

CLAIMS

What is claimed is:

1. A packet retransmission method, wherein the method is applied to a remote direct memory access RDMA network, and the method comprises:

5 receiving, by a transmit end, a first selective acknowledgment SACK packet from a receive end, wherein the first SACK packet indicates that at least one of packets sent by the transmit end to the receive end fails to be sent;

 retransmitting, by the transmit end, the at least one packet to the receive end, and when retransmitting the last packet in the at least one packet, recording a packet sequence number of the
10 first new packet to be sent by the transmit end; and

 retransmitting, by the transmit end, a first packet to the receive end again when the transmit end receives a second SACK packet and a packet sequence number of a packet carried in the second SACK packet is greater than or equal to the packet sequence number of the first new packet, and if the transmit end determines, based on the second SACK packet, that the transmit end still
15 has not received the first packet in the at least one packet.

2. The method according to claim 1, wherein the first SACK packet carries a bitmap, the bitmap comprises at least one bit, and some bits of the at least one bit indicate that the at least one of the packets sent by the transmit end to the receive end fails to be sent.

3. The method according to claim 1 or 2, wherein the retransmitting, by the transmit end, a
20 first packet to the receive end again when the transmit end receives a second SACK packet and a packet sequence number of a packet carried in the second SACK packet is greater than or equal to the packet sequence number of the first new packet, and if the transmit end determines, based on the second SACK packet, that the transmit end still has not received the first packet in the at least one packet comprises:

25 when receiving each SACK packet, comparing, by the transmit end, a packet sequence number carried in each SACK packet with the recorded packet sequence number of the first new packet, to determine whether the packet sequence number carried in each SACK packet is greater than or equal to the packet sequence number of the first new packet;

 when the transmit end receives the second SACK packet and the packet sequence number of
30 the packet carried in the second SACK packet is greater than or equal to the packet sequence

number of the first new packet, determining, by the transmit end, whether an ACK packet corresponding to the at least one packet is not received for the retransmitted at least one packet; and

5 if the transmit end still has not received an ACK packet corresponding to the first packet in the at least one packet, retransmitting, by the transmit end, the first packet to the receive end again.

4. The method according to any one of claims 1 to 3, wherein a time period from a time when the transmit end starts to retransmit the at least one packet to a time when the transmit end retransmits the first packet again is less than one timeout period.

10 5. A packet retransmission method, wherein the method is applied to a remote direct memory access RDMA network, and the method comprises:

receiving, by a transmit end, a first selective acknowledgment SACK packet from a receive end, wherein the first SACK packet indicates that at least one of packets sent by the transmit end to the receive end fails to be sent;

15 retransmitting, by the transmit end, the at least one packet to the receive end, and recording, when retransmitting each of the at least one packet, a packet sequence number of the first new packet to be sent by the transmit end after the transmit end retransmits each packet, wherein the at least one packet comprises a second packet, and a packet sequence number that is of the first new to-be-sent packet and that is recorded by the transmit end when the transmit end retransmits the second packet is a packet sequence number of a first new packet; and

20 when the transmit end receives a second SACK packet and a packet sequence number of a packet carried in the second SACK packet is greater than or equal to the recorded packet sequence number of the first new packet, if the transmit end still has not received an ACK packet corresponding to the second packet, retransmitting, by the transmit end, the second packet again.

25 6. The method according to claim 5, wherein the first SACK packet carries a bitmap, the bitmap comprises at least one bit, and some bits of the at least one bit indicate that the at least one of the packets sent by the transmit end to the receive end fails to be sent.

7. The method according to claim 5 or 6, wherein before the retransmitting, by the transmit end, the at least one packet to the receive end, the method further comprises:

30 establishing, by the transmit end, a linked list for each of a plurality of packet queues, wherein the linked list is used to record a packet sequence number of the first new packet to be sent by the transmit end after the transmit end retransmits any packet in the retransmitted packet queue.

8. The method according to claim 7, wherein the recording, when retransmitting each of the at least one packet, a packet sequence number of the first new packet to be sent by the transmit end after the transmit end retransmits each packet comprises:

when retransmitting the second packet, determining, by the transmit end, a first linked list corresponding to a packet queue in which the second packet is located, and recording, in the first linked list, a packet sequence number of the first new packet to be sent by the transmit end after the transmit end retransmits the second packet, wherein the packet sequence number is the packet sequence number of the first new packet.

9. The method according to any one of claims 5 to 8, wherein a time period from a time when the transmit end starts to retransmit the at least one packet to a time when the transmit end retransmits the second packet again is less than one timeout period.

10. A communication apparatus, wherein the communication apparatus serves as a transmit end, the communication apparatus is applied to a remote direct memory access RDMA network, and the communication apparatus comprises:

a receiver, configured to receive a first selective acknowledgment SACK packet from a receive end, wherein the first SACK packet indicates that at least one of packets sent by the transmit end to the receive end fails to be sent;

a transmitter, configured to retransmit the at least one packet to the receive end; a memory, configured to: when the transmit end retransmits the last packet in the at least one packet, record a packet sequence number of the first new packet to be sent by the transmit end; and

a processor, configured to: determine that the transmit end receives a second SACK packet and a packet sequence number of a packet carried in the second SACK packet is greater than or equal to the packet sequence number of the first new packet; and if the transmit end still has not received an ACK packet corresponding to a first packet in the at least one packet, indicate the transmitter to retransmit the first packet to the receive end again.

11. The communication apparatus according to claim 10, wherein the first SACK packet carries a bitmap, the bitmap comprises at least one bit, and some bits of the at least one bit indicate that the at least one of the packets sent by the transmit end to the receive end fails to be sent.

12. The communication apparatus according to claim 10 or 11, wherein the processor is configured to: when the transmit end receives each SACK packet, compare a packet sequence number carried in each SACK packet with the recorded packet sequence number of the first new

packet, to determine whether the packet sequence number carried in each SACK packet is greater than or equal to the packet sequence number of the first new packet; and

when the second SACK packet is received and the packet sequence number of the packet carried in the second SACK packet is greater than or equal to the packet sequence number of the first new packet, determine whether an ACK packet corresponding to the at least one packet is not received; and

the transmitter is configured to retransmit the first packet to the receive end again if the transmit end still has not received an ACK packet corresponding to the first packet in the at least one packet.

13. The communication apparatus according to any one of claims 10 to 12, wherein a time period from a time when the transmit end starts to retransmit the at least one packet to a time when the transmit end retransmits the first packet again is less than one timeout period.

14. A communication apparatus, wherein the communication apparatus serves as a transmit end, the communication apparatus is applied to a remote direct memory access RDMA network, and the communication apparatus comprises:

a receiver, configured to receive a first selective acknowledgment SACK packet from a receive end, wherein the first SACK packet indicates that at least one of packets sent by the transmit end to the receive end fails to be sent;

a transmitter, configured to retransmit the at least one packet to the receive end; and

a memory, configured to: during retransmission of each of the at least one packet, record a packet sequence number of the first new packet to be sent by the transmit end after the transmit end retransmits each packet, wherein the at least one packet comprises a second packet, and a packet sequence number that is of the first new to-be-sent packet and that is recorded by the transmit end when the transmit end retransmits the second packet is a packet sequence number of a first new packet; wherein

the receiver is further configured to: when the receiver receives a second SACK packet and a packet sequence number of a packet carried in the second SACK packet is greater than or equal to the recorded packet sequence number of the first new packet, if the receiver still has not received an ACK packet corresponding to the second packet, indicate the transmitter to retransmit the second packet again.

15. The communication apparatus according to claim 14, wherein the first SACK packet carries a bitmap, the bitmap comprises at least one bit, and some bits of the at least one bit indicate that the at least one of the packets sent by the transmit end to the receive end fails to be sent.

5 16. The communication apparatus according to claim 14 or 15, further comprising a processor, configured to:

establish a linked list for each of a plurality of packet queues, wherein the linked list is stored in the memory, and the linked list is used to record a packet sequence number of the first new packet to be sent by the transmit end after the transmit end retransmits any packet in the retransmitted packet queue.

10 17. The communication apparatus according to claim 16, wherein the memory is configured to:

during retransmission of the second packet, determine a first linked list corresponding to a packet queue in which the second packet is located, and record, in the first linked list, a packet sequence number of the first new packet to be sent by the transmit end after the transmit end retransmits the second packet, wherein the packet sequence number is the packet sequence number of the first new packet.

18. The communication apparatus according to any one of claims 14 to 17, wherein a time period from a time when the transmit end starts to retransmit the at least one packet to a time when the transmit end retransmits the second packet again is less than one timeout period.

20 ~~19. A computer-readable storage medium, comprising computer instructions, wherein when the computer instructions are run on an electronic device, the electronic device is enabled to perform the method according to any one of claims 1 to 9.~~

~~20. A computer program product, wherein when the computer program product runs on a computer, an electronic device is enabled to perform the method according to any one of claims 1 to 9.~~

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