CLAIMS

1. A data transmission method, comprising:

sending, by a Packet Data Convergence Protocol (PDCP) entity of a terminal, a PDCP status report when a first condition is met, wherein the first condition comprises at least one of:

the PDCP entity detecting that a first Protocol Data Unit (PDU) is missing;

the PDCP entity detecting that a number of missing first PDUs is greater than or equal to a configured number;

the PDCP entity undergoing modification from a Point To Point (PTP) sending and/or receiving mode to a Point To Multipoint (PTM) sending and/or receiving mode;

the PDCP entity of the terminal undergoing modification of at least one of addition, removal or reconfiguration;

an adaptation layer entity connected to the PDCP entity of the terminal, undergoing modification of at least one of addition, removal or reconfiguration;

a Radio Link Control (RLC) entity connected or related to the PDCP entity of the terminal, undergoing modification of at least one of addition, removal or reconfiguration;

security configuration of the PDCP entity of the terminal undergoing modification;

the terminal establishing or removing connections for sending and/or receiving a same service, Quality of Service (QoS) flow, stream or service data flow, or PDU session with other terminals;

the terminal re-entering a coverage area from a non-coverage area;

a radio condition of a service cell measured by the terminal being equal to or greater than a configured threshold; or

the terminal completing Radio Link Failure (RLF) recovery,

wherein the PDCP status report is configured to trigger a first network node to retransmit data.

2. The method of claim 1, wherein sending, by the PDCP entity of the terminal, the PDCP status report when the first condition is met, comprises:

sending, by the PDCP entity, the PDCP status report when the first condition is met, when a discard timer or a reorganization timer expires; or,

sending, by the PDCP entity, the PDCP status report at a configured period, when the first condition is met.

3. The method of claim 1, further comprising:

remaining, by the PDCP entity, a starting position of a receiving window of a receiving buffer unchanged.

4. The method of claim 1, further comprising:

receiving, by the terminal, first configuration information sent by the first network node,

wherein the first configuration information comprises indication information of at least one of:

sending the PDCP status report when the PDCP entity detects that the first PDU is missing;

sending the PDCP status report when the PDCP entity detects that the number of missing first PDUs is greater than or equal to the configured number;

sending the PDCP status report when the PDCP entity changes from a PTP sending and/or receiving mode to a PTM sending and/or receiving mode;

sending the PDCP status report when the PDCP entity undergoes modification of at least one of addition, removal or reconfiguration;

sending the PDCP status report when the adaptation layer entity connected to the PDCP entity of the terminal undergoes modification of at least one of addition, removal or reconfiguration;

sending the PDCP status report when the RLC entity connected or related to the PDCP entity of the terminal undergoes modification of at least one of addition, removal or reconfiguration;

sending the PDCP status report when the security configuration of the PDCP entity of the terminal changes;

sending the PDCP status report when the terminal establishes or removes connections for sending and/or receiving a same service, QoS flow, stream or service data flow, or PDU session with other terminals; or

sending the PDCP status report, corresponding to an RLC Acknowledged Mode (AM) mode and/or an RLC Unacknowledged Mode (UM) mode.

5. The method of claim 4, wherein the first configuration information further comprises

indication information of at least one of:

whether the PDCP status report to be sent carries information indicating a Hyper Frame Number (HFN) corresponding to the data;

whether the PDCP status report to be sent carries information indicating an absolute time corresponding to the data;

whether the PDCP status report to be sent carries information of an absolute time when first lost data is detected;

whether the PDCP status report to be sent carries information of an HFN corresponding to indicated missing data of the first PDU;

the sent PDCP status report carrying information indicating an HFN and a serial number (SN) corresponding to the data;

whether the PDCP status report to be sent carries an indication of whether the data needs to be encrypted;

whether the PDCP status report to be sent carries an indication of whether the data needs header compression; or

whether the PDCP status report to be sent carries an indication of whether the data needs integrity protection.

6. The method of any one of claims 1 to 5, further comprising: in case that both the PDCP entity and the RLC entity of the terminal have an Automatic Repeat reQuest (ARQ) function,

receiving, by the terminal, second configuration information sent by the first network node, and activating or deactivating, by the terminal, the ARQ function of the PDCP entity or the RLC entity based on the second configuration information.

7. A data transmission method, comprising:

receiving, by a first network node, a Packet Data Convergence Protocol (PDCP) status report sent by a terminal, and retransmitting, by the first network node, data based on the PDCP status report,

wherein the PDCP status report is sent when a first condition is met, and wherein the first condition comprises at least one of:

a PDCP entity of the terminal detecting that a first Protocol Data Unit (PDU) is missing;

the PDCP entity of the terminal detecting that a number of missing first PDUs is

greater than or equal to a configured number;

the PDCP entity of the terminal undergoing modification from a Point To Point (PTP) sending and/or receiving mode to a Point To Multipoint (PTM) sending and/or receiving mode;

the PDCP entity of the terminal undergoing modification of at least one of addition, removal or reconfiguration;

an adaptation layer entity connected to the PDCP entity of the terminal, undergoing modification of at least one of addition, removal or reconfiguration;

a Radio Link Control (RLC) entity connected or related to the PDCP entity of the terminal, undergoing modification of at least one of addition, removal or reconfiguration;

security configuration of the PDCP entity of the terminal undergoing modification;

the terminal establishing or removing connections for sending and/or receiving a same service, Quality of Service (QoS) flow, stream or service data flow, or PDU session with other terminals;

the terminal re-entering a coverage area from a non-coverage area;

a radio condition of a service cell measured by the terminal being equal to or greater than a configured threshold; or

the terminal completing Radio Link Failure (RLF) recovery.

8. The method of claim 7, further comprising:

sending, by the first network node, first configuration information to the terminal, wherein the first configuration information comprises indication information of at least one of:

the PDCP entity of the terminal detecting that the first PDU is missing, and sending the PDCP status report;

the PDCP entity of the terminal detecting that the number of missing first PDUs is greater than or equal to the configured number, and sending the PDCP status report;

the PDCP entity of the terminal undergoing modification from the PTP sending and/or receiving mode to the PTM sending and/or receiving mode, and sending the PDCP status report;

sending the PDCP status report when the PDCP entity undergoes modification of at least one of addition, removal or reconfiguration;

sending the PDCP status report when the adaptation layer entity connected to the PDCP entity of the terminal undergoes modification of at least one of addition, removal or

reconfiguration;

sending the PDCP status report when the RLC entity connected or related to the PDCP entity of the terminal undergoes modification of at least one of addition, removal or reconfiguration;

sending the PDCP status report when the security configuration of the PDCP entity of the terminal changes;

sending the PDCP status report when the terminal establishes or removes connections for sending and/or receiving a same service, QoS flow, stream or service data flow, or PDU session with other terminals; or

sending the PDCP status report, corresponding to an RLC Acknowledged Mode (AM) mode and/or an RLC Unacknowledged Mode (UM) mode.

9. The method of any one of claims 7 to 8, further comprising:

sending, by the first network node, second configuration information to the terminal, wherein the second configuration information is configured to activate or deactivate an Automatic Repeat reQuest (ARQ) function of the PDCP entity or the RLC entity of the terminal, and both the PDCP entity and the RLC entity of the terminal have the ARQ function.

10. A data transmission method, comprising:

sending and/or receiving, by a first terminal, data through m terminals, wherein m is a positive integer equal to or greater than 1.

11. The method of claim 10, wherein the data sent and/or received by the first terminal through the m terminals and data sent and/or received by the first terminal are in at least one of the following situations:

the data sent and/or received by the first terminal through the m terminals and the data sent and/or received by the first terminal are same data of a same service;

the data sent and/or received by the first terminal through the m terminals and the data sent and/or received by the first terminal are different data of a same service; or

the data sent and/or received by the first terminal through the m terminals and the data sent and/or received by the first terminal are data of different services.

12. The method of claim 10, further comprising:

receiving, by the first terminal, fifth configuration information sent by a first network node, wherein the fifth configuration information is configured to configure data aggregation and/or splitting among a plurality of terminals,

the fifth configuration information comprises at least one of the following information:

at least one of Service Data Adaptation Protocol (SDAP) configuration information, new logic layer configuration information, Packet Data Convergence Protocol (PDCP) configuration information, Radio Link Control (RLC) configuration information, Medium Access Control (MAC) configuration information or physical layer (PHY) configuration information;

a direction in which the data aggregation and/or splitting is performed;

security information of a service corresponding to the data;

one or more Hybrid Automatic Repeat reQuest (HARQ) process numbers configured for the first terminal and each of the m terminals respectively;

one or more common Configured Grants (CGs) and/or Semi-Persistent Scheduling (SPSs) configured for the first terminal and each of the m terminals respectively;

one or more CGs and/or SPSs configured for the first terminal and each of the m terminals respectively;

one or more common Discontinuous Reception (DRX) configurations configured for the first terminal and each of the m terminals respectively;

one or more DRX configurations configured for the first terminal and each of the m terminals respectively;

HARQ redundancy version numbers configured for the first terminal and each of the m terminals respectively;

setting of a new transmission of data configured for the first terminal, and setting of a k-th retransmission of data configured for each of the m terminals respectively, wherein k is a natural number greater than 1; or

at least one of carriers, Bandwidth Parts (BWPs) or beam resources configured for the first terminal and each of the m terminals respectively,

wherein the security information of the service corresponding to the data is in any one of the following situations:

the security information of the service corresponding to the data is applied to all of the first terminal and the m terminals; or

the security information of the service corresponding to the data comprises a plurality

of configurations, and security information of the plurality of configurations are applied to the first terminal and the m terminals respectively.

13. The method of claim 12, further comprising:

forwarding, by the first terminal, all or part of the fifth configuration information to at least one of the m terminals.

14. The method of claim 12, wherein sending and/or receiving, by the first terminal, data through the m terminals comprises:

forwarding, by the first terminal, data to at least one of the m terminals according to the fifth configuration information, wherein the data is determined according to a position of a common layer,

wherein in case that the position of the common layer is a new logic layer above an SDAP or a PDCP, the data is a PDCP Service Data Unit (SDU);

in case that the position of the common layer is a PDCP, the data is a PDCP Protocol Data Unit (PDU);

in case that the position of the common layer is RLC, the data is an RLC PDU;

in case that the position of the common layer is a MAC layer, the data is a MAC PDU;

in case that the position of the common layer is a PHY, the data is a Physical Uplink Shared Channel (PUSCH) transmission.

15. The method of claim 10, further comprising:

sending, by the first terminal, first indication information to the first network node, wherein the first indication information is configured to indicate that the first terminal starts sending data to at least one of the m terminals, and/or receiving data from the at least one of the m terminals; and

sending, by the first terminal, second indication information to at least one of the m terminals, wherein the second indication information is configured to indicate that the first terminal starts sending data to the at least one of the m terminals, and/or receiving data from the at least one of the m terminals.

16. The method of claim 10, further comprising:

sending, by the first terminal, first request information to a first network node, wherein

the first request information is used by the first terminal to request to send data to at least one of the m terminals, and/or receive data from the at least one of the m terminals.

17. The method of claim 12, further comprising:

exchanging first information between the first terminal and at least one of the m terminals with a data aggregation and/or splitting relationship before the data aggregation and/or splitting is established, wherein the first information comprises at least one of the following information: transmission power capability; Radio Frequency (RF) chain capability; processing capability; supported bandwidth; supported frequency combination; information of transmission delay and/or jitter among the m terminals; or information of a service supporting aggregation and/or splitting among the m terminals.

18. The method of claim 17, further comprising:

sending, by the first terminal, second information to the first network node and/or a core network, wherein the second information comprises information of the at least one of the m terminals with the data aggregation and/or splitting relationship, the information of the at least one terminal comprises at least one of the following information:

identifier (ID) of the terminal; or

the first information.

19. The method of claim 10, further comprising:

receiving, by the first terminal, a decomposition result of Quality of Service (QoS) decomposition or 5G service quality identifier (5QI) parameter decomposition performed by a first network node on a service or a QoS flow on two or more air interfaces.

20. A data transmission method, comprising:

receiving, by a second terminal, data from a first terminal, and/or sending, by the second terminal, data to the first terminal, wherein the second terminal is one of m terminals, the first terminal sends and/or receives data through the m terminals, and m is a positive integer equal to or greater than 1.

21. The method of claim 20, further comprising:

receiving, by the second terminal, fifth configuration information sent by a first

network node or the first terminal, wherein the fifth configuration information is configured to configure data aggregation and/or splitting among a plurality of terminals,

the fifth configuration information comprises at least one of the following information:

at least one of Service Data Adaptation Protocol (SDAP) configuration information, new logic layer configuration information, Packet Data Convergence Protocol (PDCP) configuration information, Radio Link Control (RLC) configuration information, Medium Access Control (MAC) configuration information or physical layer (PHY) configuration information;

a direction in which the data aggregation and/or splitting is performed;

security information of a service corresponding to the data;

one or more Hybrid Automatic Repeat reQuest (HARQ) process numbers configured for the first terminal and each of the m terminals respectively;

one or more common Configured Grants (CGs) and/or Semi-Persistent Scheduling (SPSs) configured for the first terminal and each of the m terminals respectively;

one or more CGs and/or SPSs configured for the first terminal and each of the m terminals respectively;

one or more common Discontinuous Reception (DRX) configurations configured for the first terminal and each of the m terminals respectively;

one or more DRX configurations configured for the first terminal and each of the m terminals respectively;

HARQ redundancy version numbers configured for the first terminal and each of the m terminals respectively;

setting of a new transmission of data configured for the first terminal, and setting of a k-th retransmission of data configured for each of the m terminals respectively, wherein k is a natural number greater than 1; or

at least one of carriers, Bandwidth Parts (BWPs) or beam resources configured for the first terminal and each of the m terminals respectively,

wherein the security information of the service corresponding to the data is in any one of the following situations:

the security information of the service corresponding to the data is applied to all of the first terminal and the m terminals; or

the security information of the service corresponding to the data comprises a plurality of configurations, and security information of the plurality of configurations are applied to the

first terminal and the m terminals respectively.

22. The method of claim 20, wherein data transmitted between the second terminal and the first terminal and data sent and/or received by the first terminal are in at least one of the following situations:

the data transmitted between the second terminal and the first terminal and the data sent and/or received by the first terminal are same data of a same service;

the data transmitted between the second terminal and the first terminal and the data sent and/or received by the first terminal are different data of a same service; or

the data transmitted between the second terminal and the first terminal and the data sent and/or received by the first terminal are data of different services.

23. The method of claim 20, wherein data transmitted between the second terminal and the first terminal is determined according to a position of a common layer,

wherein in case that the position of the common layer is a new logic layer above a Service Data Adaptation Protocol (SDAP) or a Packet Data Convergence Protocol (PDCP), the data is a PDCP Service Data Unit (SDU);

in case that the position of the common layer is a PDCP, the data is a PDCP Protocol Data Unit (PDU);

in case that the position of the common layer is RLC, the data is an RLC PDU;

in case that the position of the common layer is Medium Access Control (MAC), the data is a MAC PDU;

in case that the position of the common layer is a physical layer (PHY), the data is a Physical Uplink Shared Channel (PUSCH) transmission.

24. The method of claim 20, further comprising:

receiving, by the second terminal, second indication information sent by the first terminal, wherein the second indication information is configured to indicate that the first terminal starts sending data to the second terminal, and/or receiving data from at least one of the m terminals.

25. A data transmission method, comprising:

sending, by a first network node, fifth configuration information or aggregation and/or

splitting conditions to a first terminal and/or a second terminal, wherein the fifth configuration information and/or the aggregation and/or splitting conditions are used by the first terminal to forward data to at least one of m terminals, m is a positive integer equal to or greater than 1, and the second terminal is one of the m terminals.

26. The method of claim 25, wherein the fifth configuration information is further configured to configure data aggregation and/or splitting among a plurality of terminals,

the fifth configuration information comprises at least one of the following information:

at least one of Service Data Adaptation Protocol (SDAP) configuration information, new logic layer configuration information, Packet Data Convergence Protocol (PDCP) configuration information, Radio Link Control (RLC) configuration information, Medium Access Control (MAC) configuration information or physical layer (PHY) configuration information;

a direction in which the data aggregation and/or splitting is performed;

security information of a service corresponding to the data;

one or more Hybrid Automatic Repeat reQuest (HARQ) process numbers configured for the first terminal and each of the m terminals respectively;

one or more common Configured Grants (CGs) and/or Semi-Persistent Scheduling (SPSs) configured for the first terminal and each of the m terminals respectively;

one or more CGs and/or SPSs configured for the first terminal and each of the m terminals respectively;

one or more common Discontinuous Reception (DRX) configurations configured for the first terminal and each of the m terminals respectively;

one or more DRX configurations configured for the first terminal and each of the m terminals respectively;

HARQ redundancy version numbers configured for the first terminal and each of the m terminals respectively;

setting of a new transmission of data configured for the first terminal, and setting of a k-th retransmission of data configured for each of the m terminals respectively, wherein k is a natural number greater than 1; or

at least one of carriers, Bandwidth Parts (BWPs) or beam resources configured for the first terminal and each of the m terminals respectively,

wherein the security information of the service corresponding to the data comprises

any one of the following situations:

the security information of the service corresponding to the data is applied to all of the first terminal and the m terminals; or

the security information of the service corresponding to the data comprises a plurality of configurations, and security information of the plurality of configurations are applied to the first terminal and the m terminals respectively.

27. The method of claim 25, wherein the aggregation and/or splitting conditions comprise at least one of the following situations:

transmission power of the first terminal is greater than or equal to a configured threshold;

the first terminal receives signaling for activating aggregation and/or splitting of the first network node;

the first terminal receives a paging message about a service that is aggregatable and/or splittable;

a data loss rate of the first terminal is greater than or equal to a configured threshold;

the first terminal enters a Radio Link Failure (RLF) status;

an amount of data arriving at the first terminal is greater than or equal to a configured threshold;

an amount of data in a buffer area of the first terminal is greater than or equal to a configured threshold;

a rate of a service corresponding to data of the first terminal is greater than or equal to a configured threshold;

reliability of the service corresponding to the data of the first terminal is greater than or equal to a configured threshold; or

delay of the service corresponding to the data of the first terminal is less than or equal to a configured threshold.

28. The method of claim 25, further comprising:

receiving, by the first network node, first indication information sent by the first terminal, wherein the first indication information is configured to indicate that the first terminal starts forwarding data to the at least one of the m terminals, and/or the first terminal receives data from the at least one of the m terminals.

29. The method of claim 25, further comprising:

receiving, by the first network node, first request information sent by the first terminal, wherein the first request information is used by the first terminal to request to send data to the at least one of the m terminals, and/or used by the first terminal to request to receive data from the at least one of the m terminals.

30. The method of claim 25, further comprising:

receiving, by the first network node, second information sent by the first terminal, wherein the second information comprises information of at least one of the m terminals with a data aggregation and/or splitting relationship, the information of the at least one terminal comprises at least one of the following information:

identifier (ID) of the terminal; or

the first information.

31. The method of claim 25, further comprising:

performing, by the first network node, Quality of Service (QoS) decomposition or 5G service quality identifier (5QI) parameter decomposition on a service or a QoS flow on two or more air interfaces, to obtain a decomposition result and send the decomposition result to the first terminal.

32. A communication device, comprising a memory, a processor, and a computer program stored on the memory and executable on the processor, the processor implementing steps of the method of any one of claims 1 to 6 when the processor executes the program; or

the processor implementing steps of the method of any one of claims 7 to 9 when the processor executes the program; or

the processor implementing steps of the method of any one of claims 10 to 19 when the processor executes the program; or

the processor implementing steps of the method of any one of claims 20 to 24 when the processor executes the program; or

the processor implementing steps of the method of any one of claims 25 to 31 when the processor executes the program.