

discard the second RLC SDU corresponding to the second PDCP PDU.

[0075] When the data duplication transmission function of the PDCP layer entity is deactivated, the second PDCP PDU only needs to be transmitted in the second RLC layer entity; therefore, the terminal invokes the second RLC layer entity to send the RLC PDU in the second RLC layer entity corresponding to the second PDCP PDU to the MAC layer entity, and interrupts the processing and transmission operations corresponding to the RLC SDU in the first RLC layer entity.

[0076] If the second RLC SDU has been encapsulated and processed into the second RLC PDU when the data duplication transmission function of the PDCP layer entity is deactivated, a deletion operation will not be performed, and when the data duplication transmission function of the PDCP layer entity is activated, the second RLC PDU will be continuously transmitted.

[0077] It can be seen that in the example, when the data duplication transmission function of the PDCP layer entity is deactivated, the terminal discards the second RLC SDU in the first RLC layer entity that is no longer processed for transmission and is not encapsulated and processed into the second RLC PDU, thus avoiding redundant data packets that need to be transmitted in the first RLC layer entity, which is beneficial for improving the accuracy of subsequent data transmission of the terminal.

[0078] The embodiments of the present disclosure are explained in detail with reference to the specific application scenarios hereinafter.

[0079] Consistent with the above embodiment shown in Fig. 2A, referring to Fig. 2C, which illustrates another data transmission method provided by an embodiment of the present disclosure, a 5G/NR communication system is employed as the communication system, a base station gNB in the 5G/NR is employed as the network side device, and a user equipment UE in the 5G/NR is employed as the terminal. The data duplication transmission function of the PDCP layer entity is in a deactivated status, the first RLC layer entity is in a disabled status, and the second RLC layer entity is in an enabled status. When the PDCP layer entity receives the first PDCP SDU, the following steps are performed.

[0080] In 2b01, the terminal invokes the PDCP layer entity to encapsulate the first PDCP SDU into the PDCP PDU, and reserves the PDCP PDU copy as the first PDCP PDU.

[0088] Moreover, when the data duplication transmission function of the PDCP layer entity is in a deactivated status, the terminal reserves the PDCP PDU copy, i.e., the first PDCP PDU, in the PDCP layer entity. When the data duplication transmission function of the PDCP layer entity is activated, the terminal directly acquires the copy in the PDCP layer entity without a duplication operation again, which is beneficial for improving the data transmission speed of the terminal.

[0089] Consistent with the above embodiment shown in Fig. 2A, referring to Fig. 2D, which illustrates another data transmission method provided by an embodiment of the present disclosure, a 5G/NR communication system is employed as the communication system, a base station gNB in the 5G/NR is employed as the network side device, and a user equipment UE in the 5G/NR is employed as the terminal. The data duplication transmission function of the PDCP layer entity is in an activated status, the first RLC layer entity is in an enabled status, and the second RLC layer entity is in an enabled status. When the PDCP layer entity receives the second PDCP SDU, the following steps are performed.

[0090] In 2c01, the terminal invokes the PDCP layer entity to encapsulate the second PDCP SDU into a second PDCP PDU.

[0091] In 2c02, the terminal invokes the PDCP layer entity to send the second PDCP PDU to the first RLC layer entity and the second RLC layer entity.

[0092] In 2c03, the terminal invokes the PDCP layer entity to send a preset indication to the first RLC layer entity when detecting that the data duplication transmission function of the PDCP layer entity is deactivated.

[0093] In 2c04, the terminal invokes the first RLC layer entity to receive the preset indication, and discards a second RLC SDU in the first RLC layer entity corresponding to the PDCP PDU according to the preset indication, where the second RLC SDU is not encapsulated and processed into a second RLC PDU by the first RLC layer entity.

[0094] It can be seen that in the embodiments of the present disclosure, when the data duplication transmission function of the PDCP layer entity is deactivated, the terminal discards the second RLC SDU in the first RLC layer entity that is no longer processed for transmission and is not encapsulated and processed into the second RLC PDU, thus avoiding redundant data packets that need to be transmitted in the first RLC layer entity, which is

of storage medium known in the art. An exemplary storage medium is coupled to the processor to enable the processor to read information from and write information to the storage medium. The storage medium may also be a part of the processor. The processor and the storage medium may be located in an ASIC. In addition, the ASIC may be located in an access network device, a target network device, or a core network device. The processor and the storage medium may also exist as discrete components in the access network device, the target network device or the core network device.

[00185] Those skilled in the art should aware that in one or more of the above examples, the functions described in the embodiments of the present disclosure may be implemented in whole or in part by software, hardware, firmware, or any combination thereof. When the functions are implemented using software, it may be implemented in whole or in part in the form of a computer program product. The computer program product includes one or more computer instructions. When the computer program instructions are loaded and executed on a computer, the processes or functions according to the embodiments of the present disclosure are generated in whole or in part. The computer may be a general purpose computer, a special purpose computer, a computer network, or other programmable apparatus. The computer instruction may be stored in a computer readable storage medium or transmitted from one computer readable storage medium to another computer readable storage medium, for example, the computer instruction may be transmitted from one website site, computer, server or data center to another website site, computer, server or data center by wired (e.g., coaxial cable, optical fiber, Digital Subscriber Line (DSL)) or wireless (e.g., infrared, wireless, microwave, etc) manners. The computer readable storage medium may be any available medium that a computer can access or a data storage device such as a server, a data center, or the like that includes one or more available media integration. The available medium may be a magnetic medium (e.g., a floppy disk, a hard disk, a magnetic tape), an optical medium (e.g., a Digital Video Disc (DVD)), or a semiconductor medium (e.g., a Solid status Disk (SSD)) or the like.

WHAT IS CLAIMED IS:

1. A data transmission method, applied to a terminal comprising a PDCP layer entity, a first RLC layer entity, a second RCL layer entity and a MAC layer entity, wherein the method comprises:

when detecting that a data duplication transmission function of the PDCP layer entity is activated, enabling the first RLC layer entity, wherein the second RLC layer entity is in an enabled status; and

invoking the PDCP layer entity to determine a first PDCP PDU associated with a first PDCP SDU, and sending the first PDCP PDU to the first RLC layer entity, wherein the first PDCP PDU is configured for the first RLC layer entity and the MAC layer entity to process the first PDCP PDU into a MAC PDU and send the MAC PDU.

2. The method according to claim 1, wherein the invoking the PDCP layer entity to determine the first PDCP PDU associated with the first PDCP SDU comprises:

when detecting that the PDCP layer entity satisfies a preset condition, invoking the PDCP layer entity to determine a pre-stored PDCP PDU copy as the first PDCP PDU associated with the first PDCP SDU.

3. The method according to claim 2, wherein the preset condition comprises at least one of followings: a discard timer in the PDCP layer entity does not time out, a status report of the PDCP layer entity does not indicate to discard the first PDCP PDU, and the PDCP layer entity does not receive an indication of discarding the first PDCP PDU sent by the second RLC layer entity.

4. The method according to any one of claims 1 to 3, wherein the first PDCP PDU is configured for the first RLC layer entity to encapsulate the first PDCP PDU into a first RLC PDU and send the first RLC PDU to the MAC layer entity, and the first RLC PDU is configured for the MAC layer entity to encapsulate the first RLC PDU into the MAC PDU and send the MAC PDU.

5. The method according to any one of claims 1 to 4, wherein after enabling the first RLC layer entity when detecting that the data duplication transmission function of the PDCP layer entity is activated, the method further comprises:

when detecting that the PDCP layer entity receives a second PDCP SDU, invoking the PDCP layer entity to encapsulate the second PDCP SDU into a second PDCP PDU; and

invoking the PDCP layer entity to send the second PDCP PDU to the first RLC layer entity and the second RLC layer entity.

6. The method according to claim 5, wherein after sending the second PDCP PDU to the first RLC layer entity and the second RLC layer entity, the method further comprises:

when detecting that the data duplication transmission function of the PDCP layer entity is deactivated, invoking the PDCP layer entity to send a preset indication to the first RLC layer entity; and

invoking the first RLC layer entity to receive the preset indication, and discarding a second RLC SDU in the first RLC layer entity and corresponding to the second PDCP PDU according to the preset indication, wherein the second RLC SDU is not encapsulated and processed into a second RLC PDU by the first RLC layer entity.

7. A data transmission method, comprising:

acquiring, by a network side device, a MAC PDU of a terminal, wherein the MAC PDU is obtained through processing a first PDCP PDU by a first RLC layer entity and a MAC layer entity, the first PDCP PDU is associated with a first PDCP SDU and is determined by the terminal through enabling the first RLC layer entity and invoking a PDCP layer entity when detecting that a data duplication transmission function of the PDCP layer entity is activated, and the first PDCP PDU is sent by the terminal to the first RLC layer entity, a second RLC layer entity being in an enabled status.

8. A data transmission method, applied to a terminal comprising a PDCP layer entity, a first RLC layer entity, a second RLC layer entity and a MAC layer entity, wherein the

method comprises:

when detecting that a data duplication transmission function of the PDCP layer entity is activated, enabling the first RLC layer entity, wherein the second RLC layer entity is in an enabled status;

invoking the first RLC layer entity to receive a first RLC SDU from the second RLC layer entity; and

invoking the first RLC layer entity and the MAC layer entity to process the first RLC SDU into a MAC PDU and send the MAC PDU.

9. The method according to claim 8, wherein the invoking the first RLC layer entity and the MAC layer entity to process the first RLC SDU into the MAC PDU and send the MAC PDU comprises:

invoking the first RLC layer entity to encapsulate the first RLC SDU into a first RLC PDU and send the first RLC PDU to the MAC layer entity; and

invoking the MAC layer entity to encapsulate the first RLC PDU into the MAC PDU and send the MAC PDU.

10. The method according to claim 8 or 9, wherein after enabling the first RLC layer entity when detecting that the data duplication transmission function of the PDCP layer entity is activated, the method further comprises:

when detecting that the PDCP layer entity receives a PDCP SDU, invoking the PDCP layer entity to encapsulate the PDCP SDU into a PDCP PDU; and

invoking the PDCP layer entity to send the PDCP PDU to the first RLC layer entity and the second RLC layer entity.

11. The method according to claim 10, wherein after sending the PDCP PDU to the first RLC layer entity and the second RLC layer entity, the method further comprises:

when detecting that the data duplication transmission function of the PDCP layer entity is deactivated, invoking the PDCP layer entity to send a preset indication to the first RLC layer entity; and

invoking the first RLC layer entity to receive the preset indication, and discarding a second RLC SDU in the first RLC layer entity corresponding to the PDCP PDU according to the preset indication, wherein the second RLC SDU is not encapsulated and processed into a second RLC PDU by the first RLC layer entity.

12. A data transmission method, comprising:

acquiring, by a network side device, a MAC PDU of a terminal, wherein the MAC PDU is obtained through processing a first RLC SDU by a first RLC layer entity and a MAC layer entity, the first PDCP PDU is from a second RLC layer entity and received by the terminal through enabling the first RLC layer entity and invoking the first RLC layer entity when detecting that a data duplication transmission function of the PDCP layer entity is activated, the second RLC layer entity being in an enabled status.

13. A terminal, comprising a processing unit and a communication unit, wherein:

the processing unit is configured to, when detecting that a data duplication transmission function of a PDCP layer entity is activated, enable a first RLC layer entity, wherein a second RLC layer entity is in an enabled status; invoke the PDCP layer entity to determine a first PDCP PDU associated with a first PDCP SDU and send the first PDCP PDU to the first RLC layer entity; and invoke the first RLC layer entity and a MAC layer entity to process the first PDCP PDU into a MAC PDU and send the MAC PDU through the communication unit.

14. A network side device, comprising a processing unit and a communication unit, wherein:

the processing unit is configured to acquire a MAC PDU of a terminal through the communication unit, wherein the MAC PDU is obtained through processing a first PDCP PDU by a first RLC layer entity and a MAC layer entity, the first PDCP PDU is associated with a first PDCP SDU and determined by the terminal through enabling the first RLC layer entity and invoking a PDCP layer entity when detecting that a data duplication transmission function of the PDCP layer entity is activated, and the first PDCP PDU is sent by the terminal to the first RLC layer entity, a second RLC layer entity being in an enabled status.

15. A terminal, comprising a processing unit and a communication unit, wherein:

the processing unit is configured to, when detecting that a data duplication transmission function of a PDCP layer entity is activated, enable a first RLC layer entity, wherein a second RLC layer entity is in an enabled status; invoke the first RLC layer entity to receive a first RLC SDU from the second RLC layer entity; and invoke the first RLC layer entity and a MAC layer entity to process the first RLC SDU into a MAC PDU and send the MAC PDU through the communication unit.

16. A network side device, comprising a processing unit and a communication unit, wherein:

the processing unit is configured to acquire a MAC PDU of a terminal through the communication unit, wherein the MAC PDU is obtained through processing a first RLC SDU by a first RLC layer entity and a MAC layer entity, the first PDCP PDU is from a second RLC layer entity and received by the terminal through enabling the first RLC layer entity and invoking the first RLC layer entity when detecting that a data duplication transmission function of the PDCP layer entity is activated, the second RLC layer entity being in an enabled status.

17. A terminal, comprising a processor, a memory, a communication interface, and one or more programs stored in the memory and configured to be executed by a processor, wherein the programs comprise instructions for performing steps in the methods according to at least one of any one of claims 1 to 6 and any one of claims 7 to 10.

18. A network side device, comprising a processor, a memory, a transceiver, and one or more programs stored in the memory and configured to be executed by the processor, wherein the programs comprise instructions for performing steps in the methods according to at least one of claim 7 and claim 12.

19. A computer readable storage medium storing a computer program for electronic data exchange, wherein the computer program enables a computer to perform the methods according to at least one of any one of claims 1 to 6 and any one of claims 8 to 11.

20. A computer readable storage medium storing a computer program for electronic data exchange, wherein the computer program enables a computer to the methods according to at least one of claim 7 and claim 12.