COMMUNICATION METHOD, CP DEVICE, AND NAT DEVICE

~~This application claims priority to Chinese Patent Application No. 202010712973.3, filed with the China National Intellectual Property Administration on July 22, 2020 and entitled "COMMUNICATION METHOD, CP DEVICE, AND NAT DEVICE", which is incorporated herein by reference in its entirety.~~

TECHNICAL FIELD

[0001] This application relates to the field of communication technologies, and in particular, to a communication method, a CP device, and a NAT device.

BACKGROUND

[0002] As a quantity of broadband users increases rapidly, public network Internet protocol (Internet Protocol, IP) addresses (for example, public network Internet protocol version 4 (Internet Protocol version 4, IPv4) addresses) face a problem of insufficient resources. In view of this, a NAT device for executing a NAT technology such as a network address translation (Network Address Translation, NAT) technology and a carrier grade NAT (Carrier Grade NAT, CGN) technology is provided to resolve this problem. Specifically, a gateway device such as a broadband network gateway (Broadband Network Gateway, BNG) assigns a private network IP address to a user. The NAT device translates the private network IP address to a public network IP address, so that the public network IP address obtained after translation supports the user in accessing a public network. Because a plurality of private network IP addresses can be translated to the same public network IP address, a problem of insufficient public network IP address resources is effectively resolved. Because the private network IP address of the user is hidden due to deployment of a NAT function, it is usually required to implement a tracing function when the NAT function is deployed. The tracing indicates that the private network IP address of the user can be queried based on the public network IP address of the user, to lock the specific user based on the private network IP address.

CLAIMS

~~What is claimed is:~~

1. A communication method, applied to a control plane, CP, device in a communications system in which a CP and a user plane, UP, are separated, wherein the method comprises:

assigning, by the CP device, a first Internet protocol, IP, address to a user;

sending, by the CP device, the first IP address to a network address translation, NAT, device;

receiving, by the CP device, a second IP address from the NAT device, wherein the second IP address is a public network IP address that is assigned by the NAT device to the user; and

sending, by the CP device, an accounting packet to a remote authentication dial in user service, RADIUS, server, wherein the accounting packet comprises the first IP address and the second IP address.

2. The method according to claim 1, wherein the first IP address comprises at least one of a private network Internet protocol version 4, IPv4, address or an Internet protocol version 6, IPv6, address.

3. The method according to claim 1 or 2, wherein the communications system comprises a gateway system, and the gateway system is a broadband network gateway, BNG, system or a broadband remote access server, BRAS, system.

4. The method according to any one of claims 1 to 3, wherein the accounting packet further comprises a port block, and the port block comprises at least one port number that is assigned by the NAT device to the user, and

the receiving, by the CP device, a second IP address from the NAT device comprises: receiving, by the CP device, information about the user from the NAT device, wherein the information about the user comprises a correspondence among the first IP address, the second IP address, and the port block.

5. The method according to claim 4, wherein before the CP device receives the port block from the NAT device, the method further comprises:

receiving, by the CP device, a port block set from the RADIUS server, wherein the port block set comprises the port block; and

sending, by the CP device, the port block set to the NAT device.

6. The method according to claim 4 or 5, wherein after the sending, by the CP device, an

accounting packet to a remote authentication dial in user system RADIUS server, the method further comprises at least one of the following:

if the user is offline, sending, by the CP device, a delete message to the NAT device, wherein the delete message is used to indicate the NAT device to delete the information that is about the user and that is stored in the NAT device; and

if the user is offline, deleting, by the CP device, the information that is about the user and that is stored in the CP device.

7. The method according to any one of claims 4 to 6, wherein the NAT device comprises an active NAT device and a standby NAT device, each of which is a reserve one to the other, and the receiving, by the CP device, a second IP address from the NAT device comprises:

receiving, by the CP device, the information about the user from the active NAT device.

8. The method according to claim 7, wherein after the receiving, by the CP device, the information about the user from the active NAT device, the method further comprises:

sending, by the CP device, the information about the user to the standby NAT device.

9. The method according to claim 7, wherein the method further comprises:

if the active NAT device is in a faulty state, sending, by the CP device, a first update message to the standby NAT device, wherein the first update message is used to indicate the standby NAT device to improve a route priority corresponding to the second IP address.

10. The method according to claim 9, wherein the method further comprises:

if the active NAT device is in the faulty state, sending, by the CP device, a second update message to the standby NAT device, wherein the second update message is used to indicate the standby NAT device to improve a route priority corresponding to a third IP address, the third IP address is an IP address of a tunnel endpoint, and the tunnel endpoint comprises the active NAT device or the standby NAT device.

11. A communication method, applied to a network address translation NAT device, wherein the method comprises:

receiving, by the NAT device from a control plane, CP, device, a first Internet protocol, IP, address that is assigned by the CP device to a user, wherein the CP device is a CP device in a communications system in which a CP and a user plane, UP, are separated;

assigning, by the NAT device, a second IP address to the user, wherein the second IP address is a public network IP address; and

sending, by the NAT device, the second IP address to the CP device.

12. The method according to claim 11, wherein after the receiving, by the NAT device from a control plane CP device, a first Internet protocol IP address that is assigned by the CP device to a user, the method further comprises:

assigning, by the NAT device, a port block to the user, wherein the port block comprises at least one port number; and

sending, by the NAT device, the port block to the CP device.

13. The method according to claim 12, wherein before the assigning, by the NAT device, a port block to the user, the method further comprises: receiving, by the NAT device, a port block set from the CP device; and

the assigning, by the NAT device, a port block to the user comprises: assigning, by the NAT device, the port block in the port block set to the user.

14. The method according to claim 12, wherein after the assigning, by the NAT device, a second IP address to the user, the method further comprises:

storing, by the NAT device, information about the user, wherein the information about the user comprises a correspondence among the first IP address, the second IP address, and the port block.

15. The method according to claim 14, wherein the sending, by the NAT device, the second IP address to the CP device comprises:

sending, by the NAT device, the information about the user to the CP device.

16. The method according to claim 14 or 15, wherein after the sending, by the NAT device, the second IP address to the CP device, the method further comprises:

receiving, by the NAT device, a delete message from the CP device; and

deleting, by the NAT device, the information about the user in response to the delete message.

17. The method according to claim 11, wherein the NAT device is a standby NAT device in an active NAT device and the standby NAT device, each of which is a reserve one to the other, and before the assigning, by the NAT device, a second IP address to the user, the method further comprises:

receiving, by the NAT device, information about the user from the CP device, wherein the information about the user comprises a correspondence among the first IP address, the second IP address, and a port block, and the port block comprises at least one port number; and

the assigning, by the NAT device, a second IP address to the user comprises:

when the active NAT device is faulty, assigning, by the standby NAT device, the second IP address to the user based on the information about the user.

18. The method according to claim 17, wherein the method further comprises:

receiving, by the standby NAT device, a first update message from the CP device; and

in response to the first update message, improving, by the standby NAT device, a route priority corresponding to the second IP address.

19. The method according to claim 17 or 18, wherein the method further comprises:

receiving, by the standby NAT device, a second update message from the CP device; and

in response to the second update message, improving, by the standby NAT device, a route priority corresponding to a third IP address, wherein the third IP address is an IP address of a tunnel endpoint, and the tunnel endpoint comprises the active NAT device or the standby NAT device.

~~20. A control plane CP device, wherein the CP device is in a communications system in which a CP and a user plane UP are separated, and the CP device comprises:~~

~~an assignment unit, configured to assign a first Internet protocol IP address to a user;~~

~~a sending unit, configured to send the first IP address to a network address translation NAT device; and~~

~~a receiving unit, configured to receive a second IP address from the NAT device, wherein the second IP address is a public network IP address that is assigned by the NAT device to the user, and~~

~~the sending unit is further configured to send an accounting packet to a remote authentication dial in user system RADIUS server, wherein the accounting packet comprises the first IP address and the second IP address.~~

~~21. A network address translation NAT device, wherein the NAT device comprises:~~

~~a receiving unit, configured to receive, from a control plane CP device, a first Internet protocol IP address that is assigned by the CP device to a user, wherein the CP device is a CP device in a communications system in which a CP and a user plane UP are separated;~~

~~an assignment unit, configured to assign a second IP address to the user, wherein the second IP address is a public network IP address; and~~

~~a sending unit, configured to send the second IP address to the CP device.~~

20. A network device, wherein the network device is configured to implement the method

according to any one of claims 1 to 19.

~~22~~21. A communications system, wherein the communications system comprises the CP device ~~according to claim 20~~configured to implement the method according to any one of claims 1 to 10 and the NAT device configured to implement the method according to any one of claims 11 to 19~~according to claim 21~~.

~~23~~22. A computer-readable storage medium, wherein the storage medium stores at least one instruction, and the instruction is read by a processor so that a control plane CP device in a communications system in which the CP device and a user plane UP are separated performs the method according to any one of claims 1 to 10.

~~24~~23. A computer-readable storage medium, wherein the storage medium stores at least one instruction, and the instruction is read by a processor so that a network address translation NAT device performs the method according to any one of claims 11 to 19.