corresponding transfer-out account and transfer-in account, and the performing a freeze operation on a corresponding account on a current blockchain based on the transaction information includes: freezing the transaction amount in the transfer-out account on the current blockchain.

**[0193]** Corresponding to the foregoing embodiments of the cross-blockchain transaction synchronization method, this specification further provides a computer-readable storage medium. The computer readable storage medium stores a computer program. When the program is executed by a processor, the following steps are implemented: receiving a second freeze

transaction sent by a bridging system, where the second freeze transaction carries to-be-synchronized transaction information and a first freeze result obtained by performing, by a first blockchain system, a freeze operation on an account corresponding to the transaction information on a blockchain of the first blockchain system; executing the second freeze transaction, so as to invoke second freeze logic in a smart contract to perform, when it is determined that the first freeze result is "succeed", a freeze operation on a corresponding account on a current blockchain based on the transaction information, to obtain a second freeze result; receiving a second transfer transaction sent by the bridging system, where the second transfer transaction carries a first transfer result obtained by performing an unfreeze operation on the account corresponding to the transaction information on the blockchain of the first blockchain system and transferring a balance by the first blockchain system when the first blockchain system determines that the second freeze result is "succeed", and the second freeze result is obtained through monitoring by the bridging system; and executing the second transfer transaction, so as to invoke second transfer logic in the smart contract to perform an unfreeze operation on the corresponding account on the current blockchain based on the transaction information and transfer a balance to obtain a second transfer result when it is determined that the first transfer result is "succeed", so that the first blockchain system determines, when the second transfer result is "succeed", that synchronization of the to-be-synchronized transaction information is completed.

**[0194]** Optionally, the second freeze logic is further configured to verify whether the first freeze result is tampered with, so as to perform a freeze operation on the corresponding account on the current blockchain based on the transaction information when the first freeze result is not tampered with and the first freeze result is "succeed".

**[0195]** Optionally, the second transfer logic is further configured to verify whether the first transfer result is tampered with, so as to perform an unfreeze operation on the corresponding account on the current blockchain based on the transaction information and transfer a balance when the first transfer result is not tampered with and the first transfer result is "succeed".

**[0196]** Optionally, if the first transfer result is not tampered with, the performing an unfreeze operation on the corresponding account on the current blockchain based on the transaction information and transferring a balance includes: unfreezing an account corresponding to the transaction information; and transferring a balance between an account corresponding to the bridging system and the account corresponding to the transaction information, so as to deduct a reward amount from a specified account in the account corresponding to the transaction information, and transfer the reward amount to the account corresponding to the bridging system.

**[0197]** Optionally, the second freeze logic is further configured to: after performing a freeze

operation on the corresponding account on the current blockchain based on the transaction information, determine whether the second transfer transaction sent by the bridging system is received in third preset duration; and if no, perform an unfreeze operation on the account.

**[0198]** Optionally, the transaction information includes a transaction amount and a corresponding transfer-out account and transfer-in account, and the performing a freeze operation on a corresponding account on a current blockchain based on the transaction information includes: freezing the transaction amount in the transfer-out account on the current blockchain.

**[0199]** Corresponding to the foregoing embodiments of the cross-blockchain transaction synchronization method, this specification further provides a computer-readable storage medium. The computer-readable storage medium stores a computer program. When the program is executed by a processor, the following steps are implemented: obtaining, through monitoring, a first freeze result obtained by performing, by a first blockchain system, a freeze operation on an account corresponding to to-be-synchronized transaction information on a blockchain of the first blockchain system; generating a second freeze transaction based on the to-be-synchronized transaction information and the first freeze result, and sending the second freeze transaction to a second blockchain system; obtaining a second freeze result of the second blockchain system through monitoring, where the second freeze result is obtained after the second blockchain system executes the second freeze transaction, and performs, when determining that the first freeze result is "succeed", a freeze operation on a corresponding account on a blockchain of the second blockchain system based on the transaction information; generating a first transfer transaction based on the second freeze result, and sending the first transfer transaction to the first blockchain system; obtaining a first transfer result of the first blockchain system through monitoring, where the first transfer result is obtained after the first blockchain system executes the first transfer transaction, and performs an unfreeze operation on the corresponding account on the blockchain of the first blockchain system based on the transaction information and transfers a balance when determining that the second freeze result is "succeed"; generating a second transfer transaction based on the first transfer result, and sending the second transfer transaction to the second blockchain system; obtaining a second transfer result of the second blockchain system through monitoring, where the second transfer result is obtained after the second blockchain system executes the second transfer transaction, and performs an unfreeze operation on the corresponding account on the blockchain of the second blockchain system based on the transaction information and transfers a balance when determining that the first transfer result is "succeed"; and generating a confirm transaction based on the second transfer result, and sending the confirm transaction to the first blockchain system, so that the first blockchain

determines, when the second transfer result is "succeed", that synchronization of the to-be-synchronized transaction information is completed.

**[0200]** Optionally, the following steps are further included: obtaining the to-be-synchronized transaction information; generating a first freeze transaction, where the first freeze transaction carries the transaction information; and sending the first freeze transaction to the first blockchain system.

**[0201]** Specific embodiments of this specification are described above. Other embodiments fall within the scope of the appended claims. In some cases, the actions or steps described in the claims can be performed in an order different from that in the embodiments, and the desired results can still be achieved. In addition, processes described in the accompanying drawings do not necessarily need a specific order or a sequential order shown to achieve the desired results. In some implementations, multi-tasking and concurrent processing are feasible or may be advantageous.

**[0202]** The foregoing descriptions are merely example embodiments of this specification, and are not intended to limit this specification. Any modification, equivalent replacement, or improvement made within the spirit and principle of this specification shall be included in the protection scope of this specification.

## CLAIMS

What is claimed is:

1. A cross-blockchain transaction synchronization method, used to implement transaction synchronization between a first blockchain system and a second blockchain system based on a bridging system, wherein the method is applied to any blockchain node in the first blockchain system, and the method comprises:

receiving a first freeze transaction, wherein the first freeze transaction carries to-be-synchronized transaction information;

executing the first freeze transaction, so as to invoke first freeze logic in a smart contract to perform a freeze operation on a corresponding account on a current blockchain based on the transaction information, to obtain a first freeze result;

receiving a first transfer transaction sent by the bridging system, wherein the first transfer transaction carries a second freeze result obtained by performing, by the second blockchain system when the second blockchain system determines that the first freeze result is "succeed", a freeze operation on an account corresponding to the transaction information on a blockchain of the second blockchain system, and the first freeze result is obtained through monitoring by the bridging system;

executing the first transfer transaction, so as to invoke first transfer logic in the smart contract to perform an unfreeze operation on the corresponding account on the current blockchain based on the transaction information and transfer a balance to obtain a first transfer result when it is determined that the second freeze result is "succeed";

receiving a confirm transaction sent by the bridging system, wherein the confirm transaction carries a second transfer result obtained by performing an unfreeze operation on the account corresponding to the transaction information on the blockchain of the second blockchain system and transferring a balance by the second blockchain system when the second blockchain system determines that the first transfer result is "succeed", and the first transfer result is obtained through monitoring by the bridging system; and

executing the confirm transaction, so as to invoke confirm logic in the smart contract to determine, when it is determined that the second transfer result is "succeed", that synchronization of the to-be-synchronized transaction information is completed.

2. The method according to claim 1, wherein the first transfer logic is further configured to:

verify whether the second freeze result is tampered with, so as to perform an unfreeze operation on the corresponding account on the current blockchain based on the transaction information and transfer a balance when the second freeze result is not tampered with and the

second freeze result is "succeed".

3. The method according to claim 2, wherein the performing an unfreeze operation on the corresponding account on the current blockchain based on the transaction information and transfer a balance when the second freeze result is not tampered with comprises:

5       unfreezing an account corresponding to the transaction information; and  
transferring a balance between an account corresponding to the bridging system and the account corresponding to the transaction information, so as to deduct a reward amount from a specified account in the account corresponding to the transaction information, and transfer the reward amount to the account corresponding to the bridging system.

10       4. The method according to claim 1, wherein the confirm logic is further configured to:  
verify whether the second transfer result is tampered with, so as to determine, when the second transfer result is not tampered with and the second transfer result is "succeed", that synchronization of the to-be-synchronized transaction information is completed.

15       5. The method according to claim 1, wherein the first freeze logic is further configured to:  
after performing a freeze operation on the corresponding account on the current blockchain based on the transaction information, determine whether the first transfer transaction sent by the bridging system is received in first preset duration; and  
if no, perform an unfreeze operation on the account.

20       6. The method according to claim 1, wherein the first transfer logic is further configured to:  
after performing an freeze operation on the corresponding account on the current blockchain based on the transaction information, determine whether the confirm transaction sent by the bridging system is received in second preset duration; and  
if no, cancel the transfer of the account balance.

25       7. The method according to claim 1, wherein the first freeze transaction is generated based on the to-be-synchronized transaction information and sent to the first blockchain system after the bridging system obtains the to-be-synchronized transaction information.

30       8. The method according to claim 1, wherein the transaction information comprises a transaction amount and a corresponding transfer-out account and transfer-in account, and the performing a freeze operation on the corresponding account on the current blockchain based on the transaction information comprises:

freezing the transaction amount in the transfer-out account on the current blockchain.

35       9. A cross-blockchain transaction synchronization method, used to implement transaction synchronization between a first blockchain system and a second blockchain system based on a bridging system, wherein the method is applied to any blockchain node in the second blockchain system, and the method comprises:

receiving a second freeze transaction sent by the bridging system, wherein the second freeze transaction carries to-be-synchronized transaction information and a first freeze result obtained by performing, by the first blockchain system, a freeze operation on an account corresponding to the transaction information on a blockchain of the first blockchain system;

5        executing the second freeze transaction, so as to invoke second freeze logic in a smart contract to perform, when it is determined that the first freeze result is "succeed", a freeze operation on a corresponding account on a current blockchain based on the transaction information, to obtain a second freeze result;

10        receiving a second transfer transaction sent by the bridging system, wherein the second transfer transaction carries a first transfer result obtained by performing an unfreeze operation on the account corresponding to the transaction information on the blockchain of the first blockchain system and transferring a balance by the first blockchain system when the first blockchain system determines that the second freeze result is "succeed", and the second freeze result is obtained through monitoring by the bridging system; and

15        executing the second transfer transaction, so as to invoke second transfer logic in the smart contract to perform an unfreeze operation on the corresponding account on the current blockchain based on the transaction information and transfer a balance to obtain a second transfer result when it is determined that the first transfer result is "succeed", so that the first blockchain system determines, when the second transfer result is "succeed", that synchronization  
20        of the to-be-synchronized transaction information is completed.

10. The method according to claim 9, wherein the second freeze logic is further configured to:

25        verify whether the first freeze result is tampered with, so as to perform a freeze operation on the corresponding account on the current blockchain based on the transaction information when the first freeze result is not tampered with and the first freeze result is "succeed".

11. The method according to claim 9, wherein the second transfer logic is further configured to:

30        verify whether the first transfer result is tampered with, so as to perform an unfreeze operation on the corresponding account on the current blockchain based on the transaction information and transfer a balance when the first transfer result is not tampered with and the first transfer result is "succeed".

12. The method according to claim 11, wherein when the first transfer result is not tampered with, the performing an unfreeze operation on the corresponding account on the current blockchain based on the transaction information and transferring a balance comprises:

35        unfreezing an account corresponding to the transaction information; and

transferring a balance between an account corresponding to the bridging system and the account corresponding to the transaction information, so as to deduct a reward amount from a specified account in the account corresponding to the transaction information, and transfer the reward amount to the account corresponding to the bridging system.

13. The method according to claim 9, wherein the second freeze logic is further configured to:

after performing a freeze operation on the corresponding account on the current blockchain based on the transaction information, determine whether the second transfer transaction sent by the bridging system is received in third preset duration; and

if no, perform an unfreeze operation on the account.

14. The method according to claim 9, wherein the transaction information comprises a transaction amount and a corresponding transfer-out account and transfer-in account, and the performing a freeze operation on the corresponding account on the current blockchain based on the transaction information comprises:

freezing the transaction amount in the transfer-out account on the current blockchain.

15. A cross-blockchain transaction synchronization method, used to implement transaction synchronization between a first blockchain system and a second blockchain system based on a bridging system, wherein the method is applied to the bridging system, and the method comprises:

obtaining, through monitoring, a first freeze result obtained by performing, by the first blockchain system, a freeze operation on an account corresponding to to-be-synchronized transaction information on a blockchain of the first blockchain system;

generating a second freeze transaction based on the to-be-synchronized transaction information and the first freeze result, and sending the second freeze transaction to the second blockchain system;

obtaining a second freeze result of the second blockchain system through monitoring, wherein the second freeze result is obtained after the second blockchain system executes the second freeze transaction, and performs, when determining that the first freeze result is "succeed", a freeze operation on a corresponding account on a blockchain of the second blockchain system based on the transaction information;

generating a first transfer transaction based on the second freeze result, and sending the first transfer transaction to the first blockchain system;

obtaining a first transfer result of the first blockchain system through monitoring, wherein the first transfer result is obtained after the first blockchain system executes the first transfer transaction, and performs an unfreeze operation on the corresponding account on the blockchain

of the first blockchain system based on the transaction information and transfers a balance when determining that the second freeze result is "succeed";

generating a second transfer transaction based on the first transfer result, and sending the second transfer transaction to the second blockchain system;

5 obtaining a second transfer result of the second blockchain system through monitoring, wherein the second transfer result is obtained after the second blockchain system executes the second transfer transaction, and performs an unfreeze operation on the corresponding account on the blockchain of the second blockchain system based on the transaction information and transfers a balance when determining that the first transfer result is "succeed"; and

10 generating a confirm transaction based on the second transfer result, and sending the confirm transaction to the first blockchain system, so that the first blockchain determines, when the second transfer result is "succeed", that synchronization of the to-be-synchronized transaction information is completed.

16. The method according to claim 15, wherein the method further comprises:

15 obtaining the to-be-synchronized transaction information;

generating a first freeze transaction, wherein the first freeze transaction carries the transaction information; and

sending the first freeze transaction to the first blockchain system.

17. A cross-blockchain transaction synchronization apparatus, wherein the apparatus  
20 comprises:

a first freeze transaction receiving unit, configured to receive a first freeze transaction, wherein the first freeze transaction carries to-be-synchronized transaction information;

a first freeze transaction execution unit, configured to execute the first freeze transaction, so as to invoke first freeze logic in a smart contract to perform a freeze operation on a  
25 corresponding account on a current blockchain based on the transaction information, to obtain a first freeze result;

a first transfer transaction receiving unit, configured to receive a first transfer transaction sent by a bridging system, wherein the first transfer transaction carries a second freeze result obtained by performing, by a second blockchain system when the second blockchain system  
30 determines that the first freeze result is "succeed", a freeze operation on an account corresponding to the transaction information on a blockchain of the second blockchain system, and the first freeze result is obtained through monitoring by the bridging system;

a first transfer transaction execution unit, configured to execute the first transfer transaction, so as to invoke first transfer logic in the smart contract to perform an unfreeze operation on the  
35 corresponding account on the current blockchain based on the transaction information and

transfer a balance to obtain a first transfer result when it is determined that the second freeze result is "succeed";

a confirm transaction receiving unit, configured to receive a confirm transaction sent by the bridging system, wherein the confirm transaction carries a second transfer result obtained by performing an unfreeze operation on the account corresponding to the transaction information on the blockchain of the second blockchain system and transferring a balance by the second blockchain system when the second blockchain system determines that the first transfer result is "succeed", and the first transfer result is obtained through monitoring by the bridging system; and

a confirm transaction execution unit, configured to execute the confirm transaction, so as to invoke confirm logic in the smart contract to determine, when it is determined that the second transfer result is "succeed", that synchronization of the to-be-synchronized transaction information is completed.

18. The apparatus according to claim 17, wherein the first transfer logic is further configured to:

verify whether the second freeze result is tampered with, so as to perform an unfreeze operation on the corresponding account on the current blockchain based on the transaction information and transfer a balance when the second freeze result is not tampered with and the second freeze result is "succeed".

19. The apparatus according to claim 18, wherein if the second freeze result is not tampered with, when performing an unfreeze operation on the corresponding account on the current blockchain based on the transaction information and transferring a balance, the first transfer transaction execution unit is configured to:

unfreeze an account corresponding to the transaction information; and

transfer a balance between an account corresponding to the bridging system and the account corresponding to the transaction information, so as to deduct a reward amount from a specified account in the account corresponding to the transaction information, and transfer the reward amount to the account corresponding to the bridging system.

20. The apparatus according to claim 17, wherein the confirm logic is further configured to:

verify whether the second transfer result is tampered with, so as to determine, when the second transfer result is not tampered with and the second transfer result is "succeed", that synchronization of the to-be-synchronized transaction information is completed.

21. A cross-blockchain transaction synchronization apparatus, wherein the apparatus comprises:

a second freeze transaction receiving unit, configured to receive a second freeze transaction

sent by a bridging system, wherein the second freeze transaction carries to-be-synchronized transaction information and a first freeze result obtained by performing, by a first blockchain system, a freeze operation on an account corresponding to the transaction information on a blockchain of the first blockchain system;

5 a second freeze transaction execution unit, configured to execute the second freeze transaction, so as to invoke second freeze logic in a smart contract to perform, when it is determined that the first freeze result is "succeed", a freeze operation on a corresponding account on a current blockchain based on the transaction information, to obtain a second freeze result;

10 a second transfer transaction receiving unit, configured to receive a second transfer transaction sent by the bridging system, wherein the second transfer transaction carries a first transfer result obtained by performing an unfreeze operation on the account corresponding to the transaction information on the blockchain of the first blockchain system and transferring a balance by the first blockchain system when the first blockchain system determines that the second freeze result is "succeed", and the second freeze result is obtained through monitoring by  
15 the bridging system; and

a second transfer transaction execution unit, configured to execute the second transfer transaction, so as to invoke second transfer logic in the smart contract to perform an unfreeze operation on the corresponding account on the current blockchain based on the transaction information and transfer a balance to obtain a second transfer result when it is determined that  
20 the first transfer result is "succeed", so that the first blockchain system determines, when the second transfer result is "succeed", that synchronization of the to-be-synchronized transaction information is completed.

22. A cross-blockchain transaction synchronization apparatus, wherein the apparatus comprises:

25 a first freeze result monitoring unit, configured to obtain, through monitoring, a first freeze result obtained by performing, by a first blockchain system, a freeze operation on an account corresponding to to-be-synchronized transaction information on a blockchain of the first blockchain system;

a second freeze transaction sending unit, configured to: generate a second freeze transaction  
30 based on the to-be-synchronized transaction information and the first freeze result, and send the second freeze transaction to a second blockchain system;

a second freeze result monitoring unit, configured to obtain a second freeze result of the second blockchain system through monitoring, wherein the second freeze result is obtained after the second blockchain system executes the second freeze transaction, and performs, when  
35 determining that the first freeze result is "succeed", a freeze operation on a corresponding

account on a blockchain of the second blockchain system based on the transaction information;

a first transfer transaction sending unit, configured to: generate a first transfer transaction based on the second freeze result, and send the first transfer transaction to the first blockchain system;

5 a first transfer result monitoring unit, configured to obtain a first transfer result of the first blockchain system through monitoring, wherein the first transfer result is obtained after the first blockchain system executes the first transfer transaction, and performs an unfreeze operation on the corresponding account on the blockchain of the first blockchain system based on the transaction information and transfers a balance when determining that the second freeze result is  
10 "succeed";

a second transfer transaction sending unit, configured to: generate a second transfer transaction based on the first transfer result, and send the second transfer transaction to the second blockchain system;

a second transfer result monitoring unit, configured to obtain a second transfer result of the  
15 second blockchain system through monitoring, wherein the second transfer result is obtained after the second blockchain system executes the second transfer transaction, and performs an unfreeze operation on the corresponding account on the blockchain of the second blockchain system based on the transaction information and transfers a balance when determining that the first transfer result is "succeed"; and

20 a confirm transaction sending unit, configured to: generate a confirm transaction based on the second transfer result, and send the confirm transaction to the first blockchain system, so that the first blockchain determines, when the second transfer result is "succeed", that synchronization of the to-be-synchronized transaction information is completed.

23. A cross-blockchain transaction synchronization apparatus, comprising:

25 a processor; and

a memory configured to store machine-executable instructions, wherein the processor reads and executes the machine-executable instructions stored in the memory that correspond to cross-blockchain transaction synchronization logic to:

receive a first freeze transaction, wherein the first freeze transaction carries  
30 to-be-synchronized transaction information;

execute the first freeze transaction, so as to invoke first freeze logic in a smart contract to perform a freeze operation on a corresponding account on a current blockchain based on the transaction information, to obtain a first freeze result;

receive a first transfer transaction sent by a bridging system, wherein the first transfer  
35 transaction carries a second freeze result obtained by performing, by a second blockchain system

when the second blockchain system determines that the first freeze result is "succeed", a freeze operation on an account corresponding to the transaction information on a blockchain of the second blockchain system, and the first freeze result is obtained through monitoring by the bridging system;

5        execute the first transfer transaction, so as to invoke first transfer logic in the smart contract to perform an unfreeze operation on the corresponding account on the current blockchain based on the transaction information and transfer a balance to obtain a first transfer result when it is determined that the second freeze result is "succeed";

10        receive a confirm transaction sent by the bridging system, wherein the confirm transaction carries a second transfer result obtained by performing an unfreeze operation on the account corresponding to the transaction information on the blockchain of the second blockchain system and transferring a balance by the second blockchain system when the second blockchain system determines that the first transfer result is "succeed", and the first transfer result is obtained through monitoring by the bridging system; and

15        execute the confirm transaction, so as to invoke confirm logic in the smart contract to determine, when it is determined that the second transfer result is "succeed", that synchronization of the to-be-synchronized transaction information is completed.

24. A cross-blockchain transaction synchronization apparatus, comprising:

a processor; and

20        a memory configured to store machine-executable instructions, wherein the processor reads and executes the machine-executable instructions stored in the memory that correspond to cross-blockchain transaction synchronization logic to:

25        receive a second freeze transaction sent by a bridging system, wherein the second freeze transaction carries to-be-synchronized transaction information and a first freeze result obtained by performing, by a first blockchain system, a freeze operation on an account corresponding to the transaction information on a blockchain of the first blockchain system;

30        execute the second freeze transaction, so as to invoke second freeze logic in a smart contract to perform, when it is determined that the first freeze result is "succeed", a freeze operation on a corresponding account on a current blockchain based on the transaction information, to obtain a second freeze result;

35        receive a second transfer transaction sent by the bridging system, wherein the second transfer transaction carries a first transfer result obtained by performing an unfreeze operation on the account corresponding to the transaction information on the blockchain of the first blockchain system and transferring a balance by the first blockchain system when the first blockchain system determines that the second freeze result is "succeed", and the second freeze

result is obtained through monitoring by the bridging system; and

execute the second transfer transaction, so as to invoke second transfer logic in the smart contract to perform an unfreeze operation on the corresponding account on the current blockchain based on the transaction information and transfer a balance to obtain a second transfer result when it is determined that the first transfer result is "succeed", so that the first blockchain system determines, when the second transfer result is "succeed", that synchronization of the to-be-synchronized transaction information is completed.

25. A cross-blockchain transaction synchronization apparatus, comprising:

a processor; and

a memory configured to store machine-executable instructions, wherein

the processor reads and executes the machine-executable instructions stored in the memory that correspond to cross-blockchain transaction synchronization logic to:

obtain, through monitoring, a first freeze result obtained by performing, by a first blockchain system, a freeze operation on an account corresponding to to-be-synchronized transaction information on a blockchain of the first blockchain system;

generate a second freeze transaction based on the to-be-synchronized transaction information and the first freeze result, and send the second freeze transaction to a second blockchain system;

obtain a second freeze result of the second blockchain system through monitoring, wherein the second freeze result is obtained after the second blockchain system executes the second freeze transaction, and performs, when determining that the first freeze result is "succeed", a freeze operation on a corresponding account on a blockchain of the second blockchain system based on the transaction information;

generate a first transfer transaction based on the second freeze result, and send the first transfer transaction to the first blockchain system;

obtain a first transfer result of the first blockchain system through monitoring, wherein the first transfer result is obtained after the first blockchain system executes the first transfer transaction, and performs an unfreeze operation on the corresponding account on the blockchain of the first blockchain system based on the transaction information and transfers a balance when determining that the second freeze result is "succeed";

generate a second transfer transaction based on the first transfer result, and send the second transfer transaction to the second blockchain system;

obtain a second transfer result of the second blockchain system through monitoring, wherein the second transfer result is obtained after the second blockchain system executes the second transfer transaction, and performs an unfreeze operation on the corresponding account on

the blockchain of the second blockchain system based on the transaction information and transfers a balance when determining that the first transfer result is "succeed"; and

generate a confirm transaction based on the second transfer result, and send the confirm transaction to the first blockchain system, so that the first blockchain determines, when the  
5 second transfer result is "succeed", that synchronization of the to-be-synchronized transaction information is completed.