

CLAIMS

What is claimed is:

1. A blockchain-based cross-currency settlement method, applicable to a settlement system built based on a blockchain, wherein the settlement system comprises a first settlement node inside a territory, a transit node, and a second settlement node outside the territory, the transit node opens a first settlement account at the first settlement node, and the transit node opens a second settlement account at the second settlement node, the method comprising:

creating, for the transit node in response to a determination that off-chain funds of a first currency transferred by the first settlement node to the first settlement account are in a frozen state, a first blockchain asset corresponding to the off-chain funds of the first currency in the blockchain; and creating, for the transit node in response to a determination that off-chain funds of a second currency transferred by the second settlement node to the second settlement account are in a frozen state, a second blockchain asset corresponding to the off-chain funds of the second currency in the blockchain;

receiving a fund exchange transaction sent by the transit node, wherein the fund exchange transaction is a transaction created by the transit node according to fund exchange instructions from the first settlement node and the second settlement node; and

transferring, in response to the fund exchange transaction, the first blockchain asset from a blockchain account corresponding to the transit node to a blockchain account corresponding to the second settlement node and transferring the second blockchain asset from the blockchain account corresponding to the transit node to a blockchain account corresponding to the first settlement node, for the first settlement node or the second settlement node to perform a cross-currency fund settlement for a user based on the blockchain asset transferred to the respective blockchain account.

2. The method according to claim 1, wherein the creating, for the transit node in response to a determination that off-chain funds of a first currency transferred by the first settlement node to the first settlement account are in a frozen state, a first blockchain asset corresponding to the off-chain funds of the first currency in the blockchain comprises:

receiving an asset creation transaction sent by the first settlement node, wherein the asset creation transaction comprises a freeze credential of the off-chain funds of the first currency transferred by the first settlement node to the first settlement account; and

calling an asset creation logic in a smart contract published in the blockchain in response to the asset creation transaction, to create the first blockchain asset corresponding to the off-chain funds of the first currency in the blockchain for the transit node based on the freeze credential, and adding the created first blockchain asset to the blockchain account corresponding to the transit node for holding.

3. The method according to claim 1, wherein the creating, for the transit node in response to a determination that off-chain funds of a second currency transferred by the second settlement node to the second settlement account are in a frozen state, a second blockchain asset corresponding to the off-chain funds of the second currency in the blockchain comprises:

receiving an asset creation transaction sent by the second settlement node, wherein the asset creation transaction comprises a freeze credential of the off-chain funds of the second currency transferred by the second settlement node to the second settlement account; and

calling an asset creation logic in a smart contract published in the blockchain in response to the asset creation transaction, to create the second blockchain asset corresponding to the off-chain funds of the second currency in the blockchain for the transit node based on the freeze credential, and adding the created second blockchain asset to the blockchain account corresponding to the transit node for holding.

4. The method according to claim 1, wherein the transferring, in response to the fund exchange transaction, the first blockchain asset from a blockchain account corresponding to the transit node to a blockchain account corresponding to the second settlement node and transferring the second blockchain asset from the blockchain account corresponding to the transit node to a blockchain account corresponding to the first settlement node comprises:

calling an asset exchange logic in a smart contract published in the blockchain in response to the fund exchange transaction, to transfer the first blockchain asset held in the blockchain account corresponding to the transit node to the blockchain account corresponding to the second settlement node, and transfer the second blockchain asset held in the blockchain account corresponding to the transit node to the blockchain account corresponding to the first settlement node.

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

receiving a fund settlement transaction sent by the first settlement node or the second settlement node, wherein the fund settlement transaction is a transaction created by the first settlement node or the second settlement node according to an instruction, sent by the user, of performing a cross-currency fund settlement according to a blockchain asset; and

calling an asset settlement logic in a smart contract published in the blockchain in response to the fund settlement transaction, to further transfer the blockchain asset held in the blockchain account corresponding to the first settlement node or the second settlement node to a blockchain account of the user for holding, to complete the cross-currency fund settlement.

6. The method according to claim 1, further comprising:

receiving an asset conversion transaction sent by the first settlement node or the second settlement node, wherein the asset conversion transaction is a transaction created according to an instruction, sent by the user, of performing a cross-currency fund settlement based on off-chain funds; and

calling an asset conversion logic in a smart contract published in the blockchain in response to the asset conversion transaction, to mark the blockchain asset held in the blockchain account corresponding to the first settlement node or the second settlement node in a deregistered state, for a settlement node at a peer end of the first settlement node or the second settlement node to unfreeze off-chain funds corresponding to the blockchain asset in response to a determination that the blockchain asset is in a deregistered state, and transfer the unfrozen off-chain funds to a settlement account opened at the first settlement node or the second settlement node by the user.

7. The method according to claim 6, further comprising:

receiving a further asset conversion transaction sent by a user client, wherein the asset conversion transaction is a transaction created by the client according to an instruction, sent by the user, of converting a held blockchain asset; and

calling the further asset conversion logic in the smart contract published in the blockchain in response to the further asset conversion transaction, to mark a blockchain asset held in a blockchain account of the user in a deregistered state, for the first settlement node or the second settlement node to unfreeze off-chain funds corresponding to the blockchain asset in response to a determination that the blockchain asset held in the blockchain account of the user is in a deregistered state, and transfer the unfrozen off-chain funds to the settlement account opened at the first settlement node or the second settlement node by the user.

8. The method according to claim 1, wherein the settlement nodes are banks, the transit node is an intermediary bank, and the first settlement account and the second settlement account are nostro/vostro accounts.

9. The method according to claim 8, wherein the transit node is a branch bank node of the first settlement node inside a territory in which the second settlement node is located, or the transit node is a branch bank node of the second settlement node inside the territory in which

the first settlement node is located.

10. The method according to claim 1, wherein the settlement nodes are banks, the transit node is a non-bank institution, and the first settlement account and the second settlement account are client reserve accounts opened at bank nodes by the non-bank institution.

11. The method according to claim 1, wherein the user is a non-bank institution opening a client reserve account at the first settlement node or the second settlement node.

12. The method according to claim 10, wherein the non-bank institution is a third-party payment institution.

13. The method according to claim 10, wherein the non-bank institution is an issuing institution of a stored value instrument.

14. The method according to claim 1, wherein the cross-currency fund settlement comprises cross-currency remittance settlement.

15. The method according to claim 1, wherein the cross-currency fund settlement comprises cross-currency foreign exchange transaction settlement.

16. The method according to claim 1, wherein the blockchain asset comprises an on-chain balance issued on the blockchain based on the frozen off-chain funds.

17. A blockchain-based cross-currency settlement apparatus, applicable to a settlement system built based on a blockchain, wherein the settlement system comprises a first settlement node inside a territory, a transit node, and a second settlement node outside the territory, the transit node opens a first settlement account at the first settlement node, and the transit node opens a second settlement account at the second settlement node, the apparatus comprising:

a creation module, configured to create, for the transit node in response to a determination that off-chain funds of a first currency transferred by the first settlement node to the first settlement account are in a frozen state, a first blockchain asset corresponding to the off-chain funds of the first currency in the blockchain; and create, for the transit node in response to a determination that off-chain funds of a second currency transferred by the second settlement node to the second settlement account are in a frozen state, a second blockchain asset corresponding to the off-chain funds of the second currency in the blockchain;

a receiving module, configured to receive a fund exchange transaction sent by the transit node, wherein the fund exchange transaction is a transaction created by the transit node according to fund exchange instructions from the first settlement node and the second settlement node; and

a transfer module, configured to transfer, in response to the fund exchange transaction, the first blockchain asset from a blockchain account corresponding to the transit node to a blockchain account corresponding to the second settlement node and transfer the second blockchain asset from the blockchain account corresponding to the transit node to a blockchain account corresponding to the first settlement node, for the first settlement node or the second settlement node to perform a cross-currency fund settlement for a user based on the blockchain asset transferred to the respective blockchain account.

18. The apparatus according to claim 17, wherein the creation module is configured to:

receive an asset creation transaction sent by the first settlement node, wherein the asset creation transaction comprises a freeze credential of the off-chain funds of the first currency transferred by the first settlement node to the first settlement account; and

call an asset creation logic in a smart contract published in the blockchain in response to the asset creation transaction, to create the first blockchain asset corresponding to the off-chain funds of the first currency in the blockchain for the transit node based on the freeze credential, and add the created first blockchain asset to the blockchain account corresponding to the transit node for holding.

19. The apparatus according to claim 17, wherein the creation module is configured to:

receive an asset creation transaction sent by the second settlement node, wherein the asset

creation transaction comprises a freeze credential of the off-chain funds of the second currency transferred by the second settlement node to the second settlement account; and

call an asset creation logic in a smart contract published in the blockchain in response to the asset creation transaction, to create the second blockchain asset corresponding to the off-chain funds of the second currency in the blockchain for the transit node based on the freeze credential, and add the created second blockchain asset to the blockchain account corresponding to the transit node for holding.

20. The apparatus according to claim 17, wherein the transfer module is configured to:

call an asset exchange logic in a smart contract published in the blockchain in response to the fund exchange transaction, to transfer the first blockchain asset held in the blockchain account corresponding to the transit node to the blockchain account corresponding to the second settlement node, and transfer the second blockchain asset held in the blockchain account corresponding to the transit node to the blockchain account corresponding to the first settlement node.

21. The apparatus according to claim 17, wherein the transfer module is further configured to:

receive a fund settlement transaction sent by the first settlement node or the second settlement node, wherein the fund settlement transaction is a transaction created by the first settlement node or the second settlement node according to an instruction, sent by the user, of performing a cross-currency fund settlement according to a blockchain asset; and

call an asset settlement logic in a smart contract published in the blockchain in response to the fund settlement transaction, to further transfer the blockchain asset held in the blockchain account corresponding to the first settlement node or the second settlement node to a blockchain account of the user for holding, to complete the cross-currency fund settlement.

22. The apparatus according to claim 17, further comprising:

a conversion module, configured to receive an asset conversion transaction sent by the first settlement node or the second settlement node, wherein the asset conversion transaction is a transaction created according to an instruction, sent by the user, of performing a cross-currency fund settlement based on off-chain funds; and

call an asset conversion logic in a smart contract published in the blockchain in response to the asset conversion transaction, to mark the blockchain asset held in the blockchain account corresponding to the first settlement node or the second settlement node in a deregistered state, for a settlement node at a peer end of the first settlement node or the second settlement node to unfreeze off-chain funds corresponding to the blockchain asset in response to a determination that the blockchain asset is in a deregistered state, and transfer the unfrozen off-chain funds to a settlement account opened at the first settlement node or the second settlement node by the user.

23. The apparatus according to claim 22, wherein the conversion module is further configured to:

receive a further asset conversion transaction sent by a user client, wherein the asset conversion transaction is a transaction created by the client according to an instruction, sent by the user, of converting a held blockchain asset; and

call the further asset conversion logic in the smart contract published in the blockchain in response to the further asset conversion transaction, to mark a blockchain asset held in a blockchain account of the user in a deregistered state, for the first settlement node or the second settlement node to unfreeze off-chain funds corresponding to the blockchain asset in response to a determination that the blockchain asset held in the blockchain account of the user is in a deregistered state, and transfer the unfrozen off-chain funds to the settlement account opened at the first settlement node or the second settlement node by the user.

24. The apparatus according to claim 17, wherein the settlement nodes are banks, the

transit node is an intermediary bank, and the first settlement account and the second settlement account are nostro/vostro accounts.

25. The apparatus according to claim 24, wherein the transit node is a branch bank node of the first settlement node inside a territory in which the second settlement node is located, or the transit node is a branch bank node of the second settlement node inside the territory in which the first settlement node is located.

26. The apparatus according to claim 17, wherein the settlement nodes are banks, the transit node is a non-bank institution, and the first settlement account and the second settlement account are client reserve accounts opened at bank nodes by the non-bank institution.

27. The apparatus according to claim 17, wherein the user is a non-bank institution opening a client reserve account at the first settlement node or the second settlement node.

28. The apparatus according to claim 26, wherein the non-bank institution is a third-party payment institution.

29. The apparatus according to claim 26, wherein the non-bank institution is an issuing institution of a stored value instrument.

30. The apparatus according to claim 17, wherein the cross-currency fund settlement comprises cross-currency remittance settlement.

31. The apparatus according to claim 17, wherein the cross-currency fund settlement comprises cross-currency foreign exchange transaction settlement.

32. The apparatus according to claim 17, wherein the blockchain asset comprises an on-chain balance issued on the blockchain based on the frozen off-chain funds.

33. An electronic device, comprising:

a processor; and

a memory configured to store instructions executable by the processor,

wherein the processor executes the executable instructions to implement the method according to any one of claims 1 to 16.

34. A computer-readable storage medium, storing computer instructions, wherein the instructions, when executed by a processor, implement steps of the method according to any one of claims 1 to 16.