

that the designated member node incorrectly deducts some resource amounts from the centralized account of the user within the designated period. In this case, the designated member node may add a difference between the actual payment amount and the attestation payment amount to the virtual resource account of the user.

[0063] 3. The second designated condition may alternatively be that the attestation payment amount is less than the actual payment amount, and a ratio of a payment difference to the attestation payment amount is greater than a second designated ratio, the payment difference being a difference between the actual payment amount and the attestation payment amount. Actually, in this situation, it is found that the designated member node incorrectly deducts some resource amounts from the centralized account of the user within the designated period, and the incorrectly deducted resource amounts are relatively large. In this case, the payment difference may be added to the virtual resource account of the user, and a second compensation amount is determined, and is added to the virtual resource account of the user. The second compensation amount is actually a punishment for a management party of the designated member node. For example, the second compensation amount may be determined according to a formula: an attestation payment amount*(a ratio of a payment difference to the attestation payment amount–a second designated ratio)*a punishment coefficient.

[0064] For example, assuming that the second designated ratio is 2%, the attestation payment amount is 10000 yuan, and the actual payment amount is 10300 yuan, the payment difference is 300 yuan, and $300/10000=3\%>2\%$. Therefore, the second compensation amount should be determined. Therefore, assuming that the punishment coefficient is 10, the second compensation amount is that $10000*(3\%-2\%)*10=1000$ yuan.

[0065] In addition, it should be noted that, in this embodiment of this specification, a centralized account and a decentralized account of one user may be reconciled for each other. Generally, a balance of the decentralized account is more reliable, and the centralized account may be corrected according to the balance of the decentralized account. Sometimes, if there is a failure in the blockchain network, and the balance of the decentralized account is inaccurate, the balance of the decentralized account may also be corrected according to a balance of the centralized account.

[0066] Based on the dual transaction method based on centralization and decentralization shown in FIG. 1, an embodiment of this specification further correspondingly provides a dual transaction apparatus based on centralization and decentralization. As shown in FIG. 3, a blockchain network includes a plurality of member nodes, the apparatus is any of the member nodes, a virtual resource account is registered by a user with the apparatus, and the

CLAIMS

What is claimed is:

1. A dual transaction method based on centralization and decentralization, wherein a blockchain network comprises a plurality of member nodes, a centralized virtual resource account of a paying user and a centralized virtual resource account of a receiving user are registered with a designated member node, and the method comprises:

receiving, by the designated member node, a transaction request comprising a paying user identifier of the paying user, a designated resource amount, and a receiving user identifier of the receiving user, the paying user being a user paying the designated resource amount, and the receiving user being a user receiving the designated resource amount;

performing, by the designated member node, a first transaction feasibility verification on the transaction request off the blockchain network in a centralized manner, the first transaction feasibility verification comprising verifying whether a balance of the centralized virtual resource account corresponding to the paying user identifier is sufficient to provide the designated resource amount;

after the first transaction feasibility verification is successful, settling, by the designated member node, in a local relational database, the transaction request by:

deducting the designated resource amount from the centralized virtual resource account corresponding to the paying user identifier, and

adding the designated resource amount to the centralized virtual resource account corresponding to the receiving user identifier;

transmitting, by the designated member node to a computing device of the paying user and/or a computing device of the receiving user, a confirmation message of success of the first transaction feasibility verification and the settlement of the transaction request performed by the designated member node off the blockchain network and before target transaction information is published to a blockchain of the blockchain network;

constructing, by the designated member node according to the transaction request, the target transaction information comprising the paying user identifier, the designated resource amount, and the receiving user identifier

after the settlement of the transaction request, broadcasting, by the designated member node, a blockchain transaction comprising the target transaction information and the confirmation message to the blockchain network, for the members nodes to publish the blockchain transaction comprising the target transaction information and the confirmation

message to the blockchain based on a decentralized consensus mechanism with respect to the blockchain transaction, the decentralized consensus mechanism comprising a second transaction feasibility verification of the blockchain transaction in a decentralized manner.

2. The method according to claim 1, wherein the method further comprises:

locally storing, by the designated member node, the target transaction information after the first transaction feasibility verification performed on the transaction request off the blockchain network is successful.

3. The method according to claim 2, wherein the method further comprises:

obtaining transaction information published to the blockchain within a designated period as attestation transaction information, and obtaining transaction information that is locally stored within the designated period as actual transaction information;

for either user of the paying user and the receiving user, determining, according to the attestation transaction information, a resource amount that needs to be received by either user within the designated period as an attestation received amount corresponding to either user, and determining, according to the actual transaction information, a resource amount actually received by either user within the designated period as an actually received amount corresponding to either user;

comparing the attestation received amount with the actually received amount; and

correcting a balance of a virtual resource account of either user if a result of the comparison meets a first designated condition.

4. The method according to claim 3, wherein the first designated condition is that the attestation received amount is greater than the actually received amount; and

correcting the balance of the virtual resource account of either user comprises:

adding a difference between the attestation received amount and the actually received amount to the virtual resource account of either user.

5. The method according to claim 3, wherein the first designated condition is that the attestation received amount is less than the actually received amount; and

correcting the balance of the virtual resource account of either user comprises:

deducting a difference between the actually received amount and the attestation received amount from the virtual resource account of either user.

6. The method according to claim 3, wherein the first designated condition is that the attestation received amount is greater than the actually received amount, and a ratio of a receiving difference to the attestation received amount is greater than a first designated ratio, the receiving difference being a difference between the attestation received amount and the actually received amount; and

correcting the balance of the virtual resource account of either user comprises:

adding the receiving difference to the virtual resource account of either user; and

determining a first compensation amount, and adding the first compensation amount to the virtual resource account of either user.

7. The method according to claim 2, wherein the method further comprises:

obtaining transaction information published to the blockchain within a designated period as attestation transaction information, and obtaining transaction information that is locally stored within the designated period as actual transaction information;

for either user of the paying user and the receiving user, determining, according to the attestation transaction information, a resource amount that needs to be paid by either user within the designated period as an attestation payment amount corresponding to either user, and determining, according to the actual transaction information, a resource amount actually paid by either user within the designated period as an actual payment amount corresponding to either user;

comparing the attestation payment amount with the actual payment amount; and

correcting a balance of a virtual resource account of either user if a result of the comparison meets a second designated condition.

8. The method according to claim 7, wherein the second designated condition is that the attestation payment amount is greater than the actual payment amount; and

correcting the balance of the virtual resource account of either user comprises:

deducting a difference between the attestation payment amount and the actual payment amount from the virtual resource account of either user.

9. The method according to claim 7, wherein the second designated condition is that the attestation payment amount is less than the actual payment amount; and

correcting the balance of the virtual resource account of either user comprises:

adding a difference between the actual payment amount and the attestation payment amount to the virtual resource account of either user.

10. The method according to claim 7, wherein the second designated condition is that the attestation payment amount is less than the actual payment amount, and a ratio of a payment difference to the attestation payment amount is greater than a second designated ratio, the payment difference being a difference between the actual payment amount and the attestation payment amount; and

correcting the balance of the virtual resource account of either user comprises:

adding the payment difference to the virtual resource account of either user; and

determining a second compensation amount, and adding the second compensation amount to the virtual resource account of either user.

11. A dual transaction apparatus based on centralization and decentralization, wherein a blockchain network comprises a plurality of member nodes, the apparatus is any of the member nodes, a centralized virtual resource account of a paying user and a centralized virtual resource account of a receiving user are registered with the apparatus, and the apparatus comprises:

a receiving module, configured to receive a transaction request comprising a paying user identifier of the paying user, a designated resource amount, and a receiving user identifier of the receiving user, the paying user being a user paying the designated resource amount, and the receiving user being a user receiving the designated resource amount;

a centralization processing module, configured to perform a first transaction feasibility verification on the transaction request off the blockchain network in a centralized manner, the first transaction feasibility verification comprising verifying whether a balance of the centralized virtual resource account corresponding to the paying user identifier is sufficient to provide the designated resource amount; and adding the designated resource amount to the centralized virtual resource account corresponding to the receiving user identifier; and

a blockchain processing module, configured to construct, according to the transaction request, target transaction information comprising the paying user identifier, the designated resource amount, and the receiving user identifier, and after the settlement of the transaction request, broadcast a blockchain transaction comprising the target transaction information to the blockchain network, for the members nodes to publish the blockchain transaction comprising the target transaction information to the blockchain based on a decentralized consensus mechanism with respect to the blockchain transaction, the decentralized consensus mechanism

comprising a second transaction feasibility verification of the blockchain transaction in a decentralized manner.

12. The apparatus according to claim 11, wherein the apparatus further comprises:

a storage module, configured to locally store the target transaction information after the first transaction feasibility verification performed on the transaction request off the blockchain network is successful.

13. The apparatus according to claim 12, wherein the apparatus further comprises:

a first account reconciliation module, configured to obtain transaction information published to the blockchain within a designated period as attestation transaction information, and obtain transaction information that is locally stored within the designated period as actual transaction information; for either user of the paying user and the receiving user, determine, according to the attestation transaction information, a resource amount that needs to be received by either user within the designated period as an attestation received amount corresponding to either user, and determine, according to the actual transaction information, a resource amount actually received by either user within the designated period as an actually received amount corresponding to either user; compare the attestation received amount with the actually received amount; and correct a balance of a virtual resource account of either user if a result of the comparison meets a first designated condition.

14. The apparatus according to claim 13, wherein the first designated condition is that the attestation received amount is greater than the actually received amount; and

the first account reconciliation module adds a difference between the attestation received amount and the actually received amount to the virtual resource account of either user.

15. The apparatus according to claim 13, wherein the first designated condition is that the attestation received amount is less than the actually received amount; and

the first account reconciliation module deducts a difference between the actually received amount and the attestation received amount from the virtual resource account of either user.

16. The apparatus according to claim 13, wherein the first designated condition is that the attestation received amount is greater than the actually received amount, and a ratio of a receiving difference to the attestation received amount is greater than a first designated ratio,

the receiving difference being a difference between the attestation received amount and the actually received amount; and

the first account reconciliation module adds the receiving difference to the virtual resource account of either user; and determines a first compensation amount, and adds the first compensation amount to the virtual resource account of either user.

17. The apparatus according to claim 12, wherein the apparatus further comprises:

a second account reconciliation module, configured to obtain transaction information published to the blockchain within a designated period as attestation transaction information, and obtain transaction information that is locally stored within the designated period as actual transaction information; for either user of the paying user and the receiving user, determine, according to the attestation transaction information, a resource amount that needs to be paid by either user within the designated period as an attestation payment amount corresponding to either user, and determine, according to the actual transaction information, a resource amount actually paid by either user within the designated period as an actual payment amount corresponding to either user; compare the attestation payment amount with the actual payment amount; and correct a balance of a virtual resource account of either user if a result of the comparison meets a second designated condition.

18. The apparatus according to claim 17, wherein the second designated condition is that the attestation payment amount is greater than the actual payment amount; and

the second account reconciliation module deducts a difference between the attestation payment amount and the actual payment amount from the virtual resource account of either user.

19. The apparatus according to claim 17, wherein the second designated condition is that the attestation payment amount is less than the actual payment amount; and

the second account reconciliation module adds a difference between the actual payment amount and the attestation payment amount to the virtual resource account of either user.

20. The apparatus according to claim 17, wherein the second designated condition is that the attestation payment amount is less than the actual payment amount, and a ratio of a payment difference to the attestation payment amount is greater than a second designated ratio, the payment difference being a difference between the actual payment amount and the attestation

payment amount; and

the second account reconciliation module adds the payment difference to the virtual resource account of either user; and determines a second compensation amount, and adds the second compensation amount to the virtual resource account of either user.

21. A dual transaction system based on centralization and decentralization, comprising a blockchain network formed by a plurality of member nodes, wherein a paying user can register a centralized virtual resource account and a receiving user can register a centralized virtual resource account with a designated member node, wherein:

the designated member node receives a transaction request that is sent by the paying user and that comprises a paying user identifier of the paying user, a designated resource amount, and a receiving user identifier of the receiving user, the paying user being a user paying the designated resource amount, and the receiving user being a user receiving the designated resource amount; performs a first transaction feasibility verification on the transaction request off the blockchain network in a centralized manner, the first transaction feasibility verification comprising verifying whether a balance of the centralized virtual resource account corresponding to the paying user identifier is sufficient to provide the designated resource amount; after the first transaction feasibility verification is successful, settle in a local relational database, the transaction request by:

the designated member node deducts the designated resource amount from the centralized virtual resource account corresponding to the paying user identifier, and adding the designated resource amount to the centralized virtual resource account corresponding to the receiving user identifier; transmits, to a computing device of the paying user and/or a computing device of the receiving user, a confirmation message of success of the first transaction feasibility verification and the settlement of the transaction request performed by the designated member node off the blockchain network and before target transaction information is published to a blockchain of the blockchain network; constructs, according to the transaction request, the target transaction information comprising the paying user identifier, the designated resource amount, and the receiving user identifier, after the settlement of the transaction request, broadcasts a blockchain transaction comprising the target transaction information and the confirmation message to the blockchain network; and

other members nodes and the designated member node publish the blockchain transaction comprising the target transaction information and the confirmation message to the blockchain based on a decentralized consensus mechanism with respect to the blockchain transaction, the

decentralized consensus mechanism comprising a second transaction feasibility verification of the blockchain transaction in a decentralized manner.

22. A computer device comprising a memory, a processor, and a computer program stored on the memory and executable on the processor, when executing the program, the processor implementing the method according to any of claims 1 to 10.