CLAIMS

What is claimed is:

1. A communication method~~, applied to a first access network device and~~ comprising:

receiving a first data packet and first core network sequence number~~indication information~~ from a core network device, wherein the first core network sequence number~~indication information~~ indicates a sequence of the first data packet in at least one data packet;

determining a first sequence number of a first protocol layer of the first data packet based on the first core network sequence number~~indication information~~; and

sending the first data packet to a terminal device.

2. The method according to claim 1, wherein

the first core network sequence number is set by the core network device.

~~the first indication information comprises at least one of the following information:~~

~~a general packet radio service tunneling protocol-user plane GTP-U sequence number and a first service sequence number, wherein~~

~~the first service sequence number is set by the core network device or a data server, and the at least one data packet is a data packet of a first service.~~

3. The method according to claim 1 or 2, wherein the first protocol layer ~~comprises at least one of the following:~~is

~~a service data adaptation protocol SDAP layer,~~ a packet data convergence protocol PDCP layer~~, and a radio link control layer RLC layer~~.

4. The method according to any one of claims 1 to 3, wherein

the at least one data packet is of first service, the first service is multicast service.

5. The method according to any one of claims 1 to 4, wherein determining a first sequence number of a first protocol layer of the first data packet based on the first core network sequence number comprises:

determining that a value of the first sequence number of a first protocol layer of the first data packet is equal to a value of the first core network sequence number.

6~~4~~. The method according to any one of claims 1 to 5~~3~~, wherein the method further comprises:

setting ~~a start~~the first sequence number of the first protocol layer of the first data packet based on the first core network sequence number~~indication information~~ when any one of establishment

of a first protocol entity, re-establishment of the first protocol entity, and recovery of the first protocol entity occurs.

7~~5~~. The method according to any one of claims 1 to ~~4~~6, wherein the method further comprises:

sending ~~second~~ indication information to the terminal device, wherein the ~~second~~ indication information indicates a sequence number of the 1st data packet that is of the first service and that is sent by the first access network device to the terminal device after the first protocol entity is established, the first protocol entity is re-established, or the first protocol entity is recovered.

8~~6~~. The method according to any one of claims 1 to ~~5~~7, wherein the method further comprises:

receiving third indication information from a second access network device, wherein the third indication information indicates the first access network device to stop forwarding a data packet to the second access network device; and

stopping, based on the third indication information, forwarding the data packet to the second access network device.

~~7~~9. The method according to claim ~~6~~8, wherein the method further comprises:

receiving fourth indication information sent by the second access network device, wherein the fourth indication information indicates a sequence number of the 1st data packet forwarded by the first access network device to the second access network device; and

forwarding a data packet to the second access network device based on the fourth indication information.

10~~8~~. The method according to any one of claims 1 to ~~5~~9, wherein the method further comprises:

receiving fifth indication information sent by a second access network device, wherein the fifth indication information comprises a second sequence number N, and the second sequence number indicates a sequence number of the 1st data packet that is of the first service and that is sent by the second access network device to the terminal device after handover of the terminal device is completed; and

when a sequence number of a data packet successfully sent by the first access network device to the terminal device is N–1, stopping, by the first access network device, sending a data packet to the terminal device.

11~~9~~. A communication method~~, applied to a terminal device and~~ comprising:

receiving ~~second~~ indication information sent by a first access network device, wherein the

~~second~~ indication information indicates a sequence number of the 1st data packet that is of a first service and that is sent by the first access network device to the terminal device after a first protocol entity is established, the first protocol entity is re-established, or the first protocol entity is recovered.

12~~10~~. The method according to claim ~~9~~11, wherein the method further comprises:

when the first protocol entity is re-established or recovered, sending request information to the first access network device, wherein the request information requests the first access network device to send the sequence number of the 1st data packet that is of the first service and that is sent by the first access network device to the terminal device after the first protocol entity is re-established or the first protocol entity is recovered.

~~11~~13. The method according to claim ~~9~~ 11 or 12~~0~~, wherein the method further comprises:

sending status report information of a data packet to a second access network device, wherein the status report information of the data packet indicates, to the second access network device, a data packet successfully received by the terminal device and a data packet unsuccessfully received by the terminal device, wherein

the terminal device is handed over from the first access network device to the second access network device.

~~12~~14. A communication method~~, applied to a second access network device and~~ comprising:

receiving a ~~first~~ second data packet and ~~first~~ second core network sequence number~~indication information~~ from a core network device, wherein the second core network sequence number~~first indication information~~ indicates a sequence of the second ~~first~~ data packet in at least one data packet;

determining a second sequence number of a first protocol layer of the second ~~first~~ data packet based on the second core network sequence number~~first indication information~~; and

sending the ~~first~~ second data packet to a first terminal device.

~~13. The method according to claim 12, wherein~~

~~the first indication information comprises at least one of the following information:~~

~~a general packet radio service tunneling protocol-user plane GTP-U sequence number and a first service sequence number, wherein~~

~~the first service sequence number is set by the core network device or a data server, the first data packet is a data packet of a first service, and the at least one data packet is a data packet of~~

~~the first service.~~

~~14. The method according to claim 12 or 13, wherein the first protocol layer comprises at least one of the following:~~

~~a service data adaptation protocol SDAP layer, a packet data convergence protocol PDCP layer, and a radio link control layer RLC layer.~~

~~15. The method according to any one of claims 12 to 14, wherein the method further comprises:~~

~~determining a start sequence number of the first protocol layer of the first data packet based on the first indication information when any one of establishment of a first protocol entity, re-establishment of the first protocol entity, and recovery of the first protocol entity occurs.~~

~~16. The method according to any one of claims 12 to 15, wherein the method further comprises:~~

~~sending second indication information to the terminal device, wherein the second indication information indicates a sequence number of the 1st data packet that is of the first service and that is sent by a first access network device to the terminal device after the first protocol entity is established, the first protocol entity is re-established, or the first protocol entity is recovered.~~

15~~7~~. The method according to ~~any one of~~ claim~~s 12 to 15~~ 14, wherein the method further comprises:

receiving a data packet from a first access network device, wherein

a second terminal device connected to the first access network device is handed over from the first access network device to the second access network device, both the first terminal device and the second terminal device perform the first service, and the data packet sent by the first access network device is a data packet of the first service; and

sending third indication information to the first access network device when a second sequence number of a first protocol layer of a data packet that is being sent to the first terminal device is greater than or equal to a first sequence number of a first protocol layer of the data packet that is sent by the first access network device, wherein the third indication information indicates the first access network device to stop forwarding a data packet to the second access network device.

16~~8~~. The method according to claim 15~~7~~, wherein the method further comprises:

receiving status report information that is of a data packet and that is sent by the second

terminal device, wherein the status report information of the data packet indicates, to the second access network device, a data packet successfully received by the terminal device and a data packet unsuccessfully received by the terminal device; and

sending fourth indication information to the first access network device based on the status report information, wherein the fourth indication information indicates a sequence number of the 1st data packet forwarded by the first access network device to the second access network device.

17~~9~~. The method according to any one of claims ~~12~~ 14 to 16~~5~~, wherein the method further comprises:

sending fifth indication information to a first access network device, wherein the fifth indication information comprises a second sequence number N, and the second sequence number indicates a sequence number of the 1st data packet that is of the first service and that is sent by the second access network device to a second terminal device after handover of the second terminal device is completed.

18~~20~~. A communication method, applied to a core network device and comprising:

receiving at least one ~~a first~~ data packet from a data server;

sending a ~~second~~ first data packet and first core network sequence number~~indication information~~ to a first access network device, wherein the first core network sequence number~~indication information~~ indicates a sequence of the ~~second~~ first data packet in at least one data packet sent by the core network device; and

sending a ~~third~~ second data packet and second core network sequence number~~indication information~~ to a second access network device, wherein the second indication information indicates a sequence of the ~~third~~ second data packet in the at least one data packet sent by the core network device;

wherein data in the second data packet ~~and data in the third data packet are~~ is the same as data in the first data packet, a value of the first core network sequence number is equal to a value of the second core network sequence number.

19.The method according to claim 18, wherein the first core network sequence number is for determining a first sequence number of a first protocol layer of the first data packet;

the second core network sequence number is for determining a second sequence number of a first protocol layer of the second data packet.

20. The method according to claim 18 or 19, wherein the first core network sequence number

and the second core network sequence number are set by the core network device.

21. The method according to any one of claims 18 to 20, wherein the at least one data packet is of first service, the first service is multicast service.

22. The method according to any one of claims 18 to 21, wherein

the first sequence number of a first protocol layer of the first data packet is equal to the value of the first core network sequence number;

the second sequence number of a first protocol layer of the second data packet is equal to the value of the second core network sequence number.

23. The method according to any one of claims 18 to 21, wherein the first protocol layer is a packet data convergence protocol PDCP layer.

~~21. The method according to claim 20, wherein~~

~~the first indication information comprises at least one of the following information:~~

~~a general packet radio service tunneling protocol-user plane GTP-U sequence number and a first service sequence number, wherein~~

~~the first service sequence number is set by the core network device or the data server, the first data packet is a data packet of a first service, and the at least one data packet is a data packet of the first service.~~

24~~2~~. An access network device, wherein the access network device is a first access network device, and comprises:

a transceiver unit, configured to receive a first data packet and first core network sequence number~~indication information~~ from a core network device, wherein the first core network sequence number~~indication information~~ indicates a sequence of the first data packet in at least one data packet; and

a processing unit, configured to determine a first sequence number of a first protocol layer of the first data packet based on the first core network sequence number~~indication information~~, wherein

the transceiver unit is further configured to send the first data packet to a terminal device.

25~~3~~. The access network device according to claim ~~22~~24, wherein

the first core network sequence number is set by the core network device.

~~the first indication information comprises at least one of the following information:~~

~~a general packet radio service tunneling protocol-user plane GTP-U sequence number and a~~

~~first service sequence number, wherein~~

~~the first service sequence number is set by the core network device or a data server, the first data packet is a data packet of a first service, and the at least one data packet is a data packet of the first service.~~

26~~4~~. The access network device according to claim 2~~2~~4 or 25~~3~~, wherein the first protocol layer ~~comprises at least one of the following:~~

~~a service data adaptation protocol SDAP layer,~~is a packet data convergence protocol PDCP layer~~, and a radio link control layer RLC layer~~.

27. The access network device according to any one of claims 24 to 26, wherein the at least one data packet is of first service, the first service is multicast service.

28. The access network device according to any one of claims 24 to 27, wherein the processing unit is specifically configured to determine that a value of the first sequence number of a first protocol layer of the first data packet is equal to a value of the first core network sequence number.

29~~5~~. The access network device according to any one of claims ~~22~~ 24 to ~~24~~28, wherein the processing unit is further configured to:

~~determine~~ set ~~a start~~the first sequence number of the first protocol layer of the first data packet based on the first core network sequence number ~~indication information~~ when any one of establishment of a first protocol entity, re-establishment of the first protocol entity, and recovery of the first protocol entity occurs.

30~~26~~. The access network device according to any one of claims ~~22~~ 24 to 29~~5~~, wherein the transceiver unit is further configured to:

send ~~second~~ indication information to the terminal device, wherein the ~~second~~ indication information indicates a sequence number of the 1st data packet that is of the first service and that is sent by the first access network device to the terminal device after the first protocol entity is established, the first protocol entity is re-established, or the first protocol entity is recovered.

~~27~~31. The access network device according to any one of claims ~~22~~ 24 to 30~~26~~, wherein the transceiver unit is further configured to:

receive third indication information from a second access network device, wherein the third indication information indicates the first access network device to stop forwarding a data packet to the second access network device; and

the processing unit is further configured to stop, based on the third indication information, forwarding the data packet to the second access network device.

32~~28~~. The access network device according to claim 31~~27~~, wherein the transceiver unit is further configured to:

receive fourth indication information sent by the second access network device, wherein the fourth indication information indicates a sequence number of the 1st data packet forwarded by the first access network device to the second access network device; and

the processing unit is further configured to forward a data packet to the second access network device based on the fourth indication information.

33~~29~~. The access network device according to any one of claims ~~22~~ 24 to 30~~26~~, wherein the transceiver unit is further configured to:

receive fifth indication information sent by a second access network device, wherein the fifth indication information comprises a second sequence number N, and the second sequence number indicates a sequence number of the 1st data packet that is of the first service and that is sent by the second access network device to the terminal device after handover of the terminal device is completed; and

the processing unit is further configured to determine to stop, when a sequence number of a protocol layer of a data packet successfully sent by the first access network device to the terminal device is N–1, sending a data packet to the terminal device.

~~30~~34. A terminal device, comprising:

a transceiver unit, configured to receive ~~second~~ indication information sent by a first access network device, wherein the ~~second~~ indication information indicates a sequence number of the 1st data packet that is of a first service and that is sent by the first access network device to the terminal device after a first protocol entity is established, the first protocol entity is re-established, or the first protocol entity is recovered.

~~31~~35. The terminal device according to claim ~~30~~34, wherein the transceiver unit is further configured to:

when the first protocol entity is re-established or recovered, send request information to the first access network device, wherein the request information requests the access network device to send the sequence number of the 1st data packet that is of the first service and that is sent by the first access network device to the terminal device after the first protocol entity is re-established or

the first protocol entity is recovered.

~~32~~36. The terminal device according to claim ~~30~~ 34 or 3~~5~~1, wherein the transceiver unit is further configured to:

send status report information of a data packet to a second access network device, wherein the status report information of the data packet indicates, to the second access network device, a data packet successfully received by the terminal device and a data packet unsuccessfully received by the terminal device, wherein

the terminal device is handed over from the first access network device to the second access network device.

3~~7~~3. An access network device, wherein the access network device is a second access network device, and comprises:

a transceiver unit, configured to receive a second ~~first~~ data packet and second core network sequence number~~first indication information~~ from a core network device, wherein the second core network sequence number~~first indication information~~ indicates a sequence of the ~~first~~ second data packet in at least one data packet; and

a processing unit, configured to determine a second sequence number of a ~~first~~ second protocol layer of the first data packet based on the second core network sequence number~~first indication information~~, wherein

the transceiver unit is further configured to send the ~~first~~ second data packet to a first terminal device.

~~34. The access network device according to claim 33, wherein~~

~~the first indication information comprises at least one of the following information:~~

~~a general packet radio service tunneling protocol-user plane GTP-U sequence number and a first service sequence number, wherein~~

~~the first service sequence number is set by the core network device or a data server, the first data packet is a data packet of a first service, and the at least one data packet is a data packet of the first service.~~

~~35. The access network device according to claim 33 or 34, wherein the first protocol layer comprises at least one of the following:~~

~~a service data adaptation protocol SDAP layer, a packet data convergence protocol PDCP layer, and a radio link control layer RLC layer.~~

~~36. The access network device according to any one of claims 33 to 35, wherein the processing unit is further configured to:~~

~~determine a start sequence number of the first protocol layer of the first data packet based on the first indication information when any one of establishment of a first protocol entity, re-establishment of the first protocol entity, and recovery of the first protocol entity occurs.~~

~~37. The access network device according to any one of claims 33 to 36, wherein the transceiver unit is further configured to:~~

~~send second indication information to the terminal device, wherein the second indication information indicates a sequence number of the 1st data packet that is of the first service and that is sent by a first access network device to the terminal device after the first protocol entity is established, the first protocol entity is re-established, or the first protocol entity is recovered.~~

38. The access network device according to ~~any one of~~ claim~~s 33 to~~ 37, wherein the transceiver unit is further configured to:

receive a data packet sent by a first access network device, wherein

a second terminal device connected to the first access network device is handed over from the first access network device to the second access network device, both the first terminal device and the second terminal device perform the first service, and the data packet sent by the first access network device is a data packet of the first service; and

send third indication information to the first access network device when a second sequence number of a first protocol layer of a data packet that is being sent to the first terminal device is greater than or equal to a first sequence number of a first protocol layer of the data packet that is sent by the first access network device, wherein the third indication information indicates the first access network device to stop forwarding a data packet to the second access network device.

39. The access network device according to claim 38, wherein the transceiver unit is further configured to:

receive status report information that is of a data packet and that is sent by the second terminal device, wherein the status report information of the data packet indicates, to the second access network device, a data packet successfully received by the terminal device and a data packet unsuccessfully received by the terminal device; and

send fourth indication information to the first access network device based on the status report information, wherein the fourth indication information indicates a sequence number of the 1st data

packet forwarded by the first access network device to the second access network device.

40. The access network device according to ~~any one of~~ claim~~s~~ 3~~3 to 36~~7, wherein the transceiver unit is further configured to:

send fifth indication information to a first access network device, wherein the fifth indication information comprises a second sequence number N, and the second sequence number indicates a sequence number of the 1st data packet that is of the first service and that is sent by the second access network device to a second terminal device after handover of the second terminal device is completed.

41. A core network device, comprising:

a transceiver unit, configured to receive at least one~~a first~~ packet sent by a data server, wherein

the transceiver unit is further configured to send a ~~second~~ first data packet and first core network sequence number~~indication information~~ to a first access network device, wherein the first core network sequence number~~indication information~~ indicates a sequence of the ~~second~~ first data packet in at least one data packet sent by the core network device; and

the transceiver unit is configured to send a ~~third~~ second data packet and second core network sequence number ~~indication information~~ to a second access network device, wherein the first indication information indicates a sequence of the ~~third~~ second data packet in the at least one data packet sent by the core network device, wherein

data in the second data packet ~~and data in the third data packet are~~is the same as data in the first data packet, a value of the first core network sequence number is equal to a value of the second core network sequence number.

42. The core network device according to claim 41, wherein the first core network sequence number is for determining a first sequence number of a first protocol layer of the first data packet;

the second core network sequence number is for determining a second sequence number of a first protocol layer of the second data packet.

~~the first indication information comprises at least one of the following information:~~

~~a general packet radio service tunneling protocol-user plane GTP-U sequence number and a first service sequence number, wherein~~

~~the first service sequence number is set by the core network device or the data server, the first data packet is a data packet of a first service, and the at least one data packet is a data packet of~~

~~the first service.~~

43. The core network device according to claim 41 or 42, wherein the first core network sequence number and the second core network sequence number are set by the core network device.

44. The core network device according to any one of claims 40 to 43, wherein the at least one data packet is of first service, the first service is multicast service.

45. The core network device according to any one of claims 40 to 44, wherein the first sequence number of a first protocol layer of the first data packet is equal to the value of the first core network sequence number;

the second sequence number of a first protocol layer of the second data packet is equal to the value of the second core network sequence number.

46. The core network device according to any one of claims 40 to 45, wherein the first protocol layer is a packet data convergence protocol PDCP layer.

~~43~~47. A communication apparatus, comprising a processor, wherein the processor is connected to a memory, the memory is configured to store a computer program, and the processor is configured to execute the computer program stored in the memory, to enable the apparatus to perform the method according to any one of claims 1 to 10~~8~~, the method according to any one of claims ~~9~~ 11 to 13~~1~~, the method according to any one of claims ~~12~~ 14 to 17~~9~~, or the method according to any one of claims ~~20~~ 18 to 22~~or 21~~.

~~44~~48. A computer-readable storage medium, wherein the computer-readable storage medium stores a computer program; and when the computer program is run, the method according to any one of claims 1 to 10~~8~~, the method according to any one of claims 11~~9~~ to 13~~1~~, the method according to any one of claims ~~12~~ 14 to 17~~9~~, or the method according to any one of claims ~~20 or 21~~18 to 22 is implemented.

~~45. A chip, comprising a processor and an interface, wherein~~

~~the processor is configured to read instructions to perform the data transmission method according to any one of claims 1 to 8, the method according to any one of claims 9 to 11, the method according to any one of claims 12 to 19, or the method according to claim 20 or 21.~~

~~46~~49. A communication system, comprising the communication apparatus according to any one of claims ~~22~~ 24 to 33~~29~~, the communication apparatus according to any one of claims ~~30~~ 41 to 32~~46~~, ~~the communication apparatus according to any one of claims 33 to 40, and the communication apparatus according to claim 40 or 41~~.