

CLAIMS

1. A computer-implemented method for adding a node in a blockchain network, comprising:
obtaining, by a current consensus node of the blockchain network, a first transaction comprising a first request for adding the node as a new consensus node of the blockchain network;
in response to that consensus verification of the first transaction succeeds, executing the first transaction and numbering the node in a node list based on numbers of a plurality of current consensus nodes of the blockchain network; and
performing view change for the node to participate in future consensus verification as the new consensus node of the blockchain network.
2. The method of claim 1, wherein the first transaction is configured to invoke a blockchain contract deployed in a blockchain that is maintained by the blockchain network.
3. The method of claim 2, wherein the blockchain contract comprises a genesis contract or a system contract.
4. The method of any of claims 1-3, wherein the obtaining, by a current consensus node, a first transaction comprises:
obtaining the first transaction from a client-side device or a command console of a controller.
5. The method of any of claims 1-4, wherein:
the current consensus node locally maintains the node list, the node list comprising one or more of the following: consensus node identifier, consensus node IP address, and consensus node port number; and
the plurality of consensus nodes are numbered sequentially in the node list.
6. The method of any of claims 1-5, wherein the node list is in a world state of a blockchain maintained by the blockchain network.
7. The method of any of claims 1-6, wherein the numbering the node in a node list based on numbers of a plurality of current consensus nodes of the blockchain network comprises:
adding an identifier of the node to an end of the node list and sequentially numbering the node based on the numbers of the plurality of consensus nodes in the node list; or
reordering the plurality of consensus nodes and the node in the node list according to a node attribute.
8. The method of any of claims 1-7, wherein the performing view change comprises initiating the view change in response to detecting any of the following conditions:
a number of consensus nodes in the node list is inconsistent with a number of consensus nodes in a current view; and

consensus node identifiers in the node list are inconsistent with consensus node identifiers in the current view.

9. The method of any of claims 1-8, wherein the performing view change comprises initiating the view change in response to receiving a message broadcast by the node for initiating view change.

10. The method of any of claims 1-9, after the numbering the node in a node list and before the performing view change, further comprising:

obtaining from the node a second transaction comprising a second request for activating the node;

performing consensus verification of the second transaction; and

in response to that the consensus verification of the second transaction succeeds, executing the second transaction for activating the node.

11. The method of claim 10, wherein the performing view change comprises initiating the view change in response to detecting any of the following conditions:

a number of activated consensus nodes in the node list is inconsistent with a number of activated consensus nodes in a current view; and

identifiers of activated consensus nodes in the node list are inconsistent with identifiers of the activated consensus nodes in the current view.

12. The method of any of claims 1-11, wherein a number of replicas in the view change is a total number of consensus nodes including the node.

13. A system for adding a node in a blockchain network, comprising:

one or more processors; and

one or more computer-readable memories coupled to the one or more processors and having instructions stored thereon that are executable by the one or more processors to perform the method of any of claims 1-12.

14. An apparatus for adding a node in a blockchain network comprising a plurality of modules for performing the method of any of claims 1-12.

15. A non-transitory computer-readable storage medium configured with instructions executable by one or more processors to cause the one or more processors to perform the method of any of claims 1-12.

16. A computer-implemented method for adding a node in a blockchain network comprising:

synchronizing, by the node to be added in the blockchain network, with a blockchain to obtain a first local blockchain copy, wherein the blockchain network maintains the blockchain and comprises a plurality of current consensus nodes;

in response to determining that the first local blockchain copy comprises a first request to add the node as a new consensus node of the blockchain network, transmitting to one or more of the plurality of current consensus nodes a second transaction comprising a second request to activate the node; and

after the second transaction is added to the blockchain, synchronizing the first local blockchain copy with the blockchain to obtain a second local blockchain copy.

17. The method of claim 16, before the synchronizing with a blockchain, further comprising: transmitting a first transaction comprising the first request for adding the node as the new consensus node of the blockchain network to one or more of the plurality of current consensus nodes for the plurality of current consensus nodes to perform consensus verification of the first transaction and to add the first transaction to the blockchain in response to that the consensus verification of the first transaction succeeds.

18. The method of claim 16, before the synchronizing with a blockchain, further comprising: transmitting, by one of the plurality of current consensus nodes, a first transaction comprising the first request for adding the node as the new consensus node of the blockchain network to one or more of the plurality of current consensus nodes for the plurality of current consensus nodes to perform consensus verification of the first transaction and to add the first transaction to the blockchain in response to that the consensus verification of the first transaction succeeds.

19. The method of any of claims 16-18, wherein the synchronizing with a blockchain comprises:

sending one or more synchronization requests respectively to one or more of the plurality of current consensus nodes to obtain data in the blockchain.

20. The method of any of claims 16-19, wherein the transmitting to one or more of the plurality of current consensus nodes a second transaction comprising a second request to activate the node comprises:

transmitting to one or more of the plurality of current consensus nodes the second transaction comprising the second request to activate the node, for the plurality of current consensus nodes to perform consensus verification of the second transaction and execute the second transaction for activating the node in response to that the consensus verification of the second transaction succeeds.

21. The method of any of claims 16-20, further comprising:

after the plurality of current consensus nodes perform a view change with respect to the blockchain, synchronizing the second local blockchain copy with the blockchain to obtain a third local blockchain copy.

22. The method of claim 21, further comprising:

participating in consensus verification as the new consensus node of the blockchain network.

23. The method of any of claims 21-22, further comprising determining through checkpoint messages that the synchronization of the first, second, or second local blockchain copy is completed.

24. The method of any of claims 21-22, further comprising sending a request for querying a current largest block number to at least some of the plurality of current consensus nodes, and determining that the synchronization of the first, second, or second local blockchain copy is completed through finding a same largest block number returned from the at least some of the plurality of current consensus nodes to be consistent with a largest local block number.

25. The method of any of claims 16-24, wherein:

a process of adding the node as the new consensus node of the blockchain network causes no disruption to the blockchain network's operation.

26. The method of any of claims 16-25, wherein the first request to add the node as the new consensus node of the blockchain network comprises:

a request to change the node from an inactivated consensus node of the blockchain network to an activated consensus node of the blockchain network.

27. The method of any of claims 16-25, wherein the first request to add the node as the new consensus node of the blockchain network comprises:

a request to include the node in the blockchain network as the new consensus node.

28. A system for adding a node in a blockchain network, comprising:

one or more processors; and

one or more computer-readable memories coupled to the one or more processors and having instructions stored thereon that are executable by the one or more processors to perform the method of any of claims 16-27.

29. An apparatus for adding a node in a blockchain network comprising a plurality of modules for performing the method of any of claims 16-27.

30. A non-transitory computer-readable storage medium configured with instructions executable by one or more processors to cause the one or more processors to perform the method of any of claims 16-27.