

Claims

1. A computer-implemented method for granting permission to a requestor to join a first network, wherein the first network comprises a set of bridging nodes and a set of devices controllable by one or more of the set of bridging nodes, and wherein each bridging node is also a respective node of a blockchain network; the method being performing by a registration authority and comprising:
 - generating a first blockchain transaction, wherein the first blockchain transaction comprises an input comprising a signature linked to a first public key of the registration authority, and a first output comprising a first certificate, wherein the first certificate comprises an identifier assigned to the requestor; and
 - transmitting the first blockchain transaction to the blockchain network for inclusion in the blockchain.
2. The method of claim 1, wherein the first transaction comprises a second output locked to a second public key of the registration authority,
3. The method of claim 2, wherein the first output is time-locked to the second public key of the registration authority, wherein a time-lock prevents the first output from being unlocked until after a predetermined period of time.
4. The method of claim 2 or claim 3, wherein the first output is locked to at least the second public key of the registration authority and a different public key.
5. The method of any of claims 1 to 4, comprising, transmitting a transaction identifier of the first blockchain transaction to the permission requestor.
6. The method of any of claims 1 to 5, wherein the certificate is encrypted with an encryption key, the encryption key being generated by the registration authority.

7. The method of any of claims 1 to 6, comprising:
 - receiving a request from the requestor to join the network, wherein the request comprises one or more credentials; and
 - validating the request based on the one or more credentials, wherein said generating of the first blockchain transaction is conditional on the request being valid.
8. The method of any of claims 1 to 7, wherein the set of bridging nodes comprises a master node and a set of intermediary nodes controllable by the master node, and wherein the registration authority is the master node.
9. The method of any of claims 1 to 8, wherein the set of bridging nodes comprises the master node and the set of intermediary nodes controllable by the master node, and wherein the requestor is the master node.
10. The method of any of claims 1 to 9, wherein the requestor is a respective node of the blockchain network, and wherein the certificate comprises a public key assigned to the permission requestor.
11. The method of any of claims 1 to 8, wherein the requestor is a device controllable by one or more bridging nodes of the first network, and wherein the method comprises:
 - transmitting, to the requestor, a set of certificates, each certificate in the set having been transmitted to a respective one of the set of nodes.
12. The method of any of claims 1 to 11, comprising, transmitting the first certificate to one or more of the set of bridging nodes.
13. The method of claim 2 or any claim dependent thereon, comprising:
 - generating a second blockchain transaction, wherein the second blockchain transaction comprises an input that references the second output of the first transaction and comprises a signature linked to the second public key of the registration authority; and
 - transmitting the second blockchain transaction to the blockchain network for inclusion in the blockchain.

14. A computer-implemented method for requesting permission to join a first network, wherein the first network comprises a set of bridging nodes and a set of devices controllable by one or more of the set of bridging nodes, and wherein each bridging node is also a respective node of a blockchain network; the method being performing by a requestor and comprising:

- transmitting, to a registration authority, a request to join the first network; and
- obtaining a first certificate, the certificate being issued by the registration authority and comprising an identifier assigned to the requestor.

15. The method of claim 14, wherein said obtaining comprises:

- receiving a transaction identifier of a first blockchain transaction comprising the first certificate; and

- obtaining the first blockchain transaction from the blockchain using the transaction identifier.

16. The method of claim 15, wherein the first blockchain transaction comprises a first input comprising the certificate, and a second output linked to a public key of the registration authority and wherein the method comprises:

- identifying the public key of the registration authority; and
- identifying one or more second certificates contained in one or more respective transactions transmitted to the blockchain from the public key of the registration authority, each second certificate being issued to a respective bridging node or device or the network.

17. The method of claim 16, wherein the first certificate comprises a public key of the requestor, wherein each second certificate issued to a respective one of the set of bridging nodes of the first network comprises a respective public key of said node, and wherein the method comprises:

- transmitting a third blockchain transaction to at least one of said set of bridging nodes, wherein the third blockchain transaction comprises an output locked to the respective public key of the at least one bridging node.

18. The method of any of claims 14 to 17, said obtaining comprises of the first certificate comprises receiving the first certificate from the registration authority.
19. The method of any of claims 14 to 18, comprising:
receiving one or more second certificates from the registration authority, each second certificate being issued to a respective one of the set of bridging nodes or devices of the first network.
20. The method of claim 19, wherein the first certificate comprises a network address of the requestor, wherein each second certificate issued to the respective bridging node of the first network comprises a respective network address of said node, and wherein the method comprises:
transmitting a message to one or more of said set of bridging nodes, the message being transmitted from the network address of the requestor to the respective network address of the one or more bridging nodes to which the message is transmitted.
21. The method of claim 14 or any of claims 18 to 20, wherein the requestor is one of the set of devices of the first network.
22. The method of any of claims 14 to 21, wherein the requestor is one of the set of nodes of the first network.
23. The method of claim 22, wherein the set of bridging nodes comprises a master node and one or more intermediary nodes controllable by the master node, and wherein the requestor is the master node.
24. The method of any of claims 14 to 23, wherein the request comprises one or more credentials of the requestor.
25. The method of claim 24, wherein the one or more credentials comprises an IP address of the requestor.

26. Computer equipment comprising:
memory comprising one or more memory units; and
processing apparatus comprising one or more processing units, wherein the memory stores code arranged to run on the processing apparatus, the code being configured so as when on the processing apparatus to perform the method of any of claims 1 to 13.
27. A computer program embodied on computer-readable storage and configured so as, when run on computer equipment of claim 26, to perform the method of any of claims 1 to 13.
28. Computer equipment comprising:
memory comprising one or more memory units; and
processing apparatus comprising one or more processing units, wherein the memory stores code arranged to run on the processing apparatus, the code being configured so as when on the processing apparatus to perform the method of any of claims 14 to 25.
29. A computer program embodied on computer-readable storage and configured so as, when run on computer equipment, to perform the method of any of claims 14 to 25.