CLAIMS

1. A message transmission method, applicable to a relay node in a blockchain relay communication network, the method comprising:

receiving (302) a digital certificate sent by each blockchain node of a plurality of blockchain nodes, the digital certificate comprising identity information of a corresponding blockchain node and network identifier information of a blockchain network to which the corresponding blockchain node belongs, wherein the identity information of the corresponding blockchain node comprises node identifier information and a node public key of the corresponding blockchain node of the plurality of blockchain nodes;

performing (304) signature verification for the digital certificate by using a public key of a certification authority, CA, issuing the digital certificate;

performing, by using the node public key comprised in the digital certificate, signature verification for the node identifier information comprised in the digital certificate, and associatively recording a mapping relationship between identity information of the corresponding blockchain node and corresponding network identifier information in a case that the signature verification succeeds;

determining (306), in a case that a blockchain message sent by any blockchain node is received, receiver identity information of the blockchain message and target network identifier information of the any blockchain node, and determining, according to the mapping relationship, a target blockchain node matching the target network identifier information and the receiver identity information;

establishing a persistent transmission channel with the target blockchain node, the persistent transmission channel being configured for transmitting the blockchain message between the relay node and the target blockchain node; and

transmitting (308) the blockchain message to the target blockchain node through the established persistent transmission channel.

2. The method according to claim 1, wherein the network identifier information of the blockchain network to which each blockchain node of the plurality of blockchain nodes belongs is generated by the CA based on a genesis block maintained by the corresponding blockchain node.

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

sending a digital certificate of the relay node to the each blockchain node of the plurality of blockchain nodes,

wherein in a case that signature verification for the digital certificate of the relay node by the each blockchain node of the plurality of blockchain nodes by using the public key of the CA succeeds, the digital certificate of the each blockchain node of the plurality of blockchain nodes is sent to the relay node.

4. The method according to claim 1, wherein the blockchain message comprises a set identifier of a target blockchain node set; and

the method further comprises: determining the target blockchain node set corresponding to the set identifier; and

the determining, according to the mapping relationship, a target blockchain node matching the target network identifier information and the receiver identity information comprises: determining, according to the mapping relationship, a target blockchain node matching the target network identifier information and the receiver identity information in the target blockchain node set.

5. The method according to claim 4, further comprising:

registering, according to a registration request submitted by the each blockchain node of the plurality of blockchain nodes, the each blockchain node of the plurality of blockchain nodes to a blockchain node set indicated by the registration request; and/or

wherein the digital certificate of the each blockchain node of the plurality of blockchain nodes comprises a set identifier of a blockchain node set to which the each blockchain node of the plurality of blockchain nodes belongs; and the method further comprises:

registering, in a case that the signature verification for the digital certificate succeeds, the each blockchain node of the plurality of blockchain nodes to the blockchain node set indicated by the set identifier comprised in the digital certificate respectively.

6. The method according to claim 1, wherein the blockchain message comprises at least one of the following:

a block synchronization message, a consensus message, and a transaction synchronization message.