CLAIMS

What is claimed is:

1. A communication optimization system of a blockchain network, comprising: two or more relay nodes, and a global node;

wherein the relay node is configured to: establish a connection with a blockchain node in response to a connection request of the blockchain node; receive a registration request transmitted by the blockchain node, wherein the registration request comprises an ID of the blockchain node and an ID of a relay node connected to the blockchain node; generate a registration event based on the registration request and transmit the registration event to the global node, wherein the registration event comprises the ID of the blockchain node and the ID of the relay node connected to the blockchain node; update a local routing table based on the obtained registration event, wherein the local routing table comprises a corresponding relationship between the ID of the blockchain node and the ID of the relay node connected to the blockchain node; and forward a message of the blockchain node based on the local routing table; and

the global node is configured to transmit a registration event of any relay node to another relay node.

2. The system according to claim 1, wherein the relay node comprises an IP module, a first load balancing module, a group of proxy nodes, a service discovery module, and a first database;

the IP module is configured to: receive a connection request comprising an IP of the IP module from a blockchain node, and establish a connection with the blockchain node; receive a registration request of the blockchain node and transmit the registration request to a first load balancing module of the same relay node; and receive a message of the blockchain node and transmit the message to the first load balancing module of the same relay node;

the first load balancing module is configured to: receive the registration request of the blockchain node from the IP module of the same relay node and transmit the registration request to one of a group of proxy nodes within the same relay node; receive the message of the blockchain node from the IP module of the same relay node and transmit the message to one of the group of proxy nodes within the same relay node; and receive a message of a blockchain node from a proxy node in another

relay node and transmit the message to one of the group of proxy nodes within the same relay node;

the proxy node is configured to: establish a connection with the blockchain node in response to the received registration request; generate a registration event based on the registration request and transmit the registration event to the service discovery module; update the local routing table based on the obtained registration event; and forward the message of the blockchain node based on the local routing table; wherein the registration event further comprises an IP of a proxy node connected to the blockchain node; and the local routing table further comprises a corresponding relationship between the ID of the blockchain node and the IP of the proxy node connected to the blockchain node; and

the service discovery module is configured to: transmit a registration event generated by any proxy node in the same relay node to another proxy node in the same relay node; transmit the registration event generated by any proxy node in the same relay node to the global node, so the global node transmits the registration event to a service discovery module of another relay node; write the registration event received from any proxy node in the same relay node into the first database; and receive a registration event of another relay node from the global node and forward the registration event to each proxy node in the same relay node.

3. The system according to claim 2, wherein the proxy node of each relay node stores a corresponding relationship between an ID of another relay node and an IP of a first load balancing module of the another relay node;

the forwarding the message of the blockchain node based on the local routing table comprises:

searching for an ID of a relay node corresponding to an ID of a destination blockchain node based on the local routing table after receiving a unicast message comprising the ID of the destination blockchain node, obtaining the ID of the relay node connected to the destination blockchain node to determine whether the relay node connected to the destination blockchain node is a current relay node; if no, determining an IP of a first load balancing module of the relay node connected to the destination blockchain node based on the ID of the relay node connected to the destination blockchain node, and transmitting the unicast message to the first load balancing module of the relay node connected to the destination blockchain node based on the determined IP of the first load balancing module; and if yes, searching

for an IP of a proxy node corresponding to the ID of the destination blockchain node based on the local routing table, obtaining the IP of the proxy node connected to the destination blockchain node to determine whether the proxy node connected to the destination blockchain node is a current proxy node, if yes, transmitting the unicast message to the destination blockchain node, and otherwise, transmitting the unicast message to the proxy node connected to the destination blockchain node based on the IP of the proxy node connected to the destination blockchain node.

4. The system according to claim 2, wherein the forwarding the message based on the local routing table comprises:

transmitting a broadcast message to another proxy node in a current relay node after receiving the broadcast message, transmitting the broadcast message to a first load balancing module of another relay node, searching for a corresponding relationship comprising an IP of a current proxy node in the local routing table, and transmitting the broadcast message to a connected blockchain node based on an ID of a blockchain node in the identified corresponding relationship.

5. The system according to claim 2, wherein the registration request further comprises an ID of a blockchain network that comprises the blockchain node, and the registration event further comprises the ID of the blockchain network that comprises the blockchain node;

the local routing table comprises a unicast routing table and a broadcast routing table, wherein the unicast routing table comprises a corresponding relationship between the ID of the blockchain node, the IP of the proxy node connected to the blockchain node, and the ID of the relay node connected to the blockchain node, and the broadcast routing table comprises a corresponding relationship among the ID of the blockchain network, the ID of the blockchain node in the blockchain network, the IP of the proxy node connected to the blockchain node in the blockchain network, and the ID of the relay node connected to the blockchain node in the blockchain network.

6. The system according to claim 5, wherein the proxy node of each relay node stores a corresponding relationship between an ID of another relay node and an IP of a first load balancing module of the another relay node;

the forwarding the message based on the local routing table comprises:

searching for a target corresponding relationship comprising an ID of a destination blockchain network in the broadcast routing table after receiving a broadcast message comprising the ID of the destination blockchain network; checking

whether the target corresponding relationship comprises an ID of a current relay node, if yes, transmitting the broadcast message to another proxy node in the current relay node; checking whether the target corresponding relationship comprises an ID of another relay node, if yes, determining an IP of a first load balancing module of the another relay node based on the checked ID of the another relay node, and transmitting the broadcast message to the first load balancing module of the another relay node based on the determined IP of the first load balancing module; checking whether the broadcast routing table comprises a destination corresponding relationship comprising the ID of the destination blockchain network and an IP of a current proxy node, and if yes, transmitting the broadcast message to a connected blockchain node in the destination blockchain network based on an ID of the blockchain node in the destination corresponding relationship.

7. The system according to claim 1, wherein the registration request further comprises a main/standby identifier of the relay node connected to the blockchain node for indicating that the relay node is a main relay node or a standby relay node of the blockchain node; the registration event further comprises the main/standby identifier of the relay node connected to the blockchain node; and the local routing table comprises a corresponding relationship among the ID of the blockchain node, the ID of the relay node connected to the blockchain node, and the main/standby identifier of the relay node connected to the blockchain node;

the standby relay node of the blockchain node is configured to receive a message transmitted by the blockchain node or a message transmitted to the blockchain node when the main relay node of the blockchain node fails.

8. The system according to claim 1, wherein a persistent connection is established between the blockchain node and the relay node through the IP of the relay node.

9. The system according to claim 2, wherein a persistent connection is established between relay nodes through IPs of first load balancing modules.

10. The system according to claim 2, wherein a persistent connection is established between proxy nodes in the same relay node through IPs of the proxy nodes.

11. The system according to claim 1, wherein a message body in the message is encrypted.

12. The system according to claim 2, wherein the global node comprises a second load balancing module, a group of work nodes, and a second database;

the second load balancing module is configured to receive the registration event from the service discovery module and transmit the registration event to one of the group of work nodes; and

the work node is configured to write the received registration event into the second database, and transmit a registration event of any relay node to a service discovery module of another relay node.

13. The system according to claim 1, wherein the relay node is further configured to: receive a deregistration request transmitted by the connected blockchain node, wherein the deregistration request comprises the ID of the blockchain node; generate a deregistration event based on the deregistration request and transmit the deregistration event to the global node, wherein the deregistration event comprises the ID of the blockchain node; and update the local routing table based on the obtained deregistration event; and

the global node is configured to transmit a deregistration event of any relay node to another relay node.

14. A registration method of a blockchain network-based communication optimization system, wherein the communication optimization system comprises: two or more relay nodes, and a global node; the relay node comprises an IP module, a first load balancing module, a group of proxy nodes, a service discovery module, and a first database; and the method is performed by any proxy node in the relay node, and comprises:

receiving a registration request of a blockchain node from a first load balancing module of the same relay node, and establishing a connection with the blockchain node in response to the registration request;

generating a registration event based on the registration request;

transmitting the registration event to a service discovery module of the same relay node, so the service discovery module of the same relay node transmits the registration event to the global node, and the global node transmits the registration event to a service discovery module of another relay node;

receiving a registration event of another relay node from the service discovery module of the same relay node; and

updating a local routing table based on the obtained registration event.

15. A registration system of a blockchain network-based communication optimization system, wherein the communication optimization system comprises: two or more relay nodes, and a global node; the relay node comprises a first load balancing module, a group of proxy nodes, a service discovery module, and a first database; and the registration system is implemented on any proxy node in the relay node, and comprises:

a connection module, configured to receive a registration request of a blockchain node from a first load balancing module of the same relay node, and establish a connection with the blockchain node in response to the registration request;

a registration event generation module, configured to generate a registration event based on the registration request;

a registration event transmission module, configured to transmit the registration event to a service discovery module of the relay node, so the service discovery module of the same relay node transmits the registration event to the global node, and the global node transmits the registration event to a service discovery modules of another relay node;

a registration event receiving module, configured to receive a registration event of another relay node from the service discovery module of the relay node; and

a local routing table updating module, configured to update a local routing table based on the obtained registration event.

16. A registration apparatus of a blockchain network-based communication optimization system, comprising a processor and a storage device, wherein the storage device is configured to store an instruction that, when executed by the processor, implements the method according to claim 14.