

METHOD, DEVICE, AND SYSTEM FOR RELEASING RELAY CONNECTION

[0001] This application claims priority to Chinese Patent Application No. 202010555705.5, filed with the China National Intellectual Property Administration on June 17, 2020 and entitled "METHOD, DEVICE, AND SYSTEM FOR RELEASING RELAY CONNECTION", which is incorporated herein by reference in its entirety.

TECHNICAL FIELD

[0002] Embodiments of this application relate to the field of communication technologies, and in particular, to a method, a device, and a system for releasing a relay connection.

BACKGROUND

[0003] As intelligent terminals are widely used, to improve spectrum utilization and a system throughput, expand a network coverage area, and the like, proximity service (proximity service, ProSe) communication has been more widely applied. For example, when user equipment (user equipment, UE) 1 is outside network coverage or a communication connection between the user equipment 1 and a radio access network (radio access network, RAN) is unstable, the UE 1 may implement communication with a network side via UE 2 having a relay capability. Communication between UE (for example, the UE 1) outside the network coverage and the network side may be supported in an extension manner by establishing a manner of communication between remote UE, relay UE and the network side.

[0004] As shown in FIG. 1, in a 5th generation (5th Generation, 5G) mobile communication technology communication system architecture, the remote UE may access a network via the relay UE. The remote UE and the relay UE may communicate with each other through a PC5 interface (ProSe Communication 5), for example, transmit data plane information and control plane information through the PC5 interface. Usually, the network needs to authorize the remote UE to access the network via the relay UE. For example, the UE 1 can establish a relay connection to the

UE 2 to access the network, only on the premise that the UE 1 is allowed to use the UE 2 as a relay device to transmit service data, and the UE 2 is allowed to provide a relay service for the UE 1. In this case, the UE 1 may also be referred to as remote UE (Remote UE), and the UE 2 may also be referred to as relay UE (Relay UE).

5 **[0005]** However, after the remote UE has established the relay connection to the relay UE, if subscription or authorization information of the remote UE and/or the relay UE changes, for example, a subscription in which the UE 1 uses the UE 2 as the relay device to transmit the service data expires; a subscription in which the UE 2 provides the relay service for the UE 1 expires; or a subscription in which the UE 2 provides the relay service expires, the remote UE and the relay
10 UE cannot make a response in time. This causes problems such as inaccurate relay connection management and control and inaccurate charging on the network side.

SUMMARY

[0006] This application provides a method, a device, and a system for releasing a relay connection, to make a response in time when subscription or authorization information of remote
15 UE and/or relay UE changes, and improve accuracy of relay connection management and control and accuracy of charging on a network side.

[0007] To achieve the foregoing objective, the following technical solutions are used in embodiments of this application.

[0008] According to a first aspect, a method for releasing a relay connection is provided. The
20 method includes: A first network element obtains relay service subscription information of first UE; and the first network element sends first information based on the relay service subscription information of the first UE, where the first information is used to release a relay connection corresponding to the first UE, or release a relay connection corresponding to a relay service between the first UE and second UE.

25 **[0009]** According to the technical solution provided in the first aspect, when determining, based on service subscription information of remote UE and/or relay UE, that subscription or authorization information of the remote UE and/or the relay UE changes, the first network element may indicate, in time, to release a relay connection corresponding to the remote UE or the relay UE, or release a relay connection corresponding to a relay service between the remote UE and the

relay UE. Making a response in time based on the service subscription information of the remote UE and/or the relay UE can improve accuracy of relay connection management and control and accuracy of charging on a network side.

[0010] In a possible implementation, when the first information is used to release the relay connection corresponding to the first UE, the first information is first relay service authorization revocation information or first relay connection release information, where the first relay service authorization revocation information indicates to revoke an authorization of using the first UE as relay UE or remote UE; and the first relay connection release information indicates to release the relay connection corresponding to the first UE. In this application, the first network element is supported in indicating, by using the first relay service authorization revocation information or the first relay connection release information, to release the relay connection corresponding to the first UE.

[0011] In a possible implementation, the first UE is relay UE, and that the first network element sends first information based on the relay service subscription information of the first UE includes: The first network element sends the first information when the relay service subscription information of the first UE changes from including identification information of remote UE for which the first UE is allowed to provide a relay service to not including the identification information of the remote UE for which the first UE is allowed to provide the relay service; or the first network element sends the first information when the first network element determines, based on the relay service subscription information, that the first UE changes from being allowed to provide a relay service for remote UE to not being allowed to provide the relay service for the remote UE. The first information is used to release the relay connection corresponding to the first UE. In this application, a specific form of the relay service subscription information of the first UE is not limited. For example, the relay service subscription information of the first UE may include the identification information of the remote UE for which the first UE is allowed to provide the relay service. Alternatively, the relay service subscription information of the first UE may be represented in another form that can reflect whether the first UE is allowed to provide the relay service for the remote UE.

[0012] In a possible implementation, the first UE is remote UE, and that the first network element sends first information based on the relay service subscription information of the first UE includes: The first network element sends the first information when the relay service subscription

information of the first UE changes from including identification information of relay UE whose relay service is allowed to be accepted by the first UE to not including the identification information of the relay UE whose relay service is allowed to be accepted by the first UE; or the first network element sends the first information when the first network element determines, based on the relay service subscription information, that the first UE changes from being allowed to accept a relay service to not being allowed to accept the relay service. The first information is used to release the relay connection corresponding to the first UE. In this application, a specific form of the relay service subscription information of the first UE is not limited. For example, the relay service subscription information of the first UE may include the identification information of the relay UE whose relay service is allowed to be accepted by the first UE. Alternatively, the relay service subscription information of the first UE may be represented in another form that can reflect whether the first UE is allowed to accept the relay service.

[0013] In a possible implementation, when the first information is used to release the relay connection corresponding to the relay service between the first UE and the second UE, the first information is second relay service authorization revocation information or second relay connection release information, where the second relay service authorization revocation information indicates to revoke an authorization for the first UE to provide the relay service for the second UE, or revoke an authorization for the first UE to accept the relay service provided by the second UE; and the second relay connection release information indicates to release the relay connection corresponding to the relay service between the first UE and the second UE. In this application, the first network element is supported in indicating, by using the second relay service authorization revocation information or the second relay connection release information, to release the relay connection corresponding to the relay service between the first UE and the second UE.

[0014] In a possible implementation, the first UE is relay UE, and that the first network element sends first information based on the relay service subscription information of the first UE includes: The first network element sends the first information when the relay service subscription information of the first UE changes from including identification information of remote UE for which the first UE is allowed to provide a relay service to not including the identification information of the remote UE for which the first UE is allowed to provide the relay service, where the identification information of the remote UE includes identification information of the second UE; the first network element sends the first information when identification information, in the

relay service subscription information of the first UE, of remote UE for which the first UE is allowed to provide a relay service changes from including identification information of the second UE to not including the identification information of the second UE; or the first network element sends the first information when the first network element determines, based on the relay service subscription information of the first UE, that the first UE changes from being allowed to provide the relay service for the second UE to not being allowed to provide the relay service for the second UE, where the first information is used to release the relay connection corresponding to the relay service between the first UE and the second UE. In this application, a specific form of the relay service subscription information of the first UE is not limited. For example, the relay service subscription information of the first UE may include the identification information of the remote UE for which the first UE is allowed to provide the relay service. For another example, the relay service subscription information of the first UE may include identification information indicating whether the first UE is allowed to provide the relay service for the second UE. Alternatively, the relay service subscription information of the first UE may be represented in another form that can reflect whether the first UE is allowed to provide the relay service for the second UE.

[0015] In a possible implementation, the first UE is remote UE, and that the first network element sends first information based on the relay service subscription information of the first UE includes: The first network element sends the first information when the relay service subscription information of the first UE changes from including identification information of relay UE whose relay service is allowed to be accepted by the first UE to not including the identification information of the relay UE whose relay service is allowed to be accepted by the first UE, where the identification information of the relay UE includes identification information of the second UE; the first network element sends the first information when identification information, in the relay service subscription information of the first UE, of relay UE whose relay service is allowed to be accepted by the first UE changes from including identification information of the second UE to not including the identification information of the second UE; or the first network element sends the first information when the first network element determines, based on the relay service subscription information of the first UE, that the first UE changes from being allowed to accept the relay service provided by the second UE to not being allowed to accept the relay service provided by the second UE, where the first information is used to release the relay connection corresponding to the relay service between the first UE and the second UE. In this application, a

specific form of the relay service subscription information of the first UE is not limited. For example, the relay service subscription information of the first UE may include the identification information of the relay UE whose relay service is allowed to be accepted by the first UE. For another example, the relay service subscription information of the first UE may include
5 identification information indicating whether the first UE is allowed to accept the relay service provided by the second UE. Alternatively, the relay service subscription information of the first UE may be represented in another form that can reflect whether the first UE is allowed to accept the relay service provided by the second UE.

[0016] In a possible implementation, the first information includes the identification
10 information of the second UE. The identification information of the second UE is carried in the first information, to accurately determine to release a relay connection corresponding to a relay service between the first UE and which second UE.

[0017] In a possible implementation, that the first network element sends the first information includes: The first network element sends the first information to an access network device, the
15 first UE, or a session management function (session management function, SMF) network element of the first UE. This application supports to complete, by using the access network device, the first UE, or the SMF network element of the first UE, releasing the relay connection corresponding to the first UE or releasing the relay connection corresponding to the relay service between the first UE and the second UE.

[0018] In a possible implementation, the first network element is an access and mobility
20 management function (access and mobility management function, AMF) network element or a policy control function (policy control function, PCF) network element. In this application, the AMF network element or the PCF network element is supported in indicating, based on the relay service subscription information of the first UE, to release the relay connection corresponding to
25 the first UE, or release the relay connection corresponding to the relay service between the first UE and the second UE.

[0019] In a possible implementation, the first information includes a relay connection release
cause value, and the relay connection release cause value is used to represent a reason for releasing the relay connection.

[0020] In a possible implementation, the reason for releasing the relay connection includes:
30 the relay service subscription information of the first UE changes.

[0021] According to a second aspect, a method for releasing a relay connection is provided. The method includes: An access network device receives second information used to release a relay connection corresponding to first UE; and the access network device releases, based on the second information, the relay connection corresponding to the first UE.

5 **[0022]** According to the technical solution provided in the second aspect, the access network device releases, based on the received second information used to release the relay connection corresponding to the first UE, the relay connection corresponding to the first UE. For example, the second information may be sent to the access network device when the first network element determines, based on service subscription information of remote UE and/or relay UE, that
10 subscription or authorization information of the remote UE and/or the relay UE changes, or sent to the access network device by using another network element. Making a response in time based on the service subscription information of the remote UE and/or the relay UE can improve accuracy of relay connection management and control and accuracy of charging on a network side.

[0023] In a possible implementation, the second information is first relay service authorization
15 revocation information or first relay connection release information, where the first relay service authorization revocation information indicates to revoke an authorization of using the first UE as relay UE or remote UE; and the first relay connection release information indicates to release the relay connection corresponding to the first UE. In this application, the network element is supported in indicating, by using the first relay service authorization revocation information or the
20 first relay connection release information, the access network device to release the relay connection corresponding to the first UE.

[0024] In a possible implementation, that an access network device receives second information includes: The access network device receives the second information from a first network element, where the first network element is a PCF network element of the first UE or an
25 AMF network element of the first UE; or the access network device receives the second information from the first UE. In this application, the access network device is supported in releasing, based on the second information from the first network element, the PCF network element of the first UE, the AMF network element of the first UE, or the first UE, the relay connection corresponding to the first UE.

30 **[0025]** In a possible implementation, the first UE is relay UE, and that the access network device releases, based on the second information, the relay connection corresponding to the first

UE includes: The access network device releases, based on the second information, a communication resource used for the relay connection between the first UE and the access network device. In this application, the relay connection corresponding to the first UE may include the communication resource used for the relay connection between the first UE and the access network device.

[0026] In a possible implementation, that the access network device releases, based on the second information, the relay connection corresponding to the first UE further includes: The access network device releases, based on the second information, a communication resource used for the relay connection between the first UE and the remote UE. In this application, the relay connection corresponding to the first UE may further include a communication resource used for the relay connection between the relay UE and the remote UE.

[0027] In a possible implementation, the first UE is remote UE, and that the access network device releases, based on the second information, the relay connection corresponding to the first UE includes: The access network device releases, based on the second information, at least one of the following resources: a communication resource used by the access network device for the relay connection; and a communication resource used for the relay connection between the first UE and the relay UE. In this application, the relay connection corresponding to the remote UE may include the communication resource used by the access network device for the relay connection and/or the communication resource used for the relay connection between the remote UE and the relay UE.

[0028] In a possible implementation, the second information includes a relay connection release cause value, and the relay connection release cause value is used to represent a reason for releasing the relay connection, where the reason for releasing the relay connection includes: relay service subscription information of the first UE changes.

[0029] According to a third aspect, a method for releasing a relay connection is provided. The method includes: First UE receives second information used to release a relay connection corresponding to a relay service between the first UE and second UE; and the first UE releases the relay connection based on the second information.

[0030] According to the technical solution provided in the third aspect, the first UE releases, based on the received second information used to release the relay connection corresponding to the relay service between the first UE and the second UE, the relay connection corresponding to the relay service between the first UE and the second UE. For example, the second information

may be sent to the first UE when the first network element determines, based on service subscription information of remote UE and/or relay UE, that subscription or authorization information of the remote UE and/or the relay UE changes, or sent to the first UE by using another network element. Making a response in time based on the service subscription information of the remote UE and/or the relay UE can improve accuracy of relay connection management and control and accuracy of charging on a network side.

[0031] In a possible implementation, that first UE receives second information includes: The first UE receives the second information from a second network element, where the second network element is an access network device or an AMF network element of the first UE. In this application, the first UE is supported in releasing, based on the second information from the access network device or the AMF network element of the first UE, the relay connection corresponding to the relay service between the first UE and the second UE.

[0032] In a possible implementation, the second information is second relay service authorization revocation information or second relay connection release information, where the second relay service authorization revocation information indicates to revoke an authorization for the first UE to provide the relay service for the second UE, or revoke an authorization for the first UE to accept the relay service provided by the second UE; and the second relay connection release information indicates to release the relay connection corresponding to the relay service between the first UE and the second UE. In this application, the first UE is supported in releasing, based on the second relay service authorization revocation information or the second relay connection release information, the relay connection corresponding to the relay service between the first UE and the second UE.

[0033] In a possible implementation, the first UE is relay UE, the second UE is remote UE that accepts the relay service provided by the first UE, and that the first UE releases the relay connection based on the second information includes: The first UE sends, to the access network device based on the second information, third information used to release a communication resource used for the relay connection between the first UE and the access network device; or the first UE sends, to the AMF network element of the first UE based on the second information, fourth information used to delete a context of the second UE in a protocol data unit (protocol data unit, PDU) session used by the first UE to provide the relay service. In this application, the relay UE is supported in requesting, based on the second information, the access network device or the AMF

network element of the relay UE to delete the context of the remote UE in the PDU session used by the relay UE to provide the relay service.

[0034] In a possible implementation, the first UE is remote UE, the second UE is relay UE that provides the relay service for the first UE, and that the first UE releases the relay connection based on the second information includes: The first UE sends, to the access network device based on the second information, fifth information used to release a communication resource used by the access network device for the relay connection. In this application, the remote UE is supported in requesting, based on the second information, the access network device to release the communication resource used by the access network device for the relay connection.

[0035] In a possible implementation, the method further includes: The first UE sends, to the second UE based on the second information, sixth information used to release a communication resource used for the relay connection between the first UE and the second UE. In this application, the remote UE is further supported in requesting the relay UE to release the communication resource used for the relay connection between the first UE and the second UE, or the relay UE indicates the remote UE to release the communication resource used for the relay connection between the first UE and the second UE.

[0036] In a possible implementation, the second information includes identification information of the second UE. The identification information of the second UE is carried in the second information, to accurately determine to release a relay connection corresponding to a relay service between the first UE and which second UE.

[0037] In a possible implementation, the second information includes a relay connection release cause value, and the relay connection release cause value is used to represent a reason for releasing the relay connection, where the reason for releasing the relay connection includes: relay service subscription information of the first UE changes.

[0038] According to a fourth aspect, a method for releasing a relay connection is provided. The method includes: An access network device receives second information used to release a relay connection corresponding to a relay service between first UE and second UE; and the access network device releases the relay connection based on the second information.

[0039] According to the technical solution provided in the fourth aspect, the access network device releases, based on the received second information used to release the relay connection corresponding to the relay service between the first UE and the second UE, the relay connection

corresponding to the relay service between the first UE and the second UE. For example, the second information may be sent to the access network device when a first network element determines, based on service subscription information of remote UE and/or relay UE, that subscription or authorization information of the remote UE and/or the relay UE changes, or sent to the access network device by using another network element. Making a response in time based on the service subscription information of the remote UE and/or the relay UE can improve accuracy of relay connection management and control and accuracy of charging on a network side.

[0040] In a possible implementation, the second information is second relay service authorization revocation information or second relay connection release information, where the second relay service authorization revocation information indicates to revoke an authorization for the first UE to provide the relay service for the second UE, or revoke an authorization for the first UE to accept the relay service provided by the second UE; and the second relay connection release information indicates to release the relay connection corresponding to the relay service between the first UE and the second UE. In this application, the first UE is supported in releasing, based on the second relay service authorization revocation information or the second relay connection release information, the relay connection corresponding to the relay service between the first UE and the second UE.

[0041] In a possible implementation, that an access network device receives second information includes: The access network device receives the second information from a first network element, where the first network element is a PCF network element of the first UE or an AMF network element of the first UE; or the access network device receives the second information from the first UE or the second UE. In this application, the access network device is supported in releasing, based on the second information from the first network element, the PCF network element of the first UE, the AMF network element of the first UE, the first UE, or the second UE, the relay connection corresponding to the relay service between the first UE and the second UE.

[0042] In a possible implementation, the first UE is relay UE, and that the access network device releases the relay connection based on the second information includes: The access network device releases, based on the second information, at least one of the following resources: a communication resource used for the relay connection between the first UE and the access network device; and a communication resource used for the relay connection between the first UE and the

second UE. In this application, the relay connection corresponding to the relay service between the first UE and the second UE may include the communication resource used for the relay connection between the relay UE and the access network device and/or a communication resource used for the relay connection between the remote UE and the relay UE.

5 **[0043]** In a possible implementation, the first UE is remote UE, and that the access network device releases the relay connection based on the second information includes: The access network device releases, based on the second information, at least one of the following resources: a communication resource used by the access network device for the relay connection; and a communication resource used for the relay connection between the first UE and the second UE. In
10 this application, the relay connection corresponding to the relay service between the first UE and the second UE may include the communication resource used by the access network device for the relay connection and/or a communication resource used for the relay connection between the remote UE and the relay UE.

[0044] In a possible implementation, the second information includes a relay connection
15 release cause value, and the relay connection release cause value is used to represent a reason for releasing the relay connection, where the reason for releasing the relay connection includes: relay service subscription information of the first UE changes.

[0045] According to a fifth aspect, a method for releasing a relay connection is provided. The method includes: First UE receives second information used to release a relay connection
20 corresponding to the first UE; and the first UE releases, based on the second information, the relay connection corresponding to the first UE.

[0046] According to the technical solution provided in the fifth aspect, the first UE releases, based on the received second information used to release the relay connection corresponding to the first UE, the relay connection corresponding to the first UE. For example, the second
25 information may be sent to the first UE when a first network element determines, based on service subscription information of remote UE and/or relay UE, that subscription or authorization information of the remote UE and/or the relay UE changes, or sent to the first UE by using another network element. Making a response in time based on the service subscription information of the remote UE and/or the relay UE can improve accuracy of relay connection management and control
30 and accuracy of charging on a network side.

[0047] In a possible implementation, that first UE receives second information includes: The

first UE receives the second information from a second network element, where the second network element is an access network device or an AMF network element of the first UE. In this application, the first UE is supported in releasing, based on the second information from the access network device or the AMF network element of the first UE, a relay connection corresponding to a relay service between the first UE and second UE.

[0048] In a possible implementation, the second information is first relay service authorization revocation information or first relay connection release information, where the first relay service authorization revocation information indicates to revoke an authorization of using the first UE as relay UE or remote UE; and the first relay connection release information indicates to release the relay connection corresponding to the first UE. In this application, the network element is supported in indicating, by using the first relay service authorization revocation information or the first relay connection release information, the access network device to release the relay connection corresponding to the first UE.

[0049] In a possible implementation, the first UE is relay UE, and that the first UE releases, based on the second information, the relay connection corresponding to the first UE includes: The first UE sends, to the access network device based on the second information, third information used to release a communication resource used for the relay connection between the first UE and the access network device; or the first UE sends, to the AMF network element of the first UE based on the second information, fourth information used to release a PDU session used by the first UE to provide the relay service. In this application, the relay UE is supported in requesting, based on the second information, the access network device to release the communication resource used for the relay connection between the first UE and the access network device, or requesting the AMF network element of the relay UE to release the PDU session used by the first UE to provide the relay service.

[0050] In a possible implementation, the first UE is remote UE, and that the first UE releases, based on the second information, the relay connection corresponding to the first UE includes: The first UE sends, to the access network device based on the second information, fifth information used to release a communication resource used by the access network device for the relay connection. In this application, the remote UE is supported in requesting, based on the second information, the access network device to release the communication resource used by the access network device for the relay connection.

[0051] In a possible implementation, the second information includes a relay connection release cause value, and the relay connection release cause value is used to represent a reason for releasing the relay connection, where the reason for releasing the relay connection includes: relay service subscription information of the first UE changes.

5 **[0052]** According to a sixth aspect, a first network element is provided. The first network element includes: an information obtaining unit, configured to obtain relay service subscription information of first UE; and a processing unit, configured to send first information based on the relay service subscription information of the first UE by using a transceiver unit, where the first information is used to release a relay connection corresponding to the first UE, or release a relay
10 connection corresponding to a relay service between the first UE and second UE.

[0053] According to the technical solution provided in the sixth aspect, when determining, based on service subscription information of remote UE and/or relay UE, that subscription or authorization information of the remote UE and/or the relay UE changes, the first network element may indicate, in time, to release a relay connection corresponding to the remote UE or the relay
15 UE, or release a relay connection corresponding to a relay service between the remote UE and the relay UE. Making a response in time based on the service subscription information of the remote UE and/or the relay UE can improve accuracy of relay connection management and control and accuracy of charging on a network side.

[0054] In a possible implementation, when the first information is used to release the relay
20 connection corresponding to the first UE, the first information is first relay service authorization revocation information or first relay connection release information, where the first relay service authorization revocation information indicates to revoke an authorization of using the first UE as relay UE or remote UE; and the first relay connection release information indicates to release the relay connection corresponding to the first UE. In this application, the first network element is
25 supported in indicating, by using the first relay service authorization revocation information or the first relay connection release information, to release the relay connection corresponding to the first UE.

[0055] In a possible implementation, the first UE is relay UE, and that the processing unit sends the first information based on the relay service subscription information of the first UE by
30 using the transceiver unit includes: The processing unit sends the first information by using the transceiver unit when the relay service subscription information of the first UE changes from

including identification information of remote UE for which the first UE is allowed to provide a relay service to not including the identification information of the remote UE for which the first UE is allowed to provide the relay service; or the processing unit sends the first information by using the transceiver unit when the processing unit determines, based on the relay service subscription information, that the first UE changes from being allowed to provide a relay service for remote UE to not being allowed to provide the relay service for the remote UE. The first information is used to release the relay connection corresponding to the first UE. In this application, a specific form of the relay service subscription information of the first UE is not limited. For example, the relay service subscription information of the first UE may include the identification information of the remote UE for which the first UE is allowed to provide the relay service. Alternatively, the relay service subscription information of the first UE may be represented in another form that can reflect whether the first UE is allowed to provide the relay service for the remote UE.

[0056] In a possible implementation, the first UE is remote UE, and that the processing unit sends the first information based on the relay service subscription information of the first UE by using the transceiver unit includes: The processing unit sends the first information by using the transceiver unit when the relay service subscription information of the first UE changes from including identification information of relay UE whose relay service is allowed to be accepted by the first UE to not including the identification information of the relay UE whose relay service is allowed to be accepted by the first UE; or the processing unit sends the first information by using the transceiver unit when the processing unit determines, based on the relay service subscription information, that the first UE changes from being allowed to accept a relay service to not being allowed to accept the relay service. The first information is used to release the relay connection corresponding to the first UE. In this application, a specific form of the relay service subscription information of the first UE is not limited. For example, the relay service subscription information of the first UE may include the identification information of the relay UE whose relay service is allowed to be accepted by the first UE. Alternatively, the relay service subscription information of the first UE may be represented in another form that can reflect whether the first UE is allowed to accept the relay service.

[0057] In a possible implementation, when the first information is used to release the relay connection corresponding to the relay service between the first UE and the second UE, the first

information is second relay service authorization revocation information or second relay connection release information, where the second relay service authorization revocation information indicates to revoke an authorization for the first UE to provide the relay service for the second UE, or revoke an authorization for the first UE to accept the relay service provided by the second UE; and the second relay connection release information indicates to release the relay connection corresponding to the relay service between the first UE and the second UE. In this application, the first network element is supported in indicating, by using the second relay service authorization revocation information or the second relay connection release information, to release the relay connection corresponding to the relay service between the first UE and the second UE.

[0058] In a possible implementation, the first UE is relay UE, and that the processing unit sends the first information based on the relay service subscription information of the first UE by using the transceiver unit includes: The processing unit sends the first information by using the transceiver unit when the relay service subscription information of the first UE changes from including identification information of remote UE for which the first UE is allowed to provide a relay service to not including the identification information of the remote UE for which the first UE is allowed to provide the relay service, where the identification information of the remote UE includes identification information of the second UE; the processing unit sends the first information by using the transceiver unit when identification information, in the relay service subscription information of the first UE, of remote UE for which the first UE is allowed to provide a relay service changes from including identification information of the second UE to not including the identification information of the second UE; or the processing unit sends the first information by using the transceiver unit when the processing unit determines, based on the relay service subscription information of the first UE, that the first UE changes from being allowed to provide the relay service for the second UE to not being allowed to provide the relay service for the second UE, where the first information is used to release the relay connection corresponding to the relay service between the first UE and the second UE. In this application, a specific form of the relay service subscription information of the first UE is not limited. For example, the relay service subscription information of the first UE may include the identification information of the remote UE for which the first UE is allowed to provide the relay service. For another example, the relay service subscription information of the first UE may include identification information indicating whether the first UE is allowed to provide the relay service for the second UE. Alternatively, the

relay service subscription information of the first UE may be represented in another form that can reflect whether the first UE is allowed to provide the relay service for the second UE.

[0059] In a possible implementation, the first UE is remote UE, and that the processing unit sends the first information based on the relay service subscription information of the first UE by using the transceiver unit includes: The processing unit sends the first information by using the transceiver unit when the relay service subscription information of the first UE changes from including identification information of relay UE whose relay service is allowed to be accepted by the first UE to not including the identification information of the relay UE whose relay service is allowed to be accepted by the first UE, where the identification information of the relay UE includes identification information of the second UE; the processing unit sends the first information by using the transceiver unit when identification information, in the relay service subscription information of the first UE, of relay UE whose relay service is allowed to be accepted by the first UE changes from including identification information of the second UE to not including the identification information of the second UE; or the processing unit sends the first information by using the transceiver unit when the processing unit determines, based on the relay service subscription information of the first UE, that the first UE changes from being allowed to accept the relay service provided by the second UE to not being allowed to accept the relay service provided by the second UE, where the first information is used to release the relay connection corresponding to the relay service between the first UE and the second UE. In this application, a specific form of the relay service subscription information of the first UE is not limited. For example, the relay service subscription information of the first UE may include the identification information of the relay UE whose relay service is allowed to be accepted by the first UE. For another example, the relay service subscription information of the first UE may include identification information indicating whether the first UE is allowed to accept the relay service provided by the second UE. Alternatively, the relay service subscription information of the first UE may be represented in another form that can reflect whether the first UE is allowed to accept the relay service provided by the second UE.

[0060] In a possible implementation, the first information includes the identification information of the second UE. The identification information of the second UE is carried in the first information, to accurately determine to release a relay connection corresponding to a relay service between the first UE and which second UE.

[0061] In a possible implementation, that the processing unit sends the first information by using the transceiver unit includes: The processing unit sends the first information to an access network device, the first UE, or an SMF network element of the first UE by using the transceiver unit. This application supports to complete, by using the access network device, the first UE, or the SMF network element of the first UE, releasing the relay connection corresponding to the first UE or releasing the relay connection corresponding to the relay service between the first UE and the second UE.

[0062] In a possible implementation, the first network element is an AMF network element or a PCF network element. In this application, the AMF network element or the PCF network element is supported in indicating, based on the relay service subscription information of the first UE, to release the relay connection corresponding to the first UE, or release the relay connection corresponding to the relay service between the first UE and the second UE.

[0063] In a possible implementation, the first information includes a relay connection release cause value, and the relay connection release cause value is used to represent a reason for releasing the relay connection.

[0064] In a possible implementation, the reason for releasing the relay connection includes: the relay service subscription information of the first UE changes.

[0065] According to a seventh aspect, an access network device is provided. The access network device includes: a transceiver unit, configured to receive second information used to release a relay connection corresponding to first UE; and a processing unit, configured to release, based on the second information, the relay connection corresponding to the first UE.

[0066] According to the technical solution provided in the seventh aspect, the access network device releases, based on the received second information used to release the relay connection corresponding to the first UE, the relay connection corresponding to the first UE. For example, the second information may be sent to the access network device when a first network element determines, based on service subscription information of remote UE and/or relay UE, that subscription or authorization information of the remote UE and/or the relay UE changes, or sent to the access network device by using another network element. Making a response in time based on the service subscription information of the remote UE and/or the relay UE can improve accuracy of relay connection management and control and accuracy of charging on a network side.

[0067] In a possible implementation, the second information is first relay service authorization

revocation information or first relay connection release information, where the first relay service authorization revocation information indicates to revoke an authorization of using the first UE as relay UE or remote UE; and the first relay connection release information indicates to release the relay connection corresponding to the first UE. In this application, the network element is supported in indicating, by using the first relay service authorization revocation information or the first relay connection release information, the access network device to release the relay connection corresponding to the first UE.

[0068] In a possible implementation, that the transceiver unit receives the second information includes: The transceiver unit receives the second information from a first network element, where the first network element is a PCF network element of the first UE or an AMF network element of the first UE; or the transceiver unit receives the second information from the first UE. In this application, the access network device is supported in releasing, based on the second information from the first network element, the PCF network element of the first UE, the AMF network element of the first UE, or the first UE, the relay connection corresponding to the first UE.

[0069] In a possible implementation, the first UE is relay UE, and that the processing unit releases, based on the second information, the relay connection corresponding to the first UE includes: The processing unit releases, based on the second information, a communication resource used for the relay connection between the first UE and the access network device. In this application, the relay connection corresponding to the first UE may include the communication resource used for the relay connection between the first UE and the access network device.

[0070] In a possible implementation, that the processing unit releases, based on the second information, the relay connection corresponding to the first UE further includes: The processing unit releases, based on the second information, a communication resource used for the relay connection between the first UE and the remote UE. In this application, the relay connection corresponding to the first UE may further include a communication resource used for the relay connection between the relay UE and the remote UE.

[0071] In a possible implementation, the first UE is remote UE, and that the processing unit releases, based on the second information, the relay connection corresponding to the first UE includes: The processing unit releases, based on the second information, at least one of the following resources: a communication resource used by the access network device for the relay connection; and a communication resource used for the relay connection between the first UE and

the relay UE. In this application, the relay connection corresponding to the remote UE may include the communication resource used by the access network device for the relay connection and/or the communication resource used for the relay connection between the remote UE and the relay UE.

[0072] In a possible implementation, the second information includes a relay connection release cause value, and the relay connection release cause value is used to represent a reason for releasing the relay connection, where the reason for releasing the relay connection includes: relay service subscription information of the first UE changes.

[0073] According to an eighth aspect, first UE is provided. The first UE includes: a transceiver unit, configured to receive second information used to release a relay connection corresponding to a relay service between the first UE and second UE; and a processing unit, configured to release the relay connection based on the second information.

[0074] According to the technical solution provided in the eighth aspect, the first UE releases, based on the received second information used to release the relay connection corresponding to the relay service between the first UE and the second UE, the relay connection corresponding to the relay service between the first UE and the second UE. For example, the second information may be sent to the first UE when a first network element determines, based on service subscription information of remote UE and/or relay UE, that subscription or authorization information of the remote UE and/or the relay UE changes, or sent to the first UE by using another network element. Making a response in time based on the service subscription information of the remote UE and/or the relay UE can improve accuracy of relay connection management and control and accuracy of charging on a network side.

[0075] In a possible implementation, that the transceiver unit receives the second information includes: The transceiver unit receives the second information from a second network element, where the second network element is an access network device or an AMF network element of the first UE. In this application, the first UE is supported in releasing, based on the second information from the access network device or the AMF network element of the first UE, the relay connection corresponding to the relay service between the first UE and the second UE.

[0076] In a possible implementation, the second information is second relay service authorization revocation information or second relay connection release information, where the second relay service authorization revocation information indicates to revoke an authorization for the first UE to provide the relay service for the second UE, or revoke an authorization for the first

UE to accept the relay service provided by the second UE; and the second relay connection release information indicates to release the relay connection corresponding to the relay service between the first UE and the second UE. In this application, the first UE is supported in releasing, based on the second relay service authorization revocation information or the second relay connection release information, the relay connection corresponding to the relay service between the first UE and the second UE.

[0077] In a possible implementation, the first UE is relay UE, the second UE is remote UE that accepts the relay service provided by the first UE, and that the processing unit releases the relay connection based on the second information includes: The processing unit sends, to the access network device based on the second information by using the transceiver unit, third information used to release a communication resource used for the relay connection between the first UE and the access network device; or the processing unit sends, to the AMF network element of the first UE based on the second information by using the transceiver unit, fourth information used to delete a context of the second UE in a PDU session used by the first UE to provide the relay service. In this application, the relay UE is supported in requesting, based on the second information, the access network device or the AMF network element of the relay UE to delete the context of the remote UE in the PDU session used by the relay UE to provide the relay service.

[0078] In a possible implementation, the first UE is remote UE, the second UE is relay UE that provides the relay service for the first UE, and that the processing unit releases the relay connection based on the second information includes: The processing unit sends, to the access network device based on the second information by using the transceiver unit, fifth information used to release a communication resource used by the access network device for the relay connection. In this application, the remote UE is supported in requesting, based on the second information, the access network device to release the communication resource used by the access network device for the relay connection.

[0079] In a possible implementation, the processing unit is further configured to send, to the second UE based on the second information by using the transceiver unit, sixth information used to release a communication resource used for the relay connection between the first UE and the second UE. In this application, the remote UE is further supported in requesting the relay UE to release the communication resource used for the relay connection between the first UE and the second UE, or the relay UE indicates the remote UE to release the communication resource used

for the relay connection between the first UE and the second UE.

[0080] In a possible implementation, the second information includes identification information of the second UE. The identification information of the second UE is carried in the second information, to accurately determine to release a relay connection corresponding to a relay service between the first UE and which second UE.

[0081] In a possible implementation, the second information includes a relay connection release cause value, and the relay connection release cause value is used to represent a reason for releasing the relay connection, where the reason for releasing the relay connection includes: relay service subscription information of the first UE changes.

[0082] According to a ninth aspect, an access network device is provided. The access network device includes: a transceiver unit, configured to receive second information used to release a relay connection corresponding to a relay service between first UE and second UE; and a processing unit, configured to release the relay connection based on the second information.

[0083] According to the technical solution provided in the ninth aspect, the access network device releases, based on the received second information used to release the relay connection corresponding to the relay service between the first UE and the second UE, the relay connection corresponding to the relay service between the first UE and the second UE. For example, the second information may be sent to the access network device when a first network element determines, based on service subscription information of remote UE and/or relay UE, that subscription or authorization information of the remote UE and/or the relay UE changes, or sent to the access network device by using another network element. Making a response in time based on the service subscription information of the remote UE and/or the relay UE can improve accuracy of relay connection management and control and accuracy of charging on a network side.

[0084] In a possible implementation, the second information is second relay service authorization revocation information or second relay connection release information, where the second relay service authorization revocation information indicates to revoke an authorization for the first UE to provide a relay service for the second UE, or revoke an authorization for the first UE to accept a relay service provided by the second UE; and the second relay connection release information indicates to release the relay connection corresponding to the relay service between the first UE and the second UE. In this application, the first UE is supported in releasing, based on the second relay service authorization revocation information or the second relay connection

release information, the relay connection corresponding to the relay service between the first UE and the second UE.

[0085] In a possible implementation, that the transceiver unit receives the second information includes: The transceiver unit receives the second information from a first network element, where
5 the first network element is a PCF network element of the first UE or an AMF network element of the first UE; or the transceiver unit receives the second information from the first UE or the second UE. In this application, the access network device is supported in releasing, based on the second information from the first network element, the PCF network element of the first UE, the AMF network element of the first UE, the first UE, or the second UE, the relay connection corresponding
10 to the relay service between the first UE and the second UE.

[0086] In a possible implementation, the first UE is relay UE, and that the processing unit releases the relay connection based on the second information includes: The processing unit releases, based on the second information, at least one of the following resources: a communication resource used for the relay connection between the first UE and the access network device; and a
15 communication resource used for the relay connection between the first UE and the second UE. In this application, the relay connection corresponding to the relay service between the first UE and the second UE may include the communication resource used for the relay connection between the relay UE and the access network device and/or a communication resource used for the relay connection between the remote UE and the relay UE.

[0087] In a possible implementation, the first UE is remote UE, and that the processing unit releases the relay connection based on the second information includes: The processing unit releases, based on the second information, at least one of the following resources: a communication resource used by the access network device for the relay connection; and a communication resource used for the relay connection between the first UE and the second UE. In this application,
25 the relay connection corresponding to the relay service between the first UE and the second UE may include the communication resource used by the access network device for the relay connection and/or a communication resource used for the relay connection between the remote UE and the relay UE.

[0088] In a possible implementation, the second information includes a relay connection release cause value, and the relay connection release cause value is used to represent a reason for
30 releasing the relay connection, where the reason for releasing the relay connection includes: relay

service subscription information of the first UE changes.

[0089] According to a tenth aspect, first UE is provided. The first UE includes: a transceiver unit, configured to receive second information used to release a relay connection corresponding to the first UE; and a processing unit, configured to release, based on the second information, the relay connection corresponding to the first UE.

[0090] According to the technical solution provided in the tenth aspect, the first UE releases, based on the received second information used to release the relay connection corresponding to the first UE, the relay connection corresponding to the first UE. For example, the second information may be sent to the first UE when a first network element determines, based on service subscription information of remote UE and/or relay UE, that subscription or authorization information of the remote UE and/or the relay UE changes, or sent to the first UE by using another network element. Making a response in time based on the service subscription information of the remote UE and/or the relay UE can improve accuracy of relay connection management and control and accuracy of charging on a network side.

[0091] In a possible implementation, that the transceiver unit receives the second information includes: The transceiver unit receives the second information from a second network element, where the second network element is an access network device or an AMF network element of the first UE. In this application, the first UE is supported in releasing, based on the second information from the access network device or the AMF network element of the first UE, a relay connection corresponding to a relay service between the first UE and second UE.

[0092] In a possible implementation, the second information is first relay service authorization revocation information or first relay connection release information, where the first relay service authorization revocation information indicates to revoke an authorization of using the first UE as relay UE or remote UE; and the first relay connection release information indicates to release the relay connection corresponding to the first UE. In this application, the network element is supported in indicating, by using the first relay service authorization revocation information or the first relay connection release information, the access network device to release the relay connection corresponding to the first UE.

[0093] In a possible implementation, the first UE is relay UE, and that the processing unit releases, based on the second information, the relay connection corresponding to the first UE includes: The processing unit sends, to the access network device based on the second information

by using the transceiver unit, third information used to release a communication resource used for the relay connection between the first UE and the access network device; or the processing unit sends, to the AMF network element of the first UE based on the second information by using the transceiver unit, fourth information used to release a PDU session used by the first UE to provide the relay service. In this application, the relay UE is supported in requesting, based on the second information, the access network device to release the communication resource used for the relay connection between the first UE and the access network device, or requesting the AMF network element of the relay UE to release the PDU session used by the first UE to provide the relay service.

[0094] In a possible implementation, the first UE is remote UE, and that the processing unit releases, based on the second information, the relay connection corresponding to the first UE includes: The processing unit sends, to the access network device based on the second information by using the transceiver unit, fifth information used to release a communication resource used by the access network device for the relay connection. In this application, the remote UE is supported in requesting, based on the second information, the access network device to release the communication resource used by the access network device for the relay connection.

[0095] In a possible implementation, the second information includes a relay connection release cause value, and the relay connection release cause value is used to represent a reason for releasing the relay connection, where the reason for releasing the relay connection includes: relay service subscription information of the first UE changes.

[0096] According to an eleventh aspect, a first network element is provided. The first network element includes: a memory, configured to store a computer program; and a processor, configured to execute the computer program to implement the method in any possible implementation of the first aspect.

[0097] According to a twelfth aspect, an access network device is provided. The access network device includes: a memory, configured to store a computer program; and a processor, configured to execute the computer program to implement the method in any possible implementation of the second aspect or the fourth aspect.

[0098] According to a thirteenth aspect, first UE is provided. The first UE includes a memory, configured to store a computer program; and a processor, configured to execute the computer program to implement the method in any possible implementation of the third aspect or the fifth aspect.

[0099] According to a fourteenth aspect, a communication system is provided. The communication system includes the first network element in any possible implementation of the sixth aspect or the eleventh aspect, the access network device in any possible implementation of the seventh aspect, the ninth aspect, or the twelfth aspect, and the first UE in any possible
5 implementation of the eighth aspect, the tenth aspect, or the thirteenth aspect.

[00100] In a possible implementation, the communication system further includes one or more of the following: a PCF network element, a unified data management (unified data management, UDM)/unified data repository (unified data repository, UDR) network element, an SMF network element, or an AMF network element.

[00101] According to a fifteenth aspect, a method for releasing a relay connection is provided. The method includes: First relay UE receives seventh information used to release a first PDU session, where the first PDU session is used by the first relay UE to provide a relay service for remote UE; and the first relay UE releases, based on the seventh information, a relay connection corresponding to the first PDU session, where the relay connection is used for communication
15 between the first relay UE and the remote UE.

[00102] According to the technical solution provided in the fifteenth aspect, the first relay UE receives the seventh information used to release the first PDU session, and releases, based on the seventh information, the relay connection corresponding to the first PDU session. The release of the PDU session triggers the release of the corresponding relay connection, so that a
20 communication resource between the first relay UE and the remote UE can be released in time, and resource utilization can be improved.

[00103] In a possible implementation, that the first relay UE receives seventh information includes: The first relay UE receives the seventh information from a second network element, where the second network element is an AMF network element corresponding to the first relay UE, a PCF network element corresponding to the first relay UE, or an SMF network element
25 corresponding to the first relay UE. In this application, the first relay UE is supported in releasing, based on the seventh information from the AMF network element, the PCF network element, or the SMF network element of the first relay UE, the relay connection corresponding to the first PDU session.

[00104] In a possible implementation, that the first relay UE releases, based on the seventh information, a relay connection corresponding to the first PDU session includes: The first relay
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UE determines the relay connection based on the seventh information; and the first relay UE releases the relay connection.

[00105] In a possible implementation, the relay connection includes a relay connection between the first relay UE and first remote UE, and that the first relay UE releases a relay connection includes: The first relay UE sends, to the first remote UE, eighth information to release the relay connection between the first relay UE and the first remote UE.

[00106] In a possible implementation, the eighth information includes a relay connection release cause value, and the relay connection release cause value is used to represent a reason for releasing the relay connection, where the reason for releasing the relay connection includes: the first PDU session is released.

[00107] According to a sixteenth aspect, first relay UE is provided. The first relay UE includes: a transceiver unit, configured to receive seventh information used to release a first PDU session, where the first PDU session is used by the first relay UE to provide a relay service for remote UE; and a processing unit, configured to release, based on the seventh information, a relay connection corresponding to the first PDU session, where the relay connection is used for communication between the first relay UE and the remote UE.

[00108] In a possible implementation, the transceiver unit is specifically configured to receive the seventh information from a second network element, where the second network element is an AMF network element corresponding to the first relay UE, a PCF network element corresponding to the first relay UE, or an SMF network element corresponding to the first relay UE.

[00109] In a possible implementation, the processing unit is specifically configured to: determine the relay connection based on the seventh information; and release the relay connection.

[00110] In a possible implementation, the relay connection includes a relay connection between the first relay UE and first remote UE, and the transceiver unit is specifically configured to send, to the first remote UE, eighth information to release the relay connection between the first relay UE and the first remote UE.

[00111] In a possible implementation, the eighth information includes a relay connection release cause value, and the relay connection release cause value is used to represent a reason for releasing the relay connection, where the reason for releasing the relay connection includes: the first PDU session is released.

[00112] According to a seventeenth aspect, first relay UE is provided. The first relay UE

includes a memory, configured to store a computer program; and a processor, configured to execute the computer program to implement the method in any possible implementation of the fifteenth aspect.

[00113] According to an eighteenth aspect, a computer-readable storage medium is provided.

5 The computer-readable storage medium stores computer program code; and when the computer program code is executed by a processor, the method in any possible implementation of any one of the first aspect to the fifth aspect, and the fifteenth aspect is implemented.

[00114] According to a nineteenth aspect, a chip system is provided. The chip system includes a processor and a memory. The memory stores computer program code; and when the computer
10 program code is executed by the processor, the method in any possible implementation of any one of the first aspect to the fifth aspect, and the fifteenth aspect is implemented. The chip system may include a chip, or may include a chip and another discrete component.

[00115] According to a twentieth aspect, a computer program product is provided. When the computer program product runs on a computer, the method in any possible implementation of any
15 one of the first aspect to the fifth aspect, and the fifteenth aspect is implemented.

[00116] It may be understood that any communication apparatus, chip, computer-readable medium, computer program product, communication system, or the like provided above is configured to perform a corresponding method provided above. Therefore, for beneficial effects that can be achieved by the communication apparatus, the chip, the computer-readable medium,
20 the computer program product, the communication system, or the like, refer to the beneficial effects in the corresponding method. Details are not described herein again.

BRIEF DESCRIPTION OF DRAWINGS

[00117] FIG. 1 is an example diagram of an architecture of a 5G communication system;

[00118] FIG. 2A is a diagram of an architecture of a communication network;

25 **[00119]** FIG. 2B is a schematic diagram of a communication scenario;

[00120] FIG. 3 is a schematic diagram of a hardware structure of UE according to an embodiment of this application;

[00121] FIG. 4 is a schematic diagram of a hardware structure of a network device according to an embodiment of this application;

[00122] FIG. 5 is a diagram of two examples in which remote UE accesses a network via relay UE according to an embodiment of this application;

[00123] FIG. 6 is a flowchart of a method for releasing a relay connection according to an embodiment of this application;

5 [00124] FIG. 7 is a flowchart of a method in an authorization manner 1 according to an embodiment of this application;

[00125] FIG. 8 is a flowchart of a method in an authorization manner 2 according to an embodiment of this application;

[00126] FIG. 9 is a flowchart of a method in an authorization manner 3 according to an embodiment of this application;

10 [00127] FIG. 10 is a flowchart of a method in an authorization manner 4 according to an embodiment of this application;

[00128] FIG. 11A and FIG. 11B are an interaction diagram 1 of a method for releasing a relay connection according to an embodiment of this application;

15 [00129] FIG. 12A-1 and FIG. 12A-2 are an interaction diagram 2 of a method for releasing a relay connection according to an embodiment of this application;

[00130] FIG. 12B-1 and FIG. 12B-2 are an interaction diagram 3 of a method for releasing a relay connection according to an embodiment of this application;

[00131] FIG. 13 is an interaction diagram 4 of a method for releasing a relay connection according to an embodiment of this application;

20 [00132] FIG. 14A and FIG. 14B are an interaction diagram 5 of a method for releasing a relay connection according to an embodiment of this application;

[00133] FIG. 15A and FIG. 15B are an interaction diagram 6 of a method for releasing a relay connection according to an embodiment of this application;

25 [00134] FIG. 16 is a block diagram of a structure of a communication apparatus according to an embodiment of this application;

[00135] FIG. 17 is a block diagram of a structure of another communication apparatus according to an embodiment of this application; and

[00136] FIG. 18 is an interaction diagram 7 of a method for releasing a relay connection according to an embodiment of this application.

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DESCRIPTION OF EMBODIMENTS

[00137] The following describes technical solutions in this application with reference to the accompanying drawings.

[00138] Embodiments of this application are applicable to but are not limited to the following communication system: a narrowband internet of things (narrowband internet of things, NB-IoT) system, a wireless local area network (wireless local area network, WLAN) system, a long term evolution (long term evolution, LTE) system, a 5th generation mobile communication (5th generation mobile network or 5th generation wireless system, 5G) system that is also referred to as a new radio (new radio, NR) system, a communication system, for example, a 6G system, after 5G, a device to device (device to device, D2D) communication system, an internet of vehicles, or the like.

[00139] FIG. 2A is a diagram of an architecture of a communication network. FIG. 2A shows an interaction relationship between network functions and entities and corresponding interfaces by using a network service architecture of a 5G system as an example. The network architecture is a service-based network architecture (service-based architecture, SBA).

[00140] As shown in FIG. 2A, the 5G system includes UE, an access network (access network, AN) or a radio access network (radio access network, RAN), a user plane function (user plane function, UPF) network element, a data network (data network, DN), an AMF network element, an SMF network element, an authentication server function (authentication server function, AUSF) network element, a PCF network element, an application function (application function, AF), a network slice selection function (network slice selection function, NSSF) network element, a UDM network element, a network exposure function (network exposure function, NEF) network element, and a network repository function (network repository function, NRF) network element. The UPF network element, the AMF network element, the SMF network element, the PCF network element, the AUSF network element, the UDM network element, the NSSF network element, and the NRF network element are all core network devices.

[00141] It should be noted that when UE is connected to a network via a relay device, the UE may be referred to as "remote UE". The relay device is a device that may provide the remote UE with access to a cellular network, and may be a device such as a relay station or UE. When the UE acts as the relay device of the remote UE, the UE supports PC5 interface communication. The

relay device may be referred to as "relay UE", and it indicates that the relay device is located within a coverage area of a mobile network. For example, the relay device can normally access an access network of the 5G system.

[00142] As shown in FIG. 2A, the remote UE is connected to an AN device/a RAN device and the core network device via the relay UE. An interface between the remote UE and the relay UE is a PC5 interface, an interface between the relay UE and the AN/RAN device is a Uu interface, an interface between the remote UE/relay UE and the AMF network element is an N1 interface, an interface between the AN/RAN device and the AMF network element is an N2 interface, an interface between the AN/RAN device and the UPF network element is an N3 interface, an interface between the SMF network element and the UPF network element is an N4 interface, and an interface between the UPF network element and the DN is an N6 interface. Namf is a service-based interface presented by the AMF network element, Nsmf is a service-based interface presented by the SMF network element, Nausf is a service-based interface presented by the AUSF network element, Nnssf is a service-based interface presented by the NSSF network element, Nnef is a service-based interface presented by the NEF network element, Nnrf is a service-based interface presented by the NRF network element, Npcf is a service-based interface presented by the PCF network element, Nudm is a service-based interface presented by the UDM network element, and the Naf is a service-based interface presented by the AF.

[00143] Main functions of the network elements are described in detail below.

[00144] AN/RAN: The AN/RAN may include the AN/RAN device. The AN/RAN device may be base stations in various forms, for example, a macro base station, a micro base station (also referred to as a "small cell"), and a distribute unit-control unit (distribute unit-control unit, DU-CU). The DU-CU is a device that is deployed in the radio access network and that can perform wireless communication with the UE. In addition, the base station may alternatively be a radio controller in a cloud radio access network (cloud radio access network, CRAN) scenario, a relay station, an access point, a vehicle-mounted device, a wearable device, a network device in a future evolved public land mobile network (public land mobile network, PLMN), or the like. The AN/RAN device may alternatively be a broadband network gateway (broadband network gateway, BNG), an aggregation switch, a non-3GPP access device, or the like. The AN/RAN device is mainly responsible for functions such as radio resource management, uplink and downlink data classification, quality of service (quality of service, QoS) management, and data compression and

encryption on an air interface side, completing signaling processing with a control plane network element, or completing data forwarding with a user plane function network element. A specific form and structure of the AN/RAN device are not limited in embodiments of this application.

[00145] For example, in systems for which different radio access technologies are used, names of a device having a function of the base station may be different. For example, the base station may be an evolved universal terrestrial radio access network (evolved universal terrestrial radio access network, E-UTRAN) device, for example, an evolved NodeB (evolved NodeB, eNB or e-NodeB), in LTE, or may be a next generation radio access network (next generation radio access network, NG-RAN) device (for example, a gNB) in the 5G system.

[00146] The AMF network element is mainly responsible for processing a control plane message, for example, access control, mobility management, lawful interception, and access authentication/authorization. Specifically, functions of the AMF network element mainly include: (1) processing an access network control plane; (2) processing a non-access stratum (non-access stratum, NAS) message, and being responsible for NAS encryption and integrity protection; (3) registration management; (4) connection management; (5) accessibility management; (6) mobility management; (7) intercepting legal information; (8) providing a session management message between the UE and the SMF network element; (9) implementing transparent transmission of a routing session management (session management, SM) message, which is similar to transparent transmission proxy; (10) access authentication; (11) access authorization; (12) forwarding an SMS message (short message service message) between the UE and a short message service function SMSF; (13) interacting with the AUSF and the UE to obtain a UE authentication intermediate key; and (14) calculating a specific key for accessing a network.

[00147] The SMF network element is mainly configured to manage a session, allocate and manage an internet protocol (internet protocol, IP) address of the UE, select a user plane function that may be managed, serve as a termination point of policy control and a charging function interface, notify downlink data, and the like. Specifically, main functions of the SMF network element include: (1) session management and session establishment, modification, and release, including maintaining a channel between the UPF network element and an AN node; (2) UE IP address allocation and management; (3) selecting and controlling the user plane function; (4) configuring correct service routing on the UPF network element; (5) implementing the policy control function; (6) policy enforcement and QoS control; (7) lawful interception; (8) processing

session management in a NAS message; (9) downlink data indication; (10) initiating specific session management information of an access network (routing via the AMF network element); (11) determining a session and service continuity mode; and (12) a roaming function.

[00148] The PCF network element is mainly configured to: provide the UE, the AMF network element, or the SMF network element with parameters related to a UE policy rule, an access management (access management, AM) policy rule, and an SM policy rule, manage user subscription information, interwork with the UDM network element to access subscriber information related to policy decision, or the like. The PCF network element usually performs policy decision based on the subscription information and the like.

[00149] The AF is configured to provide a service and is mainly configured to: (1) affect service routing application; (2) expose a network access capability; and (3) interact with a policy framework to perform policy management and control.

[00150] The UPF network element is mainly responsible for packet routing and transfer, quality of service (Quality of Service, QoS) control of user plane data, charging information statistics, and the like. The UPF network element may receive downlink data from the AF, and then transmit the downlink data to the UE through the (R)AN.

[00151] The NEF network element is mainly configured to connect a core network element to an external application server, and provide services such as authentication and data transfer when the external application server initiates a service request to a core network.

[00152] The UDM network element is mainly configured to manage subscription data and authentication data of a user, and perform authentication credit processing, user identity processing, access authorization, registration/mobility management, subscription management, short message service message management, and the like.

[00153] In some embodiments, the UDM network element may further include a UDR. Alternatively, in some other embodiments, a 3GPP SBA in the 5G system may further include a UDR network element. The UDR network element is configured to: provide policy storage and retrieval for the PCF network element, store and retrieve structured data for exposure, store user information requested by the application function, or the like.

[00154] In addition, for descriptions of functions of the DN, the AUSF network element, the NSSF network element, the NRF network element, and the like, refer to explanations and descriptions in the conventional technology. Details are not described herein again.

[00155] It should be noted that in this application, the UE may access the AN/RAN device via the relay UE, in other words, the UE accesses the AN/RAN device through an indirect communication (indirect communication) link. In this case, the UE is "remote UE". If the UE is within a coverage area of the AN/RAN, the UE may further directly access the AN/RAN device, in other words, the UE accesses the AN/RAN device through a direct communication (direct communication) link. In addition, the remote UE may further access the AN/RAN device via different relay UEs. Therefore, the remote UE may transmit data to the AN/RAN device through the indirect communication link and the direct communication link, to implement split (split) transmission and duplication (duplication) transmission of the data. An advantage of split transmission is to improve a transmission rate, and an advantage of duplication transmission is to improve transmission reliability.

[00156] As shown in FIG. 2B, UE 1 accesses an AN/RAN via UE 2 and UE 3, and the UE 1 also establishes a direct communication link to the AN/RAN. The UE 1 is remote UE, and the UE 2 and the UE 3 are relay UEs. The UE 1 may transmit data to an AN device/a RAN device through two indirect communication links and one direct communication link. For example, this transmission manner is split (split) transmission and/or duplication (duplication) transmission.

[00157] The remote UE/relay UE may be a desktop device, a laptop device, a handheld device, a wearable device, a smart home device, a computing device, a vehicle-mounted device, or the like having a wireless connection function, for example, a netbook, a tablet computer, a smartwatch, an ultra-mobile personal computer (ultra-mobile personal computer, UMPC), a smart camera, a personal digital assistant (personal digital assistant, PDA), a portable multimedia player (portable multimedia player, PMP), an AR (augmented reality)/VR (virtual reality) device, a wireless device on a flight vehicle, a wireless device on a robot, a wireless device in industrial control, a wireless device in telemedicine, a wireless device in a smart grid, a wireless device in a smart city (smart city), and a wireless device in a smart home (smart home). Alternatively, the remote UE/relay UE may be a wireless device in a narrowband (narrowband, NB) technology, or the like.

[00158] In addition, the remote UE/relay UE may alternatively refer to an access terminal, a subscriber unit, a subscriber station, a mobile station, a relay station, a remote station, a remote terminal, a mobile device, a user terminal (user terminal), a terminal (terminal), a wireless communication device, a user agent, or a user apparatus. The terminal device may alternatively be a cellular phone, a cordless phone, a session initiation protocol (session initiation protocol, SIP)

phone, a wireless local loop (wireless local loop, WLL) station, a personal digital assistant (personal digital assistant, PDA), a handheld device having a wireless communication function, a computing device, another processing device connected to a wireless modem, a vehicle-mounted device, a wearable device, a terminal device in a future 5G network, a terminal device in the future evolved public land mobile network (public land mobile network, PLMN), a terminal device in a future internet of vehicles, or the like. In this application, meanings of the terminal, the UE, and the terminal device are the same, and may be replaced with each other.

[00159] In addition, in this application, the relay UE may alternatively be a radio access device. For example, the relay UE may be an access device that is deployed by an operator and that is similar to a router. A specific function and structure of the remote UE/relay UE are not limited in this application.

[00160] FIG. 3 is a schematic diagram of a hardware structure of UE. The UE may remote UE, or may be relay UE. As shown in FIG. 3, the UE may specifically include components such as a processor 301, a radio frequency circuit 302, a memory 303, a touchscreen 304, a Bluetooth apparatus 305, one or more sensors 306, a Wi-Fi apparatus 307, a positioning apparatus 308, an audio circuit 309, a peripheral interface 310, a power supply apparatus 311, a fingerprint collection device 312, a speaker 313, and a microphone 314. The components may perform communication through one or more communication buses or signal lines (not shown in FIG. 3). A person skilled in the art may understand that the hardware structure shown in FIG. 3 constitutes no limitation on the UE, and the UE may include more or fewer components than those shown in the figure, or combine some components, or have a different component arrangement.

[00161] The components of the UE are specifically described below with reference to FIG. 3.

[00162] The processor 301 may be a control center of the UE, is connected to other parts of the UE through various interfaces and lines, and executes various functions of the UE by running or executing a computer program, for example, an application client-side program (which may be referred to as App for short below), stored in the memory 303.

[00163] In some embodiments, the processor 301 may be a general purpose central processing unit (central processing unit, CPU), a microprocessor, an application-specific integrated circuit (application-specific integrated circuit, ASIC), or one or more integrated circuits configured to control program execution of the solutions in this application. The processor 301 may include one or more CPUs. For example, the processor 301 may be a Kirin chip.

[00164] The radio frequency circuit 302 may be configured to receive and send a radio signal. Particularly, the radio frequency circuit 302 may receive downlink data of a base station, and send the downlink data to the processor 301 for processing. In addition, the radio frequency circuit 302 may further send uplink data to the base station.

5 **[00165]** The radio frequency circuit 302 usually includes but is not limited to an antenna, at least one amplifier, a transceiver, a coupler, a low noise amplifier, a duplexer, and the like. In addition, the radio frequency circuit 302 may further communicate with another device through wireless communication. The wireless communication may use any communication standard or protocol, including but not limited to a global system for mobile communications, a general packet
10 radio service, code division multiple access, wideband code division multiple access, long term evolution, an e-mail message, a short message service, and the like.

[00166] The memory 303 is configured to store the computer program, and may further be configured to store data. The memory 303 may be a read-only memory (read-only memory, ROM) or a random access memory (random access memory, RAM), or may be an electrically erasable
15 programmable read-only memory (electrically erasable programmable read-only memory, EEPROM), a compact disc read-only memory (compact disc read-only memory, CD-ROM) or another compact disc storage device, an optical disc storage device (including a compact disc, a laser disc, an optical disc, a digital versatile disc, a Blu-ray disc, or the like), a magnetic disk storage medium or another magnetic storage device, or any other medium that can be for carrying
20 or storing program code and that can be accessed by a computer, but is not limited thereto.

[00167] The processor 301 may execute the various functions of the UE and perform data processing by running the computer program stored in the memory 303.

[00168] The memory 303 may include a program storage area and a data storage area. The program storage area may store an operating system and an application program required by at
25 least one function (for example, a sound play function and an image play function). The data storage area may store data (for example, audio data and a phone book) created when the UE is used.

[00169] The memory 303 may store a computer program for implementing a modular function, and execution of the computer program is controlled by the processor 301. The processor 301 is
30 configured to execute the computer program stored in the memory 303, to implement the methods provided in the following embodiments of this application. In addition, the memory 303 may

include a high-speed random access memory, or may include a nonvolatile memory, for example, a magnetic disk storage device, a flash memory, another volatile solid-state storage device, or the like. The memory 303 may store various operating systems such as an iOS operating system and an Android operating system.

5 **[00170]** Although not shown in FIG. 3, the UE may further include a camera (a front-facing camera and/or a rear-facing camera), a flash, a micro projection apparatus, a near field communication (NFC) apparatus, and the like. Details are not described herein.

[00171] It should be understood that the hardware modules included in the UE shown in FIG. 3 are merely examples for description, and constitute no limitation on this application. Actually,
10 the UE (for example, the remote UE or the relay UE) provided in this embodiment of this application may further include another hardware module that has an interaction relationship with the hardware modules shown in the figure. This is not specifically limited herein.

[00172] It should be noted that the AN/RAN device in this application may be a base station. Specifically, the base station may be an Ng-eNB, a gNB, or a transmission reception point
15 (transmission reception point, TRP), or may be a base station defined in 3GPP, for example, an eNB or an e-NodeB.

[00173] In addition, when the eNB accesses an NR core network, a next generation core (next generation core, NGC), or a 5G core network (5th generation core network, 5GC), the eNB may also be referred to as an eLTE eNB. Specifically, the eLTE eNB is an LTE base station device
20 evolved based on the eNB, and may be directly connected to the 5GC. The eLTE eNB also belongs to a base station device in NR.

[00174] Alternatively, the AN/RAN device may be a wireless terminal (wireless terminal, WT), for example, an access point (access point, AP), an access controller (access controller, AC), or another network device that has a capability of communicating with UE and a core network, for
25 example, a vehicle-mounted device or an intelligent wearable device. A type of the AN/RAN device is not limited in this application.

[00175] FIG. 4 is a schematic diagram of a hardware structure of a network device. The network device may be the AN/RAN device in the radio access network shown in FIG. 1, or the AN/RAN device in the AN/RAN shown in FIG. 2A, or may be the core network element such as the AMF
30 network element, the SMF network element, or the PCF network element shown in FIG. 2A. As shown in FIG. 4, the network device may include a processor 401, a communication line 402, a

memory 403, and at least one communication interface (where that the network device includes a communication interface 404 is merely used as an example for description in FIG. 4).

[00176] The processor 401 may include one or more processors. The processor may be a general purpose central processing unit (central processing unit, CPU), a microprocessor, an application-specific integrated circuit (application-specific integrated circuit, ASIC), or another integrated circuit. This is not limited.

[00177] The communication line 402 may include a path for transmitting information between the foregoing components.

[00178] The communication interface 404 is configured to communicate with another device or a communication network.

[00179] The memory 403 may be a ROM, a RAM, an EEPROM, a CD-ROM or another compact disc storage device, an optical disc storage device (including a compact disc, a laser disc, an optical disc, a digital versatile disc, a Blu-ray disc, and the like), a magnetic disk storage medium or another magnetic storage device, or any other medium that can be used to carry or store expected program code in a form of an instruction or a data structure and that can be accessed by a computer. However, this is not limited herein.

[00180] It should be noted that the memory may exist alone, and is connected to the processor through the communication line 402. Alternatively, the memory may be integrated with the processor.

[00181] The memory 403 is configured to store a computer program. The processor 401 is configured to execute the computer program stored in the memory 403, to implement a method of a related network element provided in any one of the following method embodiments of this application.

[00182] It should be noted that the processor 401 may include one or more CPUs such as a CPU 0 and a CPU 1 in FIG. 4.

[00183] In addition, FIG. 4 is merely used as an example of the network device, and does not limit a specific structure of the network device. For example, the network device may further include another functional module.

[00184] A method for releasing a relay connection provided in embodiments of this application is applicable to layer 2 based relay (layer 2 based relay or layer 2 evolved relay) indirect communication, or is applicable to layer 3 based relay (layer 3 based relay or layer 3 evolved relay)

indirect communication. This is not limited.

[00185] (a) in FIG. 5 is a schematic diagram of layer 2 based relay indirect communication. As shown in (a) in FIG. 5, UE 1 and UE 4 are used as two remote UEs to access a network via relay UE, where the relay UE is a layer 2 relay device. The UE 1 and the UE 4 each establish a PDU session to the network via the relay UE. In this scenario, data flows of the UE 1 and the UE 4 are mapped to one data radio bearer (data radio bearer, DRB) of the relay UE on a Uu interface. Data bearers of different remote UEs are identified by using information in an additional adaptation layer (adaptation layer), so that the relay UE and an AN/a RAN distinguish between data of the different remote UEs. Alternatively, data flows of the UE 1 and the UE 4 are mapped to different DRBs of the relay UE on a Uu interface, and the relay UE and the AN/RAN distinguish between data of different remote UEs by using the different DRBs.

[00186] (b) in FIG. 5 is a schematic diagram of layer 3 based relay indirect communication. As shown in (b) in FIG. 5, UE 1 and UE 4 are used as two remote UEs to access a network via relay UE, where the relay UE is a layer 3 relay device. Specifically, the UE 1 and the UE 4 each establish a PC5 communication link to the relay UE, and the relay UE establishes a PDU session to the network. In this scenario, data flows of the UE 1 and the UE 4 are transmitted by using the PDU session established by the relay UE. The relay UE forwards uplink and downlink data of the UE 1 and the UE 4 based on IP addresses. For example, an IP address used by the UE 1 on the PC5 communication link is IP3, and an IP address corresponding to the PDU session of the relay UE is IP1. When IP1 is IPv4, the relay UE allocates a specific port number to the UE 1. To be specific, the relay UE distinguishes data of the UE 1 by using IP1 and the specific port number. In an uplink direction, after receiving an IP3 data packet, the relay UE sends the data packet to a network side by using IP1 and the specific port number. In a downlink direction, after receiving, from a network side, a data packet corresponding to IP1 and the specific port number, the relay UE then sends the data packet to the UE 1 by using IP3 through the PC5 link.

[00187] According to the method for releasing a relay connection provided in embodiments of this application, in the method, based on a change of relay service subscription information of UE, a relay connection corresponding to the UE is updated in time. The method is applicable to both relay UE and remote UE. For example, when relay service subscription information of the relay UE changes from being allowed to provide a relay service to not being allowed to provide the relay service, a relay connection corresponding to the relay UE is released in time. When relay service

subscription information of the remote UE changes from being allowed to accept a relay service to not being allowed to accept the relay service, a relay connection corresponding to the remote UE is released in time. When the relay service subscription information of the relay UE changes from being allowed to provide a relay service for remote UE to not being allowed to provide the relay service for the remote UE, a relay connection corresponding to the relay service between the remote UE and the relay UE is released in time.

[00188] The method for releasing a relay connection provided in embodiments of this application is specifically described below with reference to the accompanying drawings.

[00189] FIG. 6 is a flowchart of a method for releasing a relay connection according to an embodiment of this application. The method may be based on the foregoing architecture, and is specifically described as follows:

[00190] S601: A first network element obtains relay service subscription information of first UE.

[00191] The first UE may be remote UE, or may be relay UE.

[00192] For example, the first UE is remote UE, and the first network element obtains relay service subscription information of the remote UE. For another example, the first UE is relay UE, and the first network element obtains relay service subscription information of the relay UE.

[00193] In an implementation, the first UE is relay UE, and the relay service subscription information of the first UE may include information (which may be referred to as first relay service permission information) used to represent whether the first UE is allowed to provide a relay service. Further, if the first relay service permission information represents that the first UE is allowed to provide the relay service, the relay service subscription information of the first UE may further include identification information of remote UE for which the first UE is allowed to provide the relay service, and the like.

[00194] The identification information of the remote UE may be used to identify the remote UE. For example, the identification information may be an international mobile subscriber identity (international mobile subscriber identity, IMSI), a globally unique temporary identity (globally unique temporary identity, GUTI), a generic public subscription identifier (generic public subscription identifier, GPSI), or an application layer identifier.

[00195] For example, the first UE is UE 2, and the UE 2 is relay UE. Assuming that remote UEs for which the UE 2 is allowed to provide relay services are UE 1 and UE 4, relay service

subscription information of the UE 2 may be presented in a form of a list shown in a table 1.

Table 1

Identification information of the first UE	Identification information of the remote UE for which the relay service is allowed to be provided
Identification information of the UE 2	Identification information of the UE 1
	Identification information of the UE 4

[00196] It can be learned from the table 1 that the UE 2 is allowed to provide the relay service, and the UE 2 is allowed to provide the relay services for the UE 1 and the UE 4.

[00197] In another implementation, the first UE is remote UE, and the relay service subscription information of the first UE may include information (which may be referred to as second relay service permission information) used to represent whether the first UE is allowed to accept a relay service. Further, if the second relay service permission information represents that the first UE is allowed to accept the relay service, the relay service subscription information of the first UE may further include identification information of relay UE whose relay service is allowed to be accepted by the first UE, and the like.

[00198] The identification information of the relay UE may be used to identify the relay UE. For example, the identification information may be an IMSI, a GUTI, a GPSI, or an application layer identifier.

[00199] For example, the first UE is UE 1, the UE 1 is remote UE, and UE 2 and UE 3 are relay UEs. Assuming that the UE 1 is allowed to accept relay services provided by the UE 2 and the UE 3, relay service subscription information of the UE 1 may be presented in a form of a list shown in a table 2.

Table 2

Identification information of the first UE	Identification information of the relay UE whose relay service is allowed to be accepted
Identification information of the UE 1	Identification information of the UE 2
	Identification information of the UE 3

[00200] It can be learned from the table 2 that the UE 1 is allowed to accept the relay service, and the UE 1 is allowed to accept the relay services provided by the UE 2 and the UE 3.

[00201] It should be noted that the foregoing table 1 and table 2 are merely used as two examples of the relay service subscription information of the first UE. In this application, a specific representation form of the relay service subscription information of the first UE is not limited, and the identification information of the remote UE for which the first UE is allowed to provide the relay service, the identification information of the relay UE whose relay service is allowed to be accepted by the first UE, or the like is not limited.

[00202] In this embodiment of this application, the relay service subscription information of the first UE may be stored in a UDM/UDR network element, and step S601 may include: The first network element obtains the relay service subscription information of the first UE from the UDM/UDR network element.

[00203] For example, the first network element may periodically query the UDM/UDR network element for whether the relay service subscription information of the first UE changes, and obtain the relay service subscription information of the first UE from the UDM/UDR network element if the relay service subscription information changes. For another example, when the relay service subscription information of the first UE stored in the UDM/UDR network element changes, the UDM/UDR network element actively sends the relay service subscription information of the first UE to the first network element. For another example, the first network element subscribes to a relay service subscription information event of the first UE from the UDM/UDR network element. When the relay service subscription information of the first UE stored in the UDM/UDR network element changes, the UDM/UDR network element sends the relay service subscription information of the first UE to the first network element. This is not limited in this application.

[00204] For example, the first network element may be an AMF network element or a PCF network element. For example, when the first UE is relay UE, the first network element may be an AMF network element of the relay UE or a PCF network element of the relay UE. When the first UE is remote UE, the first network element may be an AMF network element of the remote UE or a PCF network element of the remote UE.

[00205] S602: The first network element sends first information based on the relay service subscription information of the first UE.

[00206] The first information is used to release a relay connection corresponding to the first UE, or release a relay connection corresponding to a relay service between the first UE and second UE.

[00207] For example, the first network element may send the first information by using an authorization update (Authorization Update) message or an N2 message.

5 **[00208]** In this application, if the first UE is remote UE, the second UE may be relay UE that provides a relay service for the first UE. If the first UE is relay UE, the second UE may be remote UE that accepts a relay service of the first UE.

[00209] The following separately describes content of the first information with reference to four cases.

10 **[00210]** Case 1: The first UE is relay UE, and the first UE changes from being allowed to provide a relay service for remote UE to not being allowed to provide the relay service for the remote UE.

[00211] For example, when the relay service subscription information of the first UE changes from including identification information of the remote UE for which the first UE is allowed to provide the relay service to not including the identification information of the remote UE for which the first UE is allowed to provide the relay service; or the first network element may determine, based on the relay service subscription information of the first UE, that the first UE changes from being allowed to provide the relay service for the remote UE to not being allowed to provide the relay service for the remote UE, it may be determined that the first UE changes from being previously allowed to provide the relay service for the remote UE to not being allowed to provide the relay service for the remote UE.

20 **[00212]** For the case 1, the first information is used to release the relay connection corresponding to the first UE. The relay connection corresponding to the first UE may include all relay connections corresponding to the first UE. All the relay connections corresponding to the first UE may include a relay connection used for the relay service between the first UE and an access network device, and relay connections between the first UE and all second UEs that establish relay connections to the first UE.

[00213] In some examples, the first information may be first relay service authorization revocation information or first relay connection release information. The first relay service authorization revocation information indicates to revoke an authorization of using the first UE as relay UE. The first relay connection release information indicates to release the relay connection

corresponding to the first UE.

[00214] For example, when the first network element is a PCF network element of the first UE, the first network element may send the first relay service authorization revocation information to the first UE by using the authorization update (Authorization Update) message, to indicate the first
5 UE to request a RAN to release the relay connection corresponding to the first UE. Alternatively, the first network element may send the first relay service authorization revocation information or the first relay connection release information to the second UE by using the authorization update (Authorization Update) message, to indicate the second UE to request a RAN to release the relay connection corresponding to the first UE. Alternatively, the first relay service authorization
10 revocation information may be sent to an AMF network element of the first UE by using the authorization update (Authorization Update) message, to indicate the AMF network element of the first UE to request an SMF network element of the first UE to release a PDU session resource used by the first UE for the relay service.

[00215] For another example, when the first network element is an AMF network element of
15 the first UE, the first network element may send the first relay service authorization revocation information or the first relay connection release information to a RAN by using the N2 message, to indicate the RAN to release the relay connection corresponding to the first UE.

[00216] For another example, when the first network element is an AMF network element of the first UE, the first network element may send the first relay service authorization revocation
20 information or the first relay connection release information to an AMF network element of the second UE, to indicate the AMF network element of the second UE to indicate a RAN to release the relay connection corresponding to the first UE.

[00217] Case 2: The first UE is relay UE, and the first UE changes from being allowed to provide a relay service for the second UE to not being allowed to provide the relay service for the
25 second UE.

[00218] For example, when the relay service subscription information of the first UE changes from including identification information of remote UE for which the first UE is allowed to provide a relay service to not including the identification information of the remote UE for which the first
30 UE is allowed to provide the relay service, where the identification information of the remote UE includes identification information of the second UE; identification information, in the relay service subscription information of the first UE, of remote UE for which the first UE is allowed to

provide a relay service changes from including identification information of the second UE to not including the identification information of the second UE; or the first network element determines, based on the relay service subscription information of the first UE, that the first UE changes from being allowed to provide the relay service for the second UE to not being allowed to provide the relay service for the second UE, it may be determined that the first UE changes from being previously allowed to provide the relay service for the second UE to not being allowed to provide the relay service for the second UE.

[00219] For the case 2, the first information is used to release the relay connection corresponding to the relay service between the first UE and the second UE.

[00220] In some examples, the first information may be second relay service authorization revocation information or second relay connection release information. The second relay service authorization revocation information indicates to revoke an authorization for the first UE to provide the relay service for the second UE. The second relay connection release information indicates to release the relay connection corresponding to the relay service between the first UE and the second UE.

[00221] For example, when the first network element is a PCF network element of the first UE, the first network element may send the second relay service authorization revocation information to the first UE, to indicate the first UE to request a RAN to release the relay connection corresponding to the relay service between the first UE and the second UE. Alternatively, the first network element may send the second relay service authorization revocation information to an AMF network element of the first UE, to indicate the AMF network element of the first UE to request an SMF network element of the first UE to delete a context of remote UE 1 in a PDU session used by relay UE 1 to provide a relay service.

[00222] When the first network element is an AMF network element of the first UE, the first network element may send the second relay service authorization revocation information or the second relay connection release information to an AMF network element of the second UE, to indicate the AMF network element of the second UE to indicate a RAN to release the relay connection corresponding to the relay service between the first UE and the second UE. Alternatively, the first network element may send the second relay service authorization revocation information to the first UE, to indicate the first UE to request a RAN to release the relay connection corresponding to the relay service between the first UE and the second UE.

[00223] Case 3: The first UE is remote UE, and the first UE changes from being allowed to accept a relay service to not being allowed to accept the relay service.

[00224] For example, when the relay service subscription information of the first UE changes from including identification information of relay UE whose relay service is allowed to be accepted by the first UE to not including the identification information of the relay UE whose relay service is allowed to be accepted by the first UE; or the first network element determines, based on the relay service subscription information of the first UE, that the first UE changes from being allowed to accept the relay service to not being allowed to accept the relay service, it may be determined that the first UE changes from being previously allowed to accept the relay service to not being allowed to accept the relay service.

[00225] For the case 3, the first information is used to release the relay connection corresponding to the first UE. The relay connection corresponding to the first UE includes relay connections between the first UE and all second UEs that establish relay connections to the first UE, and a communication resource (for example, a PDU session resource) used for the relay service of the first UE.

[00226] In some examples, the first information may be first relay service authorization revocation information or first relay connection release information. The first relay service authorization revocation information indicates to revoke an authorization of using the first UE as remote UE. The first relay connection release information indicates to release the relay connection corresponding to the first UE.

[00227] For example, when the first network element is an AMF network element of the first UE, the first network element may send the first relay service authorization revocation information or the first relay connection release information to a RAN by using the N2 message, to indicate the RAN to release the relay connection corresponding to the first UE.

[00228] Case 4: The first UE is remote UE, and the first UE changes from being allowed to accept a relay service provided by the second UE to not being allowed to accept the relay service provided by the second UE.

[00229] For example, when the relay service subscription information of the first UE changes from including identification information of relay UE whose relay service is allowed to be accepted by the first UE to not including the identification information of the relay UE whose relay service is allowed to be accepted by the first UE, where the identification information of the relay

UE includes identification information of the second UE; identification information, in the relay service subscription information of the first UE, of relay UE whose relay service is allowed to be accepted by the first UE changes from including identification information of the second UE to not including the identification information of the second UE; or the first network element
5 determines, based on the relay service subscription information of the first UE, that the first UE changes from being allowed to accept the relay service provided by the second UE to not being allowed to accept the relay service provided by the second UE, it may be determined that the first UE changes from being previously allowed to accept the relay service provided by the second UE to not being allowed to accept the relay service provided by the second UE.

10 **[00230]** For the case 4, the first information is used to release the relay connection corresponding to the relay service between the first UE and the second UE.

[00231] In some examples, the first information may be second relay service authorization revocation information or second relay connection release information. The second relay service authorization revocation information indicates to revoke an authorization for the first UE to accept
15 the relay service provided by the second UE. The second relay connection release information indicates to release the relay connection corresponding to the relay service between the first UE and the second UE.

[00232] For example, when the first network element is an AMF network element of the first UE, the first network element may send the second relay service authorization revocation
20 information or the second relay connection release information to a RAN, to indicate the RAN to release the relay connection corresponding to the relay service between the first UE and the second UE.

[00233] In this embodiment of this application, step S602 may specifically include the following three cases:

25 **[00234]** Case A: The first network element sends the first information to the access network device based on the relay service subscription information of the first UE.

[00235] Correspondingly, the access network device receives the first information from the first network element. After receiving the first information, the access network device releases a corresponding relay connection based on specific information indicated by the first information.

30 **[00236]** When the first network element is an AMF network element of the first UE, the AMF network element of the first UE directly sends the first information to the access network device.

When the first network element is a PCF network element of the first UE, the PCF network element of the first UE sends the first information to the access network device via the AMF network element of the first UE.

[00237] In some examples, for the foregoing case 1 in which the first UE is relay UE, and the first UE changes from being previously allowed to provide the relay service for the remote UE to not being allowed to provide the relay service for the remote UE, the first network element sends the first information to the access network device based on the relay service subscription information of the first UE. The access network device releases the relay connection between the first UE and the access network device based on the first information.

[00238] In some examples, further, the access network device may release, based on the first information, the relay connections corresponding to relay services between the first UE and all the second UEs that establish relay connections to the first UE.

[00239] For example, the access network device releases the relay connection between the first UE and the access network device based on the first information and sends second information to the first UE. The relay connection between the first UE and the access network device is a connection used for relay data transmission between the first UE and the access network device. The second information is used to release the relay connections corresponding to the relay services between the first UE and all the second UEs that establish relay connections to the first UE. After receiving the second information, the first UE releases, based on the second information, the relay connections corresponding to the relay services between the first UE and all the second UEs that establish relay connections to the first UE, and retains a connection used for direct communication between the first UE and the second UE.

[00240] In some other examples, for the foregoing case 2 in which the first UE is relay UE, and the first UE changes from being previously allowed to provide the relay service for the second UE to not being allowed to provide the relay service for the second UE, the first network element sends the first information to the access network device based on the relay service subscription information of the first UE. The access network device releases, based on the first information, at least one of the following resources: a communication resource used by the access network device for the relay connection of the first UE; and a communication resource used for the relay connection between the first UE and the second UE.

[00241] For example, the access network device releases, based on the first information, the

communication resource used by the access network device for the relay connection of the first UE, and sends the second information to the first UE. The second information is used to release the relay connection corresponding to the relay service between the first UE and the second UE. After receiving the second information, the first UE releases, based on the second information, the relay connection corresponding to the relay service between the first UE and the second UE.

[00242] For another example, the access network device sends second information to the first UE based on the first information. The second information is used to release the relay connection corresponding to the relay service between the first UE and the second UE. After receiving the second information, the first UE releases, based on the second information, the relay connection corresponding to the relay service between the first UE and the second UE.

[00243] In some other examples, for the foregoing case 3 in which the first UE is remote UE, and the first UE changes from being previously allowed to accept the relay service to not being allowed to accept the relay service, the first network element sends the first information to the access network device based on the relay service subscription information of the first UE. The access network device releases, based on the first information, a communication resource used by the access network device for the relay connection of the first UE, or releases the relay connection corresponding to the relay service between the first UE and the second UE. Releasing the communication resource used by the access network device for the relay connection of the first UE may be understood as releasing a communication resource corresponding to an indirect communication link of the first UE and retaining a communication resource corresponding to a direct communication link of the first UE.

[00244] For example, the access network device releases, based on the first information, the communication resource used by the access network device for the relay connection of the first UE, and sends second information to the first UE. The second information is used to release the relay connections corresponding to relay services between the first UE and all the second UEs that establish relay connections to the first UE. After receiving the second information, the first UE releases, based on the second information, the relay connections corresponding to the relay services between the first UE and all the second UEs that establish relay connections to the first UE.

[00245] For another example, the access network device sends second information to the first UE based on the first information. The second information is used to release the relay connections

corresponding to relay services between the first UE and all the second UEs that establish relay connections to the first UE. After receiving the second information, the first UE releases, based on the second information, the relay connections corresponding to the relay services between the first UE and all the second UEs that establish relay connections to the first UE.

5 **[00246]** In some other examples, for the foregoing case 4 in which the first UE is remote UE, and the first UE changes from being previously allowed to accept the relay service provided by the second UE to not being allowed to accept the relay service provided by the second UE, the first network element sends the first information to the access network device based on the relay service subscription information of the first UE. The access network device releases, based on the
10 first information, at least one of the following resources: a communication resource used by the access network device for the relay connection of the first UE; and a communication resource used for the relay connection between the first UE and the second UE. The communication resource used by the access network device for the relay connection of the first UE may be understood as a corresponding communication resource used by the access network device for an indirect
15 communication link of the first UE, instead of a corresponding communication resource used by the access network device for a direct communication link of the first UE.

[00247] For example, the access network device releases, based on the first information, the communication resource used by the access network device for the relay connection of the first UE, and sends second information to the first UE. The second information is used to release the
20 relay connection corresponding to the relay service between the first UE and the second UE. After receiving the second information, the first UE releases, based on the second information, the relay connection corresponding to the relay service between the first UE and the second UE.

[00248] For another example, the access network device sends second information to the first UE based on the first information. The second information is used to release the relay connection
25 corresponding to the relay service between the first UE and the second UE. After receiving the second information, the first UE releases, based on the second information, the relay connection corresponding to the relay service between the first UE and the second UE.

[00249] Case B: The first network element sends the first information to the first UE based on the relay service subscription information of the first UE.

30 **[00250]** Correspondingly, the first UE receives the first information from the first network element. After receiving the first information, the first UE releases a corresponding relay

connection based on specific information indicated by the first information.

[00251] When the first network element is an AMF network element of the first UE, the AMF network element of the first UE sends the first information to the first UE by using a NAS message. When the first network element is a PCF network element of the first UE, the PCF network element of the first UE sends the first information to the first UE via the AMF network element of the first UE.

[00252] In some examples, for the foregoing case 1 in which the first UE is relay UE, and the first UE changes from being previously allowed to provide the relay service for the remote UE to not being allowed to provide the relay service for the remote UE, the first network element sends the first information to the first UE based on the relay service subscription information of the first UE. The first UE releases, based on the first information, the relay connections corresponding to relay services between the first UE and all the second UEs that establish relay connections to the first UE, and requests the access network device to release the relay connection between the first UE and the access network device.

[00253] For example, the first UE sends sixth information to the second UE based on the first information, and sends second information to the access network device. The sixth information is used to release a communication resource used for the relay connection between the first UE and the second UE. After receiving the sixth information, the second UE releases, based on the sixth information, the relay connection corresponding to the relay service between the first UE and the second UE. The second information is used to release the relay connection corresponding to the relay service between the first UE and the access network device. After receiving the first information, the access network device releases the relay connection between the first UE and the access network device based on the second information.

[00254] For another example, the first UE releases, based on the first information, the relay connections corresponding to the relay services between the first UE and all the second UEs that establish relay connections to the first UE, and requests the access network device to release a communication resource used for the relay service between the first UE and the access network device. For example, the first UE sends sixth information to the second UE based on the first information, and sends third information to the access network device. The sixth information is used to release communication resources used for the relay connections between the first UE and all the second UEs that establish relay connections to the first UE. After receiving the sixth

information, the second UE releases, based on the sixth information, the relay connections corresponding to the relay services between the first UE and all the second UEs that establish relay connections to the first UE. The third information is used to release a communication resource used for the relay connection between the first UE and the access network device. After receiving
5 the third information, the access network device releases, based on the third information, the communication resource used for the relay connection between the first UE and the access network device.

[00255] For another example, the first UE releases, based on the first information, the relay connections corresponding to the relay services between the first UE and all the second UEs that
10 establish relay connections to the first UE, and requests the AMF network element of the first UE to release a communication resource used for the relay connection of the first UE. For example, the first UE sends sixth information to the second UE based on the first information, and sends fourth information to the AMF network element of the first UE. The sixth information is used to release a communication resource used for the relay connection between the first UE and the
15 second UE. After receiving the sixth information, the second UE releases, based on the sixth information, the relay connection corresponding to the relay service between the first UE and the second UE. The fourth information is used to delete a context of the second UE in a PDU session used by the first UE to provide the relay service. After receiving the fourth information, the AMF network element of the first UE requests, based on the fourth information, the SMF network
20 element to delete the context of the second UE in the PDU session used by the first UE to provide the relay service. The context of the second UE may include but is not limited to an ID of the second UE and/or an IP address of the second UE. The ID of the second UE may be an IMSI, a GUTI, a GPSI, or an application layer identifier.

[00256] In some other examples, for the foregoing case 2 in which the first UE is relay UE, and
25 the first UE changes from being previously allowed to provide the relay service for the second UE to not being allowed to provide the relay service for the second UE, the first network element sends the first information to the first UE based on the relay service subscription information of the first UE. The first UE performs, based on the first information, at least one of the following operations: releasing a communication resource used for the relay connection between the first UE and the
30 second UE; and requesting the access network device to release a communication resource used for the relay connection of the first UE.

[00257] For example, the first UE releases, based on the first information, the relay connection corresponding to the relay service between the first UE and the second UE, and sends second information to the access network device. The second information is used to release the relay connection corresponding to the relay service between the first UE and the access network device.

5 After receiving the second information, the access network device releases, based on the second information, the relay connection corresponding to the relay service between the first UE and the access network device.

[00258] For another example, the first UE releases, based on the first information, the relay connection corresponding to the relay service between the first UE and the second UE, and

10 requests the access network device to release a communication resource used for the relay connection of the first UE. For example, the first UE releases, based on the first information, the relay connection corresponding to the relay service between the first UE and the second UE, and sends fifth information to the access network device. The fifth information is used to release the communication resource used for the relay connection of the first UE. After receiving the fifth
15 information, the access network device releases, based on the fifth information, the communication resource used for the relay connection of the first UE.

[00259] Alternatively, the first UE releases, based on the first information, the relay connection corresponding to the relay service between the first UE and the second UE, and requests the AMF

network element of the first UE to release the communication resource used for the relay
20 connection of the first UE. For example, the first UE releases, based on the first information, the relay connection corresponding to the relay service between the first UE and the second UE, and sends fourth information to the AMF network element of the first UE. The fourth information is used to delete a context of the second UE in a PDU session used by the first UE to provide the relay service. After receiving the fourth information, the AMF network element of the first UE
25 requests, based on the fourth information, the SMF network element to delete the context of the second UE in the PDU session used by the first UE to provide the relay service. The context of the second UE may include but is not limited to an ID of the second UE and/or an IP address of the second UE.

[00260] In some other examples, for the foregoing case 3 in which the first UE is remote UE,
30 and the first UE changes from being previously allowed to accept the relay service to not being allowed to accept the relay service, the first network element sends the first information to the first

UE based on the relay service subscription information of the first UE. The first UE releases, based on the first information, the relay connections corresponding to relay services between the first UE and all the second UEs that establish relay connections to the first UE, and requests the access network device to release a communication resource used by the access network device for the relay connection of the first UE.

[00261] For example, the first UE releases, based on the first information, the relay connections corresponding to the relay services between the first UE and all the second UEs that establish relay connections to the first UE, and sends fifth information to the access network device. The second UE is relay UE, and the fifth information is used to release a communication resource used for the relay connection of the first UE. After receiving the fifth information, the access network device releases, based on the fifth information, the communication resource used for the relay connection of the first UE.

[00262] Alternatively, the first UE releases, based on the first information, the relay connections corresponding to the relay services between the first UE and all the second UEs that establish relay connections to the first UE, and the second UE is relay UE. Further, the first UE requests the second UE to release the relay connection corresponding to the relay service. After releasing the relay connection, the second UE requests the AMF network element of the second UE to delete a context of the first UE in a PDU session used by the second UE to provide the relay service. The context of the first UE may include but is not limited to an ID of the first UE and/or an address IP of the first UE.

[00263] In some other examples, for the foregoing case 4 in which the first UE is remote UE, and the first UE changes from being previously allowed to accept the relay service provided by the second UE to not being allowed to accept the relay service provided by the second UE, the first network element sends the first information to the first UE based on the relay service subscription information of the first UE. The first UE performs, based on the first information, at least one of the following operations: releasing a communication resource used for the relay connection between the first UE and the second UE; and requesting the access network device to release a communication resource used for the relay connection of the first UE. The second UE is relay UE.

[00264] For example, the first UE releases, based on the first information, the relay connection corresponding to the relay service between the first UE and the second UE, and sends second

information to the access network device. The second information is used to release the relay connection corresponding to the relay service between the first UE and the access network device. After receiving the second information, the access network device releases, based on the second information, the relay connection corresponding to the relay service between the first UE and the access network device.

[00265] For another example, the first UE releases, based on the first information, the relay connection corresponding to the relay service between the first UE and the second UE, and requests the access network device to release a communication resource used for the relay connection of the first UE. For example, the first UE releases, based on the first information, the relay connection corresponding to the relay service between the first UE and the second UE, and sends fifth information to the access network device. The fifth information is used to release the communication resource used for the relay connection of the first UE. After receiving the fifth information, the access network device releases, based on the fifth information, the communication resource used for the relay connection of the first UE.

[00266] Alternatively, the first UE releases, based on the first information, the relay connection corresponding to the relay service between the first UE and the second UE. Further, the first UE requests the second UE to release the relay connection corresponding to the relay service. After releasing the relay connection, the second UE requests the AMF network element of the second UE to delete a context of the first UE in a PDU session used by the second UE to provide the relay service. The context of the first UE may include but is not limited to an ID of the first UE and/or an IP address of the first UE.

[00267] Case C: The first network element sends the first information to the SMF network element of the first UE based on the relay service subscription information of the first UE.

[00268] Correspondingly, the SMF network element of the first UE receives the first information from the first network element. After receiving the first information, the SMF network element of the first UE releases a corresponding relay connection based on specific information indicated by the first information. The first network element is an AMF network element of the first UE.

[00269] In some examples, for the foregoing case 1 in which the first UE is relay UE, and the first UE changes from being previously allowed to provide the relay service for the remote UE to not being allowed to provide the relay service for the remote UE, the first network element sends

the first information to the SMF network element of the first UE based on the relay service subscription information of the first UE. The SMF network element of the first UE releases, based on the first information, a communication resource used for the relay connection of the first UE. For example, the communication resource for the relay connection of the first UE may be a PDU session established by the first UE for the relay service.

[00270] Alternatively, for the foregoing case 2 in which the first UE is relay UE, and the first UE changes from being previously allowed to provide the relay service for the second UE to not being allowed to provide the relay service for the second UE, the first network element sends the first information to the SMF network element of the first UE based on the relay service subscription information of the first UE. The SMF network element of the first UE deletes, based on the first information, a context of the second UE in a PDU session used by the first UE to provide the relay service.

[00271] Further, in an example, the first information or second information may further include a relay connection release cause value. The relay connection release cause value is used to represent a reason for releasing the relay connection. For example, the reason for releasing the relay connection includes: the relay service subscription information of the first UE changes. Specifically, for the relay UE, the reason for releasing the relay connection may include but is not limited to: a subscription for providing a relay service expires, or a list of remote UEs for which relay services can be provided changes. For the remote UE, the reason for releasing the relay connection may include but is not limited to: a subscription for accepting a relay service expires, or a list of relay UEs whose relay services can be accepted changes.

[00272] In an example, the first information or second information may further include the identification information of the second UE (for example, an ID of the second UE). The identification information of the second UE is used by the access network device, the first UE, or the AMF network element of the first UE to know to release a relay connection corresponding to a relay service between the first UE and which remote UE, or used by the access network device, the first UE, or the AMF network element of the first UE to know to release a relay connection corresponding to a relay service between the first UE and which relay UE.

[00273] According to the method for releasing a relay connection provided in this embodiment of this application, when determining, based on service subscription information of remote UE and/or relay UE, that subscription or authorization information of the remote UE and/or the relay

UE changes, the first network element may indicate, in time, to release a relay connection corresponding to the remote UE or the relay UE, or release a relay connection corresponding to a relay service between the remote UE and the relay UE. Making a response in time based on the service subscription information of the remote UE and/or the relay UE can improve accuracy of relay connection management and control and accuracy of charging on a network side.

[00274] It should be noted that in this embodiment of this application, different solutions may be used for authorization of the remote UE and the relay UE. In other words, before step S601, the method may further include an authorization procedure of the remote UE and/or the relay UE. For example, independent authorization may be performed on the remote UE and the relay UE, as shown in an authorization manner 1 shown in the following table 3.

[00275] Alternatively, in this embodiment of this application, associated authorization may be performed on the remote UE and the relay UE. Specifically, after independent authorization is performed on the remote UE and the relay UE, the remote UE or the relay UE initiates an associated authorization application to the network side, to apply for that the relay UE can provide a relay service for the remote UE, or the remote UE can access a network via the relay UE, as shown in an authorization manner 2, an authorization manner 3, and an authorization manner 4 shown in the following table 3.

Table 3

Solution	Network element	Feature	Detailed description
Authorization manner 1	AMF network element	No interaction between the AMF network elements	Independent authorization and no associated authorization
Authorization manner 2		Interaction between the AMF network elements	The remote UE or the relay UE requests associated authorization from a corresponding AMF network element, and an AMF network element of the remote UE exchanges an associated authorization result with an AMF network element of the relay UE.

Solution	Network element	Feature	Detailed description
Authorization manner 3			The remote UE or the relay UE requests associated authorization from a corresponding AMF network element, and an AMF network element of the remote UE or an AMF network element of the relay UE performs associated authorization. In some cases, the two AMF network elements exchange UE IDs.
Authorization manner 4	PCF network element	AMF network element forwarding	The AMF network element forwards an authorization request to the PCF network element, and the PCF network element returns a result to the AMF network element after performing associated authorization

[00276] It should be noted that, because independent authorization results of the remote UE and the relay UE are obtained in the authorization manner 1, the method for releasing a relay connection based on the authorization manner 1 is applicable only to the foregoing case 1 (in which the first UE is relay UE, and the first UE changes from being allowed to provide the relay service for the remote UE to not being allowed to provide the relay service for the remote UE) and case 3 (in which the first UE is remote UE, and the first UE changes from being allowed to accept the relay service to not being allowed to accept the relay service), and is not applicable to the foregoing case 2 and case 4. The associated authorization results of the remote UE and the relay UE are obtained in the authorization manner 2, the authorization manner 3, or the authorization manner 4, to be specific, whether UE is allowed to be used as relay UE or remote UE is obtained, and a list of remote UEs for which the UE can provide relay services or a list of relay UEs whose relay services can be accepted by the UE is obtained. Therefore, the method for releasing a relay connection based on the authorization manner 2, the authorization manner 3, or the authorization manner 4 is applicable to the foregoing case 1, case 2, case 3, and case 4.

[00277] The following uses FIG. 7 to FIG. 10 as examples to describe processes of the authorization manner 1, the authorization manner 2, the authorization manner 3, and the authorization manner 4.

[00278] The authorization manner 1 may include: Remote UE 1 obtains authorization information of the remote UE 1 from a PCF network element of the remote UE 1; and relay UE 1 obtains authorization information from a PCF network element of the relay UE 1. If the remote UE 1 or the relay UE 1 does not register with a network, pre-configured authorization information may be used.

[00279] As shown in FIG. 7, an independent authorization (namely, the authorization manner 1) process of the remote UE 1 and the relay UE 1 may be implemented by using the following steps S701 to S707.

[00280] S701: The remote UE 1 and the relay UE 1 each obtain an independent authorization result.

[00281] For example, the remote UE 1 obtains the authorization information of the remote UE 1 (namely, the independent authorization result of the remote UE 1) from the PCF network element of the remote UE 1, and the relay UE 1 obtains the authorization information of the relay UE 1 (namely, the independent authorization result of the relay UE 1) from the PCF network element of the relay UE 1. If the remote UE 1 or the relay UE 1 does not register with the network, the pre-configured authorization information may be used. For example, the pre-configured authorization information may be whether UE is allowed to be used as remote UE or relay UE.

[00282] S702: Perform a relay discovery and selection procedure.

[00283] For example, the remote UE 1 may send a broadcast message, where the broadcast message includes relay service message, and the relay service information may carry an identifier of the remote UE 1 and service information (for example, service information of a first service) that needs to be transmitted in a relay manner. After receiving the broadcast message, the relay UE 1 may send a response message to the remote UE 1. The remote UE 1 may receive response messages of a plurality of relay UEs. The remote UE 1 may select relay UE based on information such as a signal status between the remote UE 1 and each relay UE, for example, select the relay UE 1 as relay UE used by the remote UE 1 to transmit service data of the first service. For specific descriptions of the relay discovery procedure, refer to explanations and descriptions in the conventional technology. Details are not described.

[00284] S703: The remote UE 1 sends an indirect communication request (indirect communication request) to the relay UE 1.

[00285] The indirect communication request indicates the relay UE 1 to establish indirect

communication.

[00286] S704: The relay UE 1 initiates a service request (Service Request).

[00287] After receiving the indirect communication request of the remote UE 1, the relay UE 1 enters a connected state, to provide a relay service for the remote UE 1. For example, if the relay
5 UE 1 is not in the connected state (RRC connected), the relay UE 1 performs S704 to enter the connected state. If the relay UE 1 is in the connected state, S704 is not performed. After the relay UE 1 enters the connected state, the relay UE 1 performs step S705.

[00288] S705: The relay UE 1 sends an indirect communication response (indirect communication response) to the remote UE 1.

10 **[00289]** The indirect communication response indicates, to the remote UE 1, that indirect communication has been established.

[00290] S706: The remote UE 1 sends a NAS request message to an AMF network element of the remote UE 1.

[00291] The NAS request message may be a registration request message or a service request
15 message. The registration request message is used by the remote UE 1 to register with the network. The service request message is used to establish/activate a PDU session for providing the relay service for the remote UE 1. For example, if the remote UE 1 has registered with the network before, the NAS request message is the service request message; or if the remote UE 1 has not registered with the network before, the NAS request message is the registration request message.

20 **[00292]** S707: Perform a PDU session establishment procedure of the remote UE 1.

[00293] The PDU session is used by the relay UE 1 to provide the relay service for the remote
UE 1, to complete the service (for example, the first service) requested by the remote UE 1. For example, the foregoing step S707 may be initiated by the relay UE 1. For the PDU session establishment procedure, refer to descriptions in the conventional technology. Details are not
25 described again.

[00294] The authorization manner 2 may include: Remote UE sends a NAS request message to an AMF network element of the remote UE; the AMF network element of the remote UE requests authorization from an AMF network element of relay UE; and the AMF network element of the relay UE returns an associated authorization result to the AMF network element of the remote UE.
30 The associated authorization result is determined by the AMF network element of the relay UE based on subscription information of the relay UE. The subscription information of the relay UE

may include but is not limited to a list of remote UEs for which the relay UE can provide relay services. Alternatively, relay UE sends a NAS request message to an AMF network element of the relay UE; the AMF network element of the relay UE requests authorization from an AMF network element of remote UE; and the AMF network element of the remote UE returns an associated authorization result to the AMF network element of the relay UE. The associated authorization result is determined by the AMF network element of the remote UE based on subscription information of the remote UE. The subscription information of the remote UE may include but is not limited to a list of relay UEs whose relay services can be accepted by the remote UE.

[00295] As shown in FIG. 8, the authorization manner 2 of the remote UE and the relay UE may be implemented based on the foregoing steps S701 to S705 shown in FIG. 7 and the following steps S801 to S804.

[00296] S801: The relay UE 1 sends a NAS request message to an AMF network element of the relay UE 1.

[00297] After indirect communication is established, the relay UE 1 sends the NAS request message to the AMF network element of the relay UE 1, to request to obtain an associated authorization result, to be specific, obtain a list of remote UEs for which the relay UE 1 has been authorized or allowed to provide relay services. The NAS request message is used to request associated authorization.

[00298] In some examples, the NAS request message carries an ID of the relay UE 1 and the ID of the remote UE 1.

[00299] S802: The AMF network element of the relay UE 1 sends an authorization request (Authorization Request) message to an AMF network element of the remote UE 1.

[00300] The authorization request message is used to request to obtain the associated authorization result. The authorization request message carries the ID of the relay UE 1 and the ID of the remote UE 1.

[00301] S803: The AMF network element of the remote UE 1 sends an authorization response (Authorization Response) message to the AMF network element of the relay UE 1.

[00302] The authorization response message carries the associated authorization result. For example, the associated authorization result includes the list of remote UEs for which the relay UE 1 has been authorized or allowed to provide relay services.

[00303] S804: The AMF network element of the remote UE 1 stores the ID of the relay UE 1

that has been authorized or allowed to provide the relay service for the remote UE 1, and an ID of the AMF network element of the relay UE 1.

[00304] It should be noted that FIG. 8 is described by using an example in which the relay UE initiates an associated authorization request. Actually, the remote UE may also use an authorization manner 2 similar to that shown in FIG. 8. Specifically, the remote UE 1 sends a NAS request message to an AMF network element of the remote UE 1. The NAS request message carries an ID of the relay UE 1 and the ID of the remote UE 1. Then, the AMF network element of the remote UE 1 sends an authorization request message to an AMF network element of the relay UE 1, and receives an associated authorization result from the AMF network element of the relay UE 1. The associated authorization result is stored in the AMF network element of the remote UE 1.

[00305] The authorization manner 3 may include: Relay UE 1 sends a NAS request message to an AMF network element of the relay UE 1. The NAS request message includes an ID of the relay UE 1 and an ID of remote UE 1. The AMF network element of the relay UE 1 interacts with an AMF network element of the remote UE 1 to determine an authorization result and return the authorization result to the relay UE 1. Alternatively, remote UE 1 sends a NAS request message to an AMF network element of the remote UE 1. The NAS request message includes an ID of relay UE 1 and an ID of the remote UE 1. The AMF network element of the remote UE 1 interacts with an AMF network element of the relay UE 1 to determine an authorization result and return the authorization result to the remote UE 1.

[00306] As shown in FIG. 9, the authorization manner 3 of the remote UE 1 and the relay UE 1 may be implemented based on the foregoing steps S701 to S703 shown in FIG. 7 and the following steps S901 to S903.

[00307] S901: The relay UE 1 sends a NAS request message to an AMF network element of the relay UE 1.

[00308] After indirect communication is established, the relay UE 1 sends the NAS request message to the AMF network element of the relay UE 1, to request to obtain an associated authorization result, to be specific, obtain a list of remote UEs for which the relay UE 1 has been authorized or allowed to provide relay services. The NAS request message is used to request associated authorization.

[00309] In some examples, the NAS request message carries an ID of the relay UE 1 and the ID of the remote UE 1.

[00310] S902: The AMF network element of the relay UE 1 sends a NAS response message to the relay UE 1.

[00311] The NAS response message carries the associated authorization result. For example, the associated authorization result includes the list of remote UEs for which the relay UE 1 has been authorized or allowed to provide relay services.

[00312] S903: The AMF network element of the relay UE 1 stores an ID of remote UE for which the relay UE 1 has been authorized or allowed to provide the relay service.

[00313] It should be noted that FIG. 9 is described by using an example in which the relay UE initiates an associated authorization request. Actually, the remote UE may also use an authorization manner 3 similar to that shown in FIG. 9. Specifically, the remote UE 1 sends a NAS request message to an AMF network element of the remote UE 1, where the NAS request message carries an ID of the relay UE 1 and the ID of the remote UE 1, and receives an associated authorization result from the AMF network element of the remote UE 1. The associated authorization result is stored in the AMF network element of the remote UE 1.

[00314] The authorization manner 4 may include: Relay UE 1 sends a NAS request message to an AMF network element of the relay UE 1; the AMF network element of relay UE 1 forwards an authorization request to a PCF network element of the relay UE 1; and the PCF network element of the relay UE 1 obtains subscription information of the relay UE 1 from a UDM/UDR network element, and returns an authorization result based on the subscription information of the relay UE 1. The subscription information of the relay UE 1 may include but is not limited to a list of remote UEs for which the relay UE 1 can provide relay services. Alternatively, remote UE 1 sends a NAS request message to an AMF network element of the remote UE 1; the AMF network element of the remote UE 1 forwards an authorization request to a PCF network element of the remote UE 1; and the PCF network element of the remote UE 1 obtains subscription information of the remote UE 1 from a UDM/UDR network element, and returns an authorization result based on the subscription information of the remote UE 1. The subscription information of the remote UE 1 may include but is not limited to a list of relay UEs whose relay services can be accepted by the remote UE 1.

[00315] As shown in FIG. 10, the authorization manner 4 of the remote UE 1 and the relay UE 1 may be implemented based on the foregoing steps S701 to S703 shown in FIG. 7 and the following steps S1001 to S1003.

[00316] S1001: The relay UE 1 sends an authorization request (Authorization Request) message to the PCF network element of the relay UE 1.

[00317] After indirect communication is established, the relay UE 1 sends the authorization request message to the PCF network element of the relay UE 1, to request to obtain an associated authorization result, to be specific, obtain a list of remote UEs for which the relay UE 1 has been authorized or allowed to provide relay services. For example, the relay UE 1 sends the authorization request message to the PCF network element of the relay UE 1 via an AMF network element of the relay UE 1, and the AMF network element of the relay UE 1 forwards the authorization request message. The authorization request message is used to obtain the associated authorization result.

[00318] In some examples, the authorization request message includes an ID of the relay UE 1 and the ID of the remote UE 1.

[00319] S1002: The PCF network element of the relay UE 1 sends an authorization response (Authorization Response) message to the relay UE 1.

[00320] The authorization response message includes the associated authorization result. For example, specifically, the PCF network element of the relay UE 1 sends the authorization response message to the relay UE 1 via the AMF network element of the relay UE 1. The associated authorization result includes the list of remote UEs for which the relay UE 1 has been authorized or allowed to provide relay services.

[00321] S1003: The PCF network element of the relay UE 1 stores an ID of the remote UE for which the relay UE 1 has been authorized or allowed to provide the relay service.

[00322] It should be noted that FIG. 10 is described by using an example in which the relay UE initiates an associated authorization request. Actually, the remote UE may also use an authorization manner 4 similar to that shown in FIG. 10. Specifically, the remote UE 1 sends an authorization request message to the PCF network element of the remote UE 1, where the authorization request message carries an ID of the relay UE 1 and the ID of the remote UE 1, and receives an associated authorization result from the PCF network element of the remote UE 1. The associated authorization result is stored in the PCF network element of the remote UE 1.

[00323] Alternatively, an associated authorization result negotiated by the PCF network element of the remote UE and the PCF network element of the relay UE may be used. For example, the relay UE 1 initiates the associated authorization request. After receiving the authorization

request message from the relay UE 1, the PCF network element of the relay UE 1 requests the associated authorization result from the remote UE 1, and then stores, in the PCF network element of the relay UE 1, the ID of the remote UE for which the relay UE 1 has been authorized or allowed to provide the relay service.

5 **[00324]** It should be noted that the foregoing table 3 uses only a 5G communication system as an example. For another communication system, refer to the foregoing authorization manner. For example, for a 4G communication system, the AMF network element in the foregoing table 3 may be replaced with an MME network element.

[00325] In addition, only one possible implementation process of each of the authorization manner 1, the authorization manner 2, the authorization manner 3, and the authorization manner 4 is used as an example in FIG. 7 to FIG. 10. Specific solutions of independent authorization and associated authorization are not limited in this application. For detailed implementations and implementation processes of independent authorization and associated authorization, refer to specific descriptions in the conventional technology.

15 **[00326]** With reference to FIG. 11A and FIG. 11B to FIG. 14A and FIG. 14B, the following describes several possible implementation processes of the method for releasing a relay connection provided in embodiments of this application. In embodiments shown in FIG. 11A and FIG. 11B to FIG. 14A and FIG. 14B, remote UE 1 establishes an indirect communication link that is based on relay UE 1. In addition, the remote UE 1 and/or the relay UE 1 have/has obtained an authorization result. For example, the remote UE 1 and/or the relay UE 1 have/has obtained the associated authorization result obtained by using the method shown in FIG. 8, FIG. 9, or FIG. 10; or the remote UE 1 and the relay UE 1 have obtained the independent authorization result obtained by using the method shown in FIG. 7.

25 **[00327]** In some examples, the method for releasing a relay connection shown in FIG. 11A and FIG. 11B may be performed based on the authorization manner 1 (namely, the independent authorization manner). As described above, the method for releasing a relay connection based on the authorization manner 1 is applicable only to the foregoing case 1 and case 3.

[00328] For example, the first network element is a PCF network element of relay UE 1, and the first information is sent by the PCF network element of the relay UE 1 to the relay UE 1. As shown in FIG. 11A and FIG. 11B, the method for releasing a relay connection provided in this embodiment of this application specifically includes the following steps S1101 to S1107.

[00329] S1101: A PCF network element of relay UE 1 obtains relay service subscription information of the relay UE 1 from a UDM/UDR network element.

[00330] The relay service subscription information of the relay UE 1 is stored in the UDM/UDR network element. For example, the relay service subscription information is used to represent whether the relay UE 1 is allowed to provide a relay service for remote UE.

[00331] S1102: The PCF network element of the relay UE 1 determines, based on the relay service subscription information of the relay UE 1, that the relay UE 1 is not allowed to be used as a relay device.

[00332] For example, if the PCF network element of the relay UE 1 can determine, based on the relay service subscription information of the relay UE 1, that the relay UE 1 changes from being allowed to provide the relay service for the remote UE to not being allowed to provide the relay service for the remote UE, it may be determined that the relay UE 1 is not allowed to be used as the relay device.

[00333] For example, if the relay service subscription information of the relay UE 1 changes from including indication information indicating that the relay UE 1 is allowed to provide the relay service for the remote UE to not including the indication information indicating that the relay UE 1 is allowed to provide the relay service for the remote UE, the PCF network element of the relay UE 1 may determine that the relay UE 1 is not allowed to be used as the relay device.

[00334] S1103: The PCF network element of the relay UE 1 sends first relay service authorization revocation information to the relay UE 1.

[00335] The first relay service authorization revocation information is used to release a relay connection corresponding to the relay UE 1.

[00336] For example, the PCF network element of the relay UE 1 may send the first relay service authorization revocation information to the relay UE 1 by using an authorization update (Authorization Update) message. The first relay service authorization revocation information indicates to revoke an authorization of using the relay UE 1 as the relay device.

[00337] In some examples, the first relay service authorization revocation information may include a relay connection release cause value. The relay connection release cause value is used to represent a reason for releasing the relay connection. For example, the reason for releasing the relay connection includes: the relay service subscription information of the relay UE 1 changes. For example, a subscription to provide a relay service expires.

[00338] S1104: The relay UE 1 sends second information to a RAN.

[00339] The second information is used to request to release a relay connection corresponding to a relay service between the relay UE 1 and the RAN.

[00340] For example, for a layer 2 relay, the second information is used to request to release a communication resource (for example, a PDU session resource) used for the relay service between the relay UE 1 and the RAN. For a layer 3 relay, the second information is used to request to delete contexts of all remote UEs (including remote UE 1) in a PDU session used by the relay UE 1 to provide the relay service. The context of the remote UE may include but is not limited to an ID of the remote UE and/or an IP address of the remote UE.

[00341] In some examples, the relay UE 1 may send the second information to the RAN by using an RRC message.

[00342] In some examples, the second information includes an ID of the remote UE 1 and the reason for releasing the relay connection.

[00343] S1105: The relay UE 1 sends sixth information to the remote UE 1.

[00344] The sixth information is used to request to release a relay connection corresponding to a relay service between the relay UE 1 and the remote UE 1.

[00345] In some examples, the relay UE 1 may send the sixth information to the remote UE 1 by using a link release (Link Release) message. Alternatively, the sixth information in this application may be directly a link release message.

[00346] In some examples, the sixth information includes the reason for releasing the relay connection.

[00347] S1106: The RAN releases the relay connection corresponding to the relay service between the relay UE 1 and the RAN.

[00348] S1107: The remote UE 1 releases the relay connection corresponding to the relay service between the relay UE 1 and the remote UE 1.

[00349] It should be noted that, when the relay UE 1 is not allowed to be used as the relay device, in addition to sending the sixth information to the remote UE 1, the relay UE 1 further sends the sixth information to another remote UE that establishes a relay connection to the relay UE 1, to request to release a relay connection corresponding to a relay service between the relay UE 1 and the another remote UE. For another example, as shown in FIG. 11A and FIG. 11B, the method for releasing a relay connection provided in this embodiment of this application may

specifically include the following steps S1108 to S1111.

[00350] S1108: A PCF network element of relay UE 1 obtains relay service subscription information of remote UE 1 from a UDM/UDR network element.

[00351] The relay service subscription information of the remote UE 1 is stored in the UDM/UDR network element. For example, the relay service subscription information of the remote UE 1 is used to represent whether the remote UE 1 is allowed to accept a relay service.

[00352] S1109: The PCF network element of the relay UE 1 determines, based on the relay service subscription information of the remote UE 1, that the remote UE 1 is not allowed to accept the relay service.

[00353] For example, if the PCF network element of the relay UE 1 can determine, based on the relay service subscription information of the remote UE 1, that the remote UE 1 changes from being allowed to accept the relay service to not being allowed to accept the relay service, it may be determined that the remote UE 1 is not allowed to accept the relay service.

[00354] For example, if the relay service subscription information of the remote UE 1 changes from including indication information indicating that the remote UE 1 is allowed to accept the relay service to not including the indication information indicating that the remote UE 1 is allowed to accept the relay service, the PCF network element of the relay UE 1 may determine that the remote UE 1 is not allowed to accept the relay service.

[00355] S1110: The PCF network element of the relay UE 1 sends first information to the remote UE 1.

[00356] The first information is used to release a relay connection corresponding to the remote UE 1.

[00357] For example, the PCF network element of the relay UE 1 may send first relay service authorization revocation information or first relay connection release information (namely, the first information) to the remote UE 1 by using an authorization update (Authorization Update) message. The first relay service authorization revocation information indicates to revoke an authorization of using the relay UE 1 as relay UE. The first relay connection release information indicates to release the relay connection corresponding to the remote UE 1.

[00358] In some examples, the first information may include a relay connection release cause value. The relay connection release cause value is used to represent a reason for releasing the relay connection. For example, the reason for releasing the relay connection includes: relay service

subscription information of the relay UE 1 changes. For example, a subscription to accept a relay service expires.

[00359] S1111: The remote UE 1 triggers release of the relay connection corresponding to the remote UE 1.

5 **[00360]** For example, the remote UE 1 requests a RAN to release a communication resource used by the RAN for the relay connection of the remote UE 1, and release relay connections corresponding to relay services between the remote UE 1 and all relay UEs (including the relay UE 1) that establish relay connections to the remote UE 1.

[00361] Alternatively, when the remote UE 1 is not allowed to accept the relay service, as shown
10 in FIG. 11A and FIG. 11B, the method for releasing a relay connection provided in this embodiment of this application may specifically include the following steps S1112 to S1116.

[00362] S1112: An AMF network element of remote UE 1 receives a NAS message from the remote UE 1.

[00363] The NAS message is used to notify the AMF network element of the remote UE 1 that
15 the remote UE 1 is accessed in an indirect communication manner (namely, a relay manner).

[00364] S1113: The AMF network element of the remote UE 1 obtains relay service subscription information of the remote UE 1 from a UDM/UDR network element.

[00365] The relay service subscription information of the remote UE 1 is stored in the UDM/UDR network element. For example, the relay service subscription information of the
20 remote UE 1 is used to represent whether the remote UE 1 is allowed to accept a relay service.

[00366] S1114: The AMF network element of the remote UE 1 determines, based on the relay service subscription information of the remote UE 1, that the remote UE 1 is not allowed to accept the relay service.

[00367] For example, if a PCF network element of relay UE 1 can determine, based on the relay
25 service subscription information of the remote UE 1, that the remote UE 1 changes from being allowed to accept the relay service to not being allowed to accept the relay service, it may be determined that the remote UE 1 is not allowed to accept the relay service.

[00368] S1115: The AMF network element of the remote UE 1 sends first information to a RAN.

[00369] The first information is used to release a relay connection corresponding to the remote
30 UE 1.

[00370] For example, the AMF network element of the remote UE 1 may send first relay service

authorization revocation information or first relay connection release information (namely, the first information) to the RAN by using an N2 message. The first relay service authorization revocation information indicates to revoke an authorization of using the remote UE 1 as remote UE. The first relay connection release information indicates to release the relay connection corresponding to the remote UE 1.

[00371] S1116: The RAN releases the relay connection corresponding to the remote UE 1.

[00372] For example, the RAN releases a communication resource used by the RAN for the relay connection of the remote UE 1, and releases a relay connection corresponding to a relay service between the remote UE 1 and the relay UE 1.

[00373] It should be noted that the method for releasing a relay connection based on the authorization manner 1 may include the foregoing steps S1101 to S1107, include the foregoing steps S1108 to S1111, include the foregoing steps S1112 to S1116, include the foregoing steps S1101 to S1107 and S1108 to S1111, or include the foregoing steps S1101 to S1107 and S1112 to S1116.

[00374] According to the method for releasing a relay connection provided in this embodiment that is based on the authorization manner 1 in this application, when determining, based on the service subscription information of the remote UE 1, that the remote UE 1 is not allowed to accept the relay service, the PCF network element of the relay UE 1 may indicate, in time, the remote UE 1 to release the relay connection corresponding to the remote UE 1; or when determining, based on the service subscription information of the remote UE 1, that the remote UE 1 is not allowed to accept the relay service, the AMF network element of the remote UE 1 indicates, in time, the RAN to release the relay connection corresponding to the remote UE 1; and/or when determining, based on the service subscription information of the relay UE 1, that the relay UE 1 is not allowed to provide the relay service, the PCF network element of the relay UE 1 indicates, in time, the relay UE 1 to release the relay connection corresponding to the relay UE 1. Making a response in time based on the service subscription information of the remote UE 1 and/or the relay UE 1 can improve accuracy of relay connection management and control and accuracy of charging on a network side.

[00375] In some examples, the method for releasing a relay connection shown in FIG. 12A-1 and FIG. 12A-2 and FIG. 12B-1 and FIG. 12B-2 may be performed based on the authorization manner 2. As described above, the method for releasing a relay connection based on the

authorization manner 2 is applicable to the foregoing case 1, case 2, case 3, and case 4.

[00376] For example, the first network element is an AMF network element of relay UE 1, and the first information is sent by an AMF network element of the relay UE 1 to the RAN. As shown in FIG. 12A-1 and FIG. 12A-2, the method for releasing a relay connection provided in this embodiment of this application specifically includes the following steps S1201A to S1204A.

[00377] S1201A: An AMF network element of relay UE 1 obtains relay service subscription information of the relay UE 1 from a UDM/UDR network element.

[00378] The relay service subscription information of the relay UE 1 may be stored in the UDM/UDR network element. For example, the relay service subscription information is used to represent whether the relay UE 1 is allowed to provide a relay service for remote UE.

[00379] S1202A: The AMF network element of the relay UE 1 determines, based on the relay service subscription information of the relay UE 1, that the relay UE 1 is not allowed to be used as a relay device.

[00380] For example, if the relay service subscription information of the relay UE 1 changes from including identification information of the remote UE for which the relay UE 1 is allowed to provide the relay service to not including the identification information of the remote UE for which the relay UE 1 is allowed to provide the relay service, or it may be determined, based on the relay service subscription information of the relay UE 1, that the relay UE 1 changes from being allowed to provide the relay service for the remote UE to not being allowed to provide the relay service for the remote UE, it may be determined that the relay UE 1 is not allowed to be used as the relay device.

[00381] S1203A: The AMF network element of the relay UE 1 sends first information to a RAN.

[00382] The first information is used to release a relay connection corresponding to the relay UE 1.

[00383] For example, the AMF network element of the relay UE 1 may send first relay service authorization revocation information or first relay connection release information (namely, the first information) to the RAN by using an N2 message. The first relay service authorization revocation information indicates to revoke an authorization of using the relay UE 1 as relay UE. The first relay connection release information indicates to release the relay connection corresponding to the relay UE 1.

[00384] In some examples, the first information may include IDs of all remote UEs that

establish relay connections to the relay UE 1.

[00385] In some examples, the first information may include a relay connection release cause value. The relay connection release cause value is used to represent a reason for releasing the relay connection. For example, the reason for releasing the relay connection includes: the relay service
5 subscription information of the relay UE 1 changes. For example, a subscription to provide a relay service expires.

[00386] Alternatively, the AMF network element of the relay UE 1 may send the first relay service authorization revocation information to an AMF network element of remote UE 1, to indicate the AMF network element of the remote UE 1 to send the first information to the RAN.

10 **[00387]** S1204A: The RAN releases the relay connection corresponding to the relay UE 1.

[00388] For example, the RAN releases a relay connection between the relay UE 1 and the RAN based on the first information, and sends second information to the relay UE 1. The second information is used to release relay connections corresponding to relay services between the relay UE 1 and all remote UEs (including the remote UE 1) that establish relay connections to the relay
15 UE 1. After receiving the second information, the relay UE 1 releases, based on the second information, the relay connections corresponding to the relay services between the relay UE 1 and all the remote UEs (including the remote UE 1) that establish relay connections to the relay UE 1.

[00389] For another example, as shown in FIG. 12A-1 and FIG. 12A-2, the method for releasing a relay connection provided in this embodiment of this application may specifically include the
20 following steps S1205A to S1208A.

[00390] S1205A: An AMF network element of remote UE 1 obtains relay service subscription information of the remote UE 1 from a UDM/UDR network element.

[00391] The relay service subscription information of the remote UE 1 may be stored in the UDM/UDR network element. For example, the relay service subscription information of the
25 remote UE 1 is used to represent whether the remote UE 1 is allowed to accept a relay service.

[00392] S1206A: The AMF network element of the remote UE 1 determines, based on the relay service subscription information of the remote UE 1, that the remote UE 1 is not allowed to accept the relay service.

[00393] For example, if the relay service subscription information of the remote UE 1 changes
30 from including identification information of relay UE whose relay service is allowed to be accepted by the remote UE 1 to not including the identification information of the relay UE whose

relay service is allowed to be accepted by the remote UE 1, or it may be determined, based on the relay service subscription information of the remote UE 1, that the remote UE 1 changes from being allowed to accept the relay service to not being allowed to accept the relay service, it may be determined that the remote UE 1 is not allowed to accept the relay service.

5 **[00394]** For example, if the relay service subscription information of the remote UE 1 changes from including the foregoing table 2 to not including identification information of relay UE whose relay service is allowed to be accepted by the remote UE 1, a PCF network element of the remote UE 1 may determine that the remote UE 1 is not allowed to accept the relay service.

[00395] S1207A: The AMF network element of the remote UE 1 sends first information to a
10 RAN.

[00396] The first information is used to release a relay connection corresponding to the remote UE 1.

[00397] For example, the AMF network element of the remote UE 1 may send first relay service authorization revocation information or first relay connection release information (namely, the first
15 information) to the RAN by using an N2 message. The first relay service authorization revocation information indicates to revoke an authorization of using the remote UE 1 as remote UE. The first relay connection release information indicates to release the relay connection corresponding to the remote UE 1.

[00398] In some examples, the first information includes IDs of all relay UEs that establish
20 relay connections to the remote UE 1.

[00399] In some examples, the first information may include a relay connection release cause value. The relay connection release cause value is used to represent a reason for releasing the relay connection. For example, the reason for releasing the relay connection includes: relay service subscription information of relay UE 1 changes. For example, a subscription to accept a relay
25 service expires.

[00400] S1208A: The RAN releases the relay connection corresponding to the remote UE 1.

[00401] For example, the RAN may release, based on the first information, at least one of the following resources: a communication resource used by the RAN for the relay connection of the remote UE 1; and a communication resource used for the relay connection between the remote UE
30 1 and the relay UE 1.

[00402] For example, for a layer 2 relay, the RAN sends second information to the remote UE

1 based on the first information. The second information is used to release relay connections corresponding to relay services between the remote UE 1 and all the relay UEs (including the relay UE 1) that establish relay connections to the remote UE 1. After receiving the second information, the remote UE 1 releases, based on the second information, the relay connections corresponding to the relay services between the remote UE 1 and all the relay UEs (including the relay UE 1) that establish relay connections to the remote UE 1.

[00403] For another example, for a layer 3 relay, the RAN deletes, based on the first information, a context of the remote UE 1 in a PDU session used by the relay UE 1 to provide the relay service, and sends second information to the remote UE 1. The second information is used to release relay connections corresponding to relay services between the remote UE 1 and all the relay UEs (including the relay UE 1) that establish relay connections to the remote UE 1. After receiving the second information, the remote UE 1 releases, based on the second information, the relay connections corresponding to the relay services between the remote UE 1 and all the relay UEs (including the relay UE 1) that establish relay connections to the remote UE 1.

[00404] It should be noted that the method for releasing a relay connection based on the authorization manner 2 may include the foregoing steps S1201A to S1204A and/or S1205A to S1208A.

[00405] For another example, the first network element is an AMF network element of relay UE 1, and the first information is sent by the AMF network element of the relay UE 1 to a RAN. As shown in FIG. 12B-1 and FIG. 12B-2, the method for releasing a relay connection provided in this embodiment of this application specifically includes the following steps S1201B to S1205B.

[00406] S1201B: An AMF network element of relay UE 1 obtains relay service subscription information of the relay UE 1 from a UDM/UDR network element.

[00407] The relay service subscription information of the relay UE 1 may be stored in the UDM/UDR network element. For example, the relay service subscription information of the relay UE 1 includes a list of remote UEs for which the relay UE 1 is allowed to provide relay services.

[00408] S1202B: The AMF network element of the relay UE 1 determines, based on the relay service subscription information of the relay UE 1, that the relay UE 1 is not allowed to provide a relay service for remote UE 1.

[00409] For example, if the relay service subscription information of the relay UE 1 changes from including identification information of the remote UE for which the relay UE 1 is allowed to

provide the relay service to not including the identification information of the remote UE for which the relay UE 1 is allowed to provide the relay service, where the identification information of the remote UE includes identification information of the remote UE 1; identification information, in the relay service subscription information of the relay UE 1, of the remote UE for which the relay UE 1 is allowed to provide the relay service changes from including identification information of the remote UE 1 to not including the identification information of the remote UE 1; or it is determined, based on the relay service subscription information of the relay UE 1, that the relay UE 1 changes from being allowed to provide the relay service for the remote UE 1 to not being allowed to provide the relay service for the remote UE 1, it may be determined that the relay UE 1 is not allowed to provide the relay service for the remote UE 1.

[00410] For example, if the relay service subscription information of the relay UE 1 changes from being allowed to provide the relay services for the UE 1 and the UE 4 shown in the foregoing table 1 to being allowed to provide the relay service only for the UE 1, the AMF network element of the relay UE 1 may determine that the relay UE 1 is not allowed to provide the relay service for the UE 4.

[00411] S1203B: The AMF network element of the relay UE 1 sends second relay service authorization revocation information to an AMF network element of the remote UE 1.

[00412] Second information is used to release a relay connection corresponding to a relay service between the remote UE 1 and the relay UE 1. For example, the second information may be the second relay service authorization revocation information. The second relay service authorization revocation information indicates to revoke an authorization for the relay UE 1 to provide the relay service for the remote UE 1.

[00413] For example, the AMF network element of the relay UE 1 may send the second information to the AMF network element of the remote UE 1 by using an authorization update (Authorization Update) message.

[00414] In some examples, the second information includes an ID of the remote UE 1.

[00415] In some examples, the second information may include a relay connection release cause value. The relay connection release cause value is used to represent a reason for releasing the relay connection. For example, the reason for releasing the relay connection includes: the relay service subscription information of the relay UE 1 changes. For example, the list of remote UEs for which the relay UE 1 can provide the relay services changes.

[00416] S1204B: The AMF network element of the remote UE 1 sends first information to a RAN.

[00417] The first information is used to release the relay connection corresponding to the relay service between the remote UE 1 and the relay UE 1.

5 **[00418]** For example, the AMF network element of the remote UE 1 may send second relay connection release information (namely, the first information) to the RAN by using an N2 message. The second relay connection release information indicates to release the relay connection corresponding to the relay service between the remote UE 1 and the relay UE 1.

[00419] In some examples, the first information includes the ID of the remote UE 1.

10 **[00420]** In some examples, the first information may include the relay connection release cause value. The relay connection release cause value is used to represent the reason for releasing the relay connection. For example, the reason for releasing the relay connection includes: the relay service subscription information of the relay UE 1 changes. For example, the list of remote UEs for which the relay UE 1 can provide the relay services changes.

15 **[00421]** In some examples, the foregoing steps S1203B and S1204B may alternatively be replaced with the following: The AMF network element of the relay UE 1 directly sends the first information to the RAN.

[00422] S1205B: The RAN releases the relay connection corresponding to the relay service between the remote UE 1 and the relay UE 1.

20 **[00423]** For example, for a layer 2 relay, the RAN releases, based on the first information, a communication resource used by the RAN for the relay connection of first UE, and sends the second information to the relay UE 1. The second information is used to release the relay connection corresponding to the relay service between the remote UE 1 and the relay UE 1. After receiving the second information, the relay UE 1 releases, based on the second information, the
25 relay connection corresponding to the relay service between the remote UE 1 and the relay UE 1.

[00424] For another example, for a layer 3 relay, the RAN sends the second information to the relay UE 1 based on the first information. The second information is used to release the relay connection corresponding to the relay service between the remote UE 1 and the relay UE 1. After receiving the second information, the relay UE 1 releases, based on the second information, the
30 relay connection corresponding to the relay service between the remote UE 1 and the relay UE 1.

[00425] For another example, as shown in FIG. 12B-1 and FIG. 12B-2, the method for releasing

a relay connection provided in this embodiment of this application may specifically include the following steps S1206B to S1209B.

[00426] S1206B: An AMF network element of remote UE 1 obtains relay service subscription information of the remote UE 1 from a UDM/UDR network element.

5 **[00427]** The relay service subscription information of the remote UE 1 may be stored in the UDM/UDR network element. For example, the relay service subscription information of the remote UE 1 includes a list of relay UEs whose relay services are allowed to be accepted by the remote UE 1.

[00428] S1207B: The AMF network element of the remote UE 1 determines, based on the relay service subscription information of the remote UE 1, that the remote UE 1 is not allowed to accept
10 a relay service provided by relay UE 1.

[00429] For example, if the relay service subscription information of the remote UE 1 changes from including identification information of the relay UE whose relay service is allowed to be accepted by the remote UE 1 to not including the identification information of the relay UE whose
15 relay service is allowed to be accepted by the remote UE 1, where the identification information of the relay UE includes identification information of the relay UE 1; identification information, in the relay service subscription information of the remote UE 1, of the relay UE whose relay service is allowed to be accepted by the remote UE 1 changes from including identification information of the relay UE 1 to not including the identification information of the relay UE 1; or
20 it is determined, based on the relay service subscription information of the remote UE 1, that the remote UE 1 changes from being allowed to accept the relay service provided by the relay UE 1 to not being allowed to accept the relay service provided by the relay UE 1, it may be determined that the remote UE 1 is not allowed to accept the relay service provided by the relay UE 1.

[00430] For example, if the relay service subscription information of the remote UE 1 changes
25 from being allowed to accept the relay services provided by the UE 2 and the UE 3 shown in the foregoing table 2 to being allowed to accept only the relay service provided by the UE 2, the AMF network element of the remote UE 1 may determine that the remote UE 1 is not allowed to accept the relay service provided by the UE 3.

[00431] S1208B: The AMF network element of the remote UE 1 sends first information to a
30 RAN.

[00432] The first information is used to release a relay connection corresponding to a relay

service between the remote UE 1 and the relay UE 1.

[00433] For example, the AMF network element of the remote UE 1 may send second relay service authorization revocation information or second relay connection release information (namely, the first information) to the RAN by using an N2 message. The second relay service authorization revocation information indicates to revoke an authorization for the remote UE 1 to accept the relay service provided by the relay UE 1. The second relay connection release information indicates to release the relay connection corresponding to the relay service between the remote UE 1 and the relay UE 1.

[00434] In some examples, the first information includes an ID of the relay UE 1.

[00435] In some examples, the first information may include a relay connection release cause value. The relay connection release cause value is used to represent a reason for releasing the relay connection. For example, the reason for releasing the relay connection includes: relay service subscription information of the relay UE 1 changes. For example, the list of relay UEs whose relay services are allowed to be accepted by the remote UE 1 changes.

[00436] S1209B: The RAN releases the relay connection corresponding to the relay service between the remote UE 1 and the relay UE 1.

[00437] For example, for a layer 2 relay, the RAN releases, based on the first information, a communication resource used by the RAN for the relay connection of first UE, and sends second information to the relay UE 1. The second information is used to release the relay connection corresponding to the relay service between the remote UE 1 and the relay UE 1. After receiving the second information, the relay UE 1 releases, based on the second information, the relay connection corresponding to the relay service between the remote UE 1 and the relay UE 1.

[00438] For another example, for a layer 3 relay, the RAN sends second information to the relay UE 1 based on the first information. The second information is used to release the relay connection corresponding to the relay service between the remote UE 1 and the relay UE 1. After receiving the second information, the relay UE 1 releases, based on the second information, the relay connection corresponding to the relay service between the remote UE 1 and the relay UE 1.

[00439] It should be noted that the method for releasing a relay connection based on the authorization manner 2 may include the foregoing steps S1201B to S1205B and/or S1206B to S1209B.

[00440] In addition, the method for releasing a relay connection shown in FIG. 12A-1 and FIG.

12A-2 and FIG. 12B-1 and FIG. 12B-2 is performed based on the authorization manner 2 initiated by the relay UE 1. For the method for releasing a relay connection based on the authorization manner 2 initiated by the remote UE 1, refer to the method shown in FIG. 12A-1 and FIG. 12A-2 and FIG. 2B. Details are not described herein. According to the method for releasing a relay connection provided in this embodiment that is based on the authorization manner 2 of this application, when determining, based on the service subscription information of the remote UE 1, that the remote UE 1 is not allowed to accept the relay service, the AMF network element may indicate, in time, the RAN to release the relay connection corresponding to the remote UE 1; when determining, based on the service subscription information of the relay UE 1, that the relay UE 1 is not allowed to provide the relay service, the AMF network element may indicate, in time, the RAN to release the relay connection corresponding to the relay UE 1; when determining, based on the service subscription information of the relay UE 1, that the relay UE 1 is not allowed to provide the relay service for the remote UE 1, the AMF network element may indicate, in time, the RAN to release the relay connection corresponding to the relay service between the remote UE 1 and the relay UE 1; and/or when determining, based on the service subscription information of the remote UE 1, that the remote UE 1 is not allowed to accept the relay service provided by the relay UE 1, the AMF network element may indicate, in time, the RAN to release the relay connection corresponding to the relay service between the remote UE 1 and the relay UE 1. Making a response in time based on the service subscription information of the remote UE 1 and/or the relay UE 1 can improve accuracy of relay connection management and control and accuracy of charging on a network side.

[00441] In some examples, the method for releasing a relay connection shown in FIG. 13 may be performed based on the authorization manner 3. As described above, the method for releasing a relay connection based on the authorization manner 3 is applicable to the foregoing case 1, case 2, case 3, and case 4.

[00442] For example, the first network element is an AMF network element of relay UE 1, and the first information is sent by the AMF network element of the relay UE 1 to the relay UE 1. As shown in FIG. 13, the method for releasing a relay connection provided in this embodiment of this application may be based on steps S1101 to S1107 shown in FIG. 11A and FIG. 11B, steps S1101 and S1102 are replaced with steps 1201A and S1202A shown in FIG. 12A-1 and FIG. 12A-2, and step S1103 is replaced with S1301.

[00443] S1301: The AMF network element of the relay UE 1 sends first relay service authorization revocation information to the relay UE 1.

[00444] The first relay service authorization revocation information is used to release a relay connection corresponding to the relay UE 1.

5 **[00445]** For example, the AMF network element of the relay UE 1 may send the first relay service authorization revocation information to the relay UE 1 by using an authorization update (Authorization Update) message. The first relay service authorization revocation information indicates to revoke an authorization of using the relay UE 1 as relay UE.

[00446] In some examples, the first relay service authorization revocation information includes
10 IDs of all remote UEs that establish relay connections to the relay UE 1.

[00447] In some examples, the first relay service authorization revocation information may include a relay connection release cause value. The relay connection release cause value is used to represent a reason for releasing the relay connection. For example, the reason for releasing the relay connection includes: the relay service subscription information of the relay UE 1 changes.
15 For example, a subscription to provide a relay service expires.

[00448] For another example, the method for releasing a relay connection provided in this embodiment of this application may be based on the foregoing steps S1201A, S1202A, S1301, and S1104 to S1107 in FIG. 13, and step S1202A is replaced with the following: The AMF network element of the relay UE 1 determines, based on the subscription information of the relay UE 1,
20 that the relay UE 1 is not allowed to provide the relay service for remote UE 1. Step S1301 is replaced with the following: The AMF network element of the relay UE 1 sends second relay service authorization revocation information to the relay UE 1, to indicate to revoke an authorization for the relay UE 1 to provide the relay service for the remote UE 1. The second information sent by the relay UE 1 to the RAN in step S1104 is used to request to release a
25 communication resource or a corresponding relay connection used for the relay service of the remote UE 1 between the relay UE 1 and the RAN. Step S1106 is replaced with the following: The RAN releases the communication resource used for the relay service of the remote UE 1 between the relay UE 1 and the RAN, or the RAN releases the corresponding relay connection used for the relay service of the remote UE 1 between the relay UE 1 and the RAN.

30 **[00449]** For another example, the method for releasing a relay connection provided in this embodiment of this application may specifically include the foregoing steps S1205A to S1208A

shown in FIG. 12A-1 and FIG. 12A-2. For details, refer to the foregoing descriptions of steps S1205A to S1208A.

[00450] For another example, the method for releasing a relay connection provided in this embodiment of this application may specifically include the foregoing steps S1206B to S1209B shown in FIG. 12B-1 and FIG. 12B-2. For details, refer to the foregoing descriptions of steps S1206B to S1209B.

[00451] It should be noted that the method for releasing a relay connection based on the authorization manner 3 may include the foregoing steps S1201A, S1202A, S1301, and S1104 to S1107, include the foregoing steps S1205A to S1208A, include the foregoing steps S1206B to S1209B, include the foregoing steps S1201A, S1202A, S1301, S1104 to S1107, and S1205A to S1208A, or include the foregoing steps S1201A, S1202A, S1301, S1104 to S1107, and S1206B to S1209B.

[00452] In addition, the method for releasing a relay connection shown in FIG. 13 is performed based on the authorization manner 3 initiated by the relay UE 1. For the method for releasing a relay connection based on the authorization manner 3 initiated by the remote UE 1, refer to the method shown in FIG. 13. Details are not described herein.

[00453] According to the method for releasing a relay connection provided in this embodiment that is based on the authorization manner 3 of this application, when determining, based on the service subscription information of the remote UE 1, that the remote UE 1 is not allowed to accept the relay service, the AMF network element may indicate, in time, the RAN to release the relay connection corresponding to the remote UE 1; when determining, based on the service subscription information of the relay UE 1, that the relay UE 1 is not allowed to provide the relay service, the AMF network element may indicate, in time, the relay UE 1 to release the relay connection corresponding to the relay UE 1; when determining, based on the service subscription information of the relay UE 1, that the relay UE 1 is not allowed to provide the relay service for the remote UE 1, the AMF network element may indicate, in time, the relay UE 1 to release the relay connection corresponding to the relay service between the remote UE 1 and the relay UE 1; and/or when determining, based on the service subscription information of the remote UE 1, that the remote UE 1 is not allowed to accept the relay service provided by the relay UE 1, the AMF network element may indicate, in time, the RAN to release the relay connection corresponding to the relay service between the remote UE 1 and the relay UE 1. Making a response in time based on the service

subscription information of the remote UE 1 and/or the relay UE 1 can improve accuracy of relay connection management and control and accuracy of charging on a network side.

[00454] In some examples, the method for releasing a relay connection shown in FIG. 14A and FIG. 14B may be performed based on the authorization manner 4. As described above, the method for releasing a relay connection based on the authorization manner 4 is applicable to the foregoing case 1, case 2, case 3, and case 4.

[00455] For example, the first network element is a PCF network element of relay UE 1, and the first information is sent by the PCF network element of the relay UE 1 to the relay UE 1. As shown in FIG. 14A and FIG. 14B, the method for releasing a relay connection provided in this embodiment of this application may be based on steps S1201A, S1202A, S1301, and S1104 to S1107 shown in FIG. 13, steps S1201A and S1202A are replaced with steps S1101 and S1102 shown in FIG. 11A and FIG. 11B, and step S1301 is replaced with S1401.

[00456] S1401: The PCF network element of the relay UE 1 sends first relay service authorization revocation information to the relay UE 1.

[00457] The first relay service authorization revocation information is used to release a relay connection corresponding to the relay UE 1.

[00458] For example, the PCF network element of the relay UE 1 may send the first relay service authorization revocation information to the relay UE 1 by using an authorization update (Authorization Update) message via an AMF network element of the relay UE 1.

[00459] In some examples, the first relay service authorization revocation information may include IDs of all remote UEs that establish relay connections to the relay UE 1.

[00460] In some examples, the first relay service authorization revocation information may include a relay connection release cause value. The relay connection release cause value is used to represent a reason for releasing the relay connection. For example, the reason for releasing the relay connection includes: the relay service subscription information of the relay UE 1 changes. For example, a subscription to provide a relay service expires.

[00461] For another example, the method for releasing a relay connection provided in this embodiment of this application may be based on steps S1108 and S1109 in FIG. 11A and FIG. 11B and step S1401 and S1104 to S1107 in FIG. 14A and FIG. 14B. Step S1109 is replaced with the following: The PCF network element of the relay UE 1 determines, based on the relay service subscription information of the relay UE 1, that the relay UE 1 is not allowed to provide the relay

service for the remote UE 1. Step S1401 is replaced with the following: The PCF network element of the relay UE 1 sends second relay service authorization revocation information to the relay UE 1, to revoke an authorization for the relay UE 1 to provide the relay service for the remote UE 1. The second information sent by the relay UE 1 to the RAN in step S1104 is used to request to
5 release a communication resource or a corresponding relay connection used for the relay service of the remote UE 1 between the relay UE 1 and the RAN. Step S1106 is replaced with the following: The RAN releases the communication resource used for the relay service of the remote UE 1 between the relay UE 1 and the RAN, or the RAN releases the corresponding relay connection used for the relay service of the remote UE 1 between the relay UE 1 and the RAN.

10 **[00462]** Alternatively, the method for releasing a relay connection provided in this embodiment of this application may specifically include the foregoing steps S1108 and S1109 shown in FIG. 11A and FIG. 11B, and the following steps S1402 and S1403.

[00463] S1402: The PCF network element of the relay UE 1 sends first information to the RAN.

[00464] The first information is used to release a relay connection corresponding to the remote
15 UE 1.

[00465] For example, the PCF network element of the relay UE 1 may send first relay service authorization revocation information or first relay connection release information (namely, the first information) to the RAN by using an N2 message. The first relay service authorization revocation information indicates to revoke an authorization of using the remote UE 1 as remote UE. The first
20 relay connection release information indicates to release the relay connection corresponding to the remote UE 1.

[00466] In some examples, the first information includes IDs of all relay UEs that establish relay connections to the remote UE 1.

[00467] In some examples, the first information may include a relay connection release cause
25 value. The relay connection release cause value is used to represent a reason for releasing the relay connection. For example, the reason for releasing the relay connection includes: relay service subscription information of the relay UE 1 changes. For example, a subscription to accept a relay service expires.

[00468] S1403: The RAN releases the relay connection corresponding to the remote UE 1.

30 **[00469]** For example, the RAN may release, based on the first information, at least one of the following resources: a communication resource used by the RAN for the relay connection of the

remote UE 1; and a communication resource used for the relay connection between the remote UE 1 and the relay UE 1.

[00470] For example, for a layer 2 relay, the RAN sends second information to the remote UE 1 based on the first information. The second information is used to release relay connections corresponding to relay services between the remote UE 1 and all relay UEs (including the relay UE 1) that establish relay connections to the remote UE 1. After receiving the second information, the remote UE 1 releases, based on the second information, the relay connections corresponding to the relay services between the remote UE 1 and all the relay UEs (including the relay UE 1) that establish relay connections to the remote UE 1.

[00471] For another example, for a layer 3 relay, the RAN deletes, based on the first information, a context of the remote UE 1 in a PDU session used by the relay UE 1 to provide the relay service, and sends second information to the remote UE 1. The second information is used to release relay connections corresponding to relay services between the remote UE 1 and all relay UEs (including the relay UE 1) that establish relay connections to the remote UE 1. After receiving the second information, the remote UE 1 releases, based on the second information, the relay connections corresponding to the relay services between the remote UE 1 and all the relay UEs (including the relay UE 1) that establish relay connections to the remote UE 1.

[00472] Alternatively, the method for releasing a relay connection provided in this embodiment of this application may be based on steps S1201B to S1205B shown in FIG. 12A-1 and FIG. 12A-2, and S1201B is replaced with the following: A PCF network element of relay UE 1 obtains relay service subscription information of the relay UE 1 from a UDM/UDR network element. For example, the relay service subscription information of the relay UE 1 includes a list of remote UEs for which the relay UE 1 is allowed to provide relay services. S1202B is replaced with the following: The PCF network element of the relay UE 1 determines, based on the relay service subscription information of the relay UE 1, that the relay UE 1 is not allowed to provide a relay service for remote UE 1. S1203B is replaced with the following: The PCF network element of the relay UE 1 sends second relay service authorization revocation information to an AMF network element of the remote UE 1.

[00473] Alternatively, the method for releasing a relay connection provided in this embodiment of this application may be based on steps S1206B to S1209B shown in FIG. 12B-1 and FIG. 12B-2, and S1206B is replaced with the following: A PCF network element of relay UE 1 obtains relay

service subscription information of remote UE 1 from a UDM/UDR network element. For example, the relay service subscription information of the remote UE 1 includes a list of relay UEs whose relay services are allowed to be accepted by the remote UE 1. S1207B is replaced with the following: The PCF network element of the relay UE 1 determines, based on the relay service subscription information of the remote UE 1, that the remote UE 1 is not allowed to accept a relay service provided by relay UE 1. S1208B is replaced with the following: The PCF network element of the relay UE 1 sends first information to a RAN.

[00474] It should be noted that the method for releasing a relay connection based on the authorization manner 4 may include the foregoing steps S1101, S1102, S1401, and S1104 to S1107, include the foregoing steps S1108, S1109, S1402, and S1403, include the foregoing steps S1101, S1102, S1401, S1104 to S1107, S1108, S1109, S1402, and S1403, or include the corresponding step in which the relay UE 1 is not allowed to provide the relay service for the remote UE 1 or the remote UE 1 is not allowed to accept the relay service provided by the relay UE 1.

[00475] In addition, the method for releasing a relay connection shown in FIG. 14A and FIG. 14B is performed based on the authorization manner 4 initiated by the relay UE 1. For the method for releasing a relay connection based on the authorization manner 4 initiated by the remote UE 1, refer to the method shown in FIG. 14A and FIG. 14B. Details are not described herein.

[00476] In addition, the method for releasing a relay connection based on the authorization manner 4, for example, the method for releasing a relay connection shown in FIG. 14A and FIG. 14B, is also applicable to a case in which the PCF network element of the remote UE and the PCF network element of the relay UE determine an associated authorization result through negotiation. Details are not described herein again.

[00477] According to the method for releasing a relay connection provided in this embodiment that is based on the authorization manner 4 of this application, when determining, based on the service subscription information of the remote UE 1, that the remote UE 1 is not allowed to accept the relay service, the PCF network element may indicate, in time, the RAN to release the relay connection corresponding to the remote UE 1; when determining, based on the service subscription information of the relay UE 1, that the relay UE 1 is not allowed to provide the relay service, the PCF network element may indicate, in time, the relay UE 1 to release the relay connection corresponding to the relay UE 1; when determining, based on the service subscription information of the relay UE 1, that the relay UE 1 is not allowed to provide the relay service for the remote UE

1, the PCF network element may indicate, in time, the relay UE 1 to release the relay connection corresponding to the relay service between the remote UE 1 and the relay UE 1; and/or when determining, based on the service subscription information of the remote UE 1, that the remote UE 1 is not allowed to accept the relay service provided by the relay UE 1, the PCF network element
5 may indicate, in time, the RAN to release the relay connection corresponding to the relay service between the remote UE 1 and the relay UE 1. Making a response in time based on the service subscription information of the remote UE 1 and/or the relay UE 1 can improve accuracy of relay connection management and control and accuracy of charging on a network side.

[00478] In some examples, the method for releasing a relay connection shown in FIG. 15A and
10 FIG. 15B may be performed based on the authorization manner 4.

[00479] For example, the first network element is a PCF network element of relay UE 1, and the first information is sent by the PCF network element of the relay UE 1 to the relay UE 1. As shown in FIG. 15A and FIG. 15B, the method for releasing a relay connection provided in this embodiment of this application may be based on S1101, S1102, S1401, and S1104 to S1107 shown
15 in FIG. 14A and FIG. 14B, and S1104 to S1107 are replaced with S1501 and S1502.

[00480] S1501: The relay UE 1 sends first relay connection release information to an SMF network element of the relay UE 1.

[00481] The first relay connection release information indicates to release a relay connection corresponding to the relay UE 1. Specifically, the first relay connection release information is used
20 by the SMF network element of the relay UE 1 to release a PDU session resource used by the relay UE 1 for the relay service.

[00482] In some examples, the relay UE 1 sends the first relay connection release information to the SMF network element of the relay UE 1 via an AMF network element of the relay UE 1.

[00483] S1502: The SMF network element of the relay UE 1 releases the PDU session resource
25 used by the relay UE 1 for the relay service.

[00484] Alternatively, the method for releasing a relay connection provided in this embodiment of this application may be based on S1101, S1102, S1401, S1501, and S1502 shown in FIG. 15A and FIG. 15B, and S1102 is replaced with the following: The PCF network element of the relay UE determines, based on relay service subscription information of the relay UE 1, that the relay
30 UE 1 is not allowed to provide a relay service for remote UE 1. In addition, S1501 is replaced with the following: The relay UE 1 requests, via an AMF network element of the relay UE 1, an SMF

network element of the relay UE 1 to delete a context of the remote UE 1 in a PDU session used by the relay UE 1 to provide the relay service. For example, the relay UE 1 may send fourth information to the SMF network element of the relay UE 1, where the fourth information is used to delete the context of the remote UE 1 in the PDU session used by the relay UE 1 to provide the relay service. The context of the remote UE 1 may include but is not limited to an ID of the remote UE 1 and/or an IP address of the remote UE 1. In addition, S1502 is replaced with the following: The SMF network element of the relay UE 1 deletes the context of the remote UE 1 in the PDU session used by the relay UE 1 to provide the relay service.

[00485] Alternatively, as shown in FIG. 15A and FIG. 15B, the method for releasing a relay connection provided in this embodiment of this application may be based on steps S1101 and S1102 shown in FIG. 14A and FIG. 14B, and the following steps S1503 to S1505.

[00486] S1503: The PCF network element of the relay UE 1 sends first relay service authorization revocation information to an AMF network element of the relay UE 1.

[00487] The first relay service authorization revocation information indicates to revoke an authorization of using the relay UE 1 as relay UE.

[00488] For example, the PCF network element of the relay UE 1 may send the first relay service authorization revocation information to the AMF network element of the relay UE 1 by using an authorization update (Authorization Update) message.

[00489] In some examples, the authorization update (Authorization Update) message carries IDs of all remote UEs that establish relay connections to the relay UE 1.

[00490] In some examples, the first relay service authorization revocation information may include a relay connection release cause value. The relay connection release cause value is used to represent a reason for releasing the relay connection. For example, the reason for releasing the relay connection includes: the relay service subscription information of the relay UE 1 changes.

For example, a subscription to provide a relay service expires.

[00491] S1504: The AMF network element of the relay UE 1 sends first relay connection release information to an SMF network element of the relay UE 1.

[00492] The first relay connection release information indicates to release a relay connection corresponding to the relay UE 1. Specifically, the first relay connection release information is used by the SMF network element of the relay UE 1 to release a PDU session resource used by the relay UE 1 for the relay service.

[00493] In some examples, the first relay connection release information may include the relay connection release cause value. The relay connection release cause value is used to represent the reason for releasing the relay connection. For example, the reason for releasing the relay connection includes: the relay service subscription information of the relay UE 1 changes. For example, the subscription to provide the relay service expires.

[00494] S1505: The SMF network element of the relay UE 1 releases the PDU session resource used by the relay UE 1 for the relay service.

[00495] Alternatively, the method for releasing a relay connection provided in this embodiment of this application may be based on the method shown in FIG. 15A and FIG. 15B, and S1102 is replaced with the following: The PCF network element of the relay UE determines, based on the relay service subscription information of the relay UE 1, that the relay UE 1 is not allowed to provide a relay service for remote UE 1. S1503 is replaced with the following: The PCF network element of the relay UE 1 sends second relay service authorization revocation information to an AMF network element of the relay UE 1. The second relay service authorization revocation information indicates to revoke an authorization for the relay UE 1 to provide the relay service for the remote UE 1. For example, the PCF network element of the relay UE 1 may send the second relay service authorization revocation information to the AMF network element of the relay UE 1 by using an authorization update (Authorization Update) message. In some examples, the authorization update (Authorization Update) message carries IDs of all remote UEs that establish relay connections to the relay UE 1. In addition, S1504 is replaced with the following: The AMF network element of the relay UE 1 sends second relay connection release information to an SMF network element of the relay UE 1. The second relay connection release information indicates to release a relay connection corresponding to a relay service between the relay UE 1 and the remote UE 1. Specifically, the second relay connection release information is used by the SMF network element of the relay UE 1 to request to delete a context of the remote UE 1 in a PDU session used by the relay UE 1 to provide the relay service. In addition, S1505 is replaced with the following: The SMF network element of the relay UE 1 deletes the context of the remote UE 1 in the PDU session used by the relay UE 1 to provide the relay service.

[00496] It should be noted that the method for releasing a relay connection shown in FIG. 15A and FIG. 15B is performed based on the authorization manner 4 initiated by the relay UE 1. For the method for releasing a relay connection based on the authorization manner 4 initiated by the

remote UE 1, refer to the method shown in FIG. 15A and FIG. 15B. Details are not described herein. For example, reference may be made to steps S1101, S1102, S1401, S1501, and S1502 shown in FIG. 15A and FIG. 15B, and the PCF network element of the relay UE 1 is replaced with the PCF network element of the remote UE 1. Alternatively, reference may be made to steps S1101, S1102, and S1503 to S1505 shown in FIG. 15A and FIG. 15B, and the PCF network element of the relay UE 1 is replaced with the PCF network element of the remote UE 1.

[00497] In addition, the method for releasing a relay connection shown in FIG. 15A and FIG. 15B may alternatively be performed based on independent authorization (for example, the authorization manner 1) of a layer 3 relay, or reference may be made to the method shown in FIG. 15A and FIG. 15B. This is not specifically described herein.

[00498] Alternatively, for the method for releasing a relay connection in the authorization manner 3 based on the layer 3 relay, refer to the method shown in FIG. 15A and FIG. 15B. For example, the method may be based on steps S1201A, S1202A, and S1301 to S1305 shown in FIG. 13, and S1301 to S1305 are replaced with steps S1401, S1501, and S1502 shown in FIG. 15A and FIG. 15B, or S1301 to S1305 are replaced with steps S1503 to S1505 shown in FIG. 15A and FIG. 15B. It should be understood that the solutions in embodiments of this application may be properly combined for use, and explanations or descriptions of terms in embodiments may be cross-referenced or explained in embodiments. This is not limited.

[00499] In some examples, FIG. 18 shows a method for releasing a relay connection, which may be used to release a layer 3 based relay indirect communication link. The method is specifically described as follows:

[00500] S1801: First relay UE receives seventh information.

[00501] The seventh information may be used to release a first PDU session of the first relay UE. The seventh information may include an identifier used to identify the first PDU session. The identifier may be referred to as the identifier of the first PDU session, or may be referred to as a PDU session identifier (PDU Session identifier, PDU Session ID).

[00502] The first PDU session is a PDU session for relaying (PDU session for relaying). To be specific, the first PDU session is a PDU session used by the first relay UE to provide a relay service for remote UE. Specifically, the first PDU session may be used to transmit related data of one or more remote UEs between a UPF and relay UE, for example, uplink data or downlink data.

[00503] Specifically, the seventh information may be information (for example, an information

element in a message) or a message. For example, the seventh information may be information or a message used to release a PDU session (where whether the PDU session is specially used to provide a relay service is not limited), for example, a PDU session release command (PDU Session Release Command) message, where the PDU session release command message may include the identifier of the first PDU session, or the seventh information may be information or a message specially used to release the PDU session used to provide the relay service. For example, the seventh information may be sent by a second network element to the first relay UE, and the second network element may be an AMF network element, an SMF network element, or a PCF network element corresponding to the first relay UE. The AMF network element corresponding to the first relay UE may be understood as an AMF network element responsible for mobility management of the first relay UE, the SMF network element corresponding to the first relay UE may be understood as an SMF network element responsible for managing the first PDU session of the first relay UE, and the PCF network element corresponding to the first relay UE may be understood as a PCF network element responsible for managing the first PDU session of the first relay UE. FIG. 18 is drawn by using an example in which the second network element is an AMF network element corresponding to the first relay UE.

[00504] Specifically, there are a plurality of reasons for the second network element to determine to release the first PDU session. For example, when slice information (Allowed NSSAI) allowed by the first relay UE changes or slice information authorized for use changes, for example, a slice corresponding to the first PDU session changes from being allowed to not being allowed, the SMF network element corresponding to the first relay UE triggers PDU session release. Specifically, the SMF network element corresponding to the first relay UE sends the PDU session release command to the first relay UE via the AMF network element corresponding to the first relay UE. In this case, it may be considered that the seventh information is sent by the SMF network element to the first relay UE, or sent by the AMF network element to the first relay UE. Alternatively, there may be another reason for the second network element to determine to release the first PDU session. This is not limited in this application.

[00505] S1802: The first relay UE releases the first PDU session based on the seventh information.

[00506] Specifically, a process in which the first relay UE releases the first PDU session in S1802 is well known to a person skilled in the art, and details are not described herein again. Step

S1802 is an optional step.

[00507] S1803: The first relay UE releases, based on the seventh information, a relay connection corresponding to the first PDU session. The relay connection is used for communication between the first relay UE and the remote UE.

5 **[00508]** Specifically, the relay connection may be used for communication between the first relay UE and one or more remote UEs. For example, the first relay UE may be relay UE 1, and the remote UE includes remote UE 1 and remote UE 2. Correspondingly, the relay connection includes a first relay connection and a second relay connection, where the first relay connection is used to transmit related data of the remote UE 1 between the relay UE 1 and the remote UE 1, and the
10 second relay connection is used to transmit related data of the remote UE 2 between the relay UE 1 and the remote UE 2. Then, the relay UE 1 transmits related data between the remote UE 1, the remote UE 2, and a network by using the first PDU session.

[00509] It should be noted that, after the relay connection between the first relay UE and the remote UE is established, the first relay UE may communicate with the remote UE through a PC5
15 link, where the PC5 link is used to transmit relay data of the remote UE. Therefore, the relay connection between the first relay UE and the remote UE may also be understood as the PC5 link between the first relay UE and the remote UE, and the first relay connection and the second relay connection may also be understood as a first PC5 link and a second PC5 link respectively.

[00510] It should be noted that, that the first relay UE releases, based on the seventh information,
20 the relay connection corresponding to the first PDU session includes releasing one or more relay connections corresponding to the first PDU session, for example, releasing the first relay connection and/or the second relay connection.

[00511] It should be noted that, after step S1802 in which the first relay UE releases the first PDU session based on the seventh information, or before step S1803 in which the first relay UE
25 releases, based on the seventh information, the relay connection corresponding to the first PDU session, the method may further include: The first relay UE determines, based on the seventh information, whether the first PDU session is used to provide the relay service; and if the first PDU session is used to provide the relay service, S1803 is performed; or if the first PDU session is not used to provide the relay service, step S1803 is not performed.

30 **[00512]** During specific implementation, S1803 may include the following steps.

[00513] S11: The first relay UE determines, based on the seventh information, the relay

connection corresponding to the first PDU session.

[00514] S12: The first relay UE releases the relay connection.

[00515] During specific implementation, S11 may include: The first relay UE may determine PDU session information of the first PDU session based on the identifier of the first PDU session in the seventh information, then determine information about a corresponding relay connection based on the PDU session information and a correspondence between the PDU session information and information about the relay connection between the first relay UE and the remote UE, and determine the relay connection based on the information about the relay connection.

[00516] The PDU session information of the first PDU session is related information of the first PDU session, and may specifically include one or more information of the identifier of the first PDU session, address information associated with the first PDU session (where the address information is used to transmit data between the relay UE and the UPF), and a relay service code (relay service code) associated with the first PDU session. The information about the relay connection is related information of the relay connection between the first relay UE and the remote UE, or may be understood as related information obtained by the PC5 link between the first relay UE and the remote UE. Specifically, the information may include a PC5 link identifier (PC5 Link ID), and/or address information associated with the PC5 link (where the address information is used to transmit data between the relay UE and the remote UE).

[00517] It should be noted that before the first relay UE determines the PDU session information of the first PDU session based on the identifier of the first PDU session in the seventh information, the method may further include: The first relay UE determines, based on the seventh information, whether the first PDU session is used to provide the relay service; and if the first PDU session is used to provide the relay service, S11 is performed; or if the first PDU session is not used to provide the relay service, S11 is not performed. In other words, if the first PDU session is a PDU session for providing the relay service, the first relay UE then determines the relay connection corresponding to the first PDU session; or if the first PDU session is a PDU session for providing the relay service, the first relay UE releases the relay connection corresponding to the first PDU session.

[00518] The correspondence between the PDU session information and the information about the relay connection is obtained by the first relay UE after the first relay UE establishes the relay connection for the remote UE. The first relay UE stores the correspondence. For example, the

correspondence is stored in a context of the first PDU session. A specific obtaining process may be implemented by using the following S21 to S25. An example in which the relay UE 1 establishes the relay connection to the remote UE 1 to obtain the correspondence between the PDU session information and the information about the relay connection is used for description. Other remote
5 UEs may be implemented in a same manner.

[00519] S21: The relay UE 1 obtains a correspondence between the relay service code and a PDU session parameter from the PCF network element corresponding to the relay UE 1 during network registration. The PDU session parameter includes information such as a PDU session type, a data network name (data network name, DNN), and single network slice selection assistance
10 information (single network slice selection assistance information, S-NSSAI).

[00520] S22: The remote UE 1 sends an indirect communication request message or a direct communication request message to the relay UE 1.

[00521] The request message is used to establish communication between the remote UE 1 and the relay UE 1, and includes a relay service code of the remote UE 1.

[00522] S23: The relay UE 1 determines, based on the relay service code of the remote UE 1 and the correspondence between the relay service code and the PDU session parameter, whether a new PDU session for providing a relay service needs to be established for the remote UE 1.

[00523] Specifically, the relay UE 1 determines a required PDU session parameter (namely, a PDU session parameter corresponding to the relay service code word of the remote UE 1, and
20 denoted as a target PDU session parameter) based on the relay service code of the remote UE 1 and the correspondence between the relay service code and the PDU session parameter, and then determines, based on the established PDU session for providing the relay service, whether a new PDU session for providing a relay service needs to be established for the remote UE 1. If the PDU session parameter of the established PDU session for providing the relay service includes the target
25 PDU session parameter, there is no need to establish a new PDU session for the remote UE 1. If the PDU session parameter of the established PDU session for providing the relay service does not include any parameter in the target PDU session parameter, a new PDU session needs to be established for the remote UE 1.

[00524] S24: If there is no need to establish a new PDU session, determine that the established
30 PDU session for providing the relay service is used to provide the relay service for the remote UE 1; or if a new PDU session needs to be established, establish, for the remote UE 1, a new PDU

session used to provide a relay service for the remote UE 1.

[00525] After S24, a PDU session for finally providing a relay service for the remote UE 1 is the foregoing first PDU session.

[00526] S25: The relay UE 1 obtains the correspondence between the PDU session information and the information about the relay connection.

[00527] After S25, the relay UE 1 may store a correspondence between the PDU session information corresponding to the first PDU session and information about the relay connection between the relay UE 1 and the remote UE 1, for example, store the correspondence in the context of the first PDU session. The correspondence can bind or associate the PDU session used by the relay UE 1 to provide the relay service for the remote UE 1 with the PC5 link between the relay UE 1 and the remote UE 1.

[00528] In a possible implementation, the correspondence between the PDU session information and the information about the relay connection may be represented by using a correspondence between the PDU session identifier and the PC5 link identifier. When the relay UE 1 establishes, for the remote UE 1, a new PDU session used to provide a relay service, the relay UE 1 allocates a PDU session identifier to the newly established PDU session. After the remote UE 1 establishes the PC5 link with the relay UE 1, the relay UE 1 also allocates a PC5 link identifier to the PC5 link, and establishes a correspondence between the PDU session identifier and the PC5 link identifier. When the established PDU session for providing the relay service is used to provide the relay service for the remote UE 1, after the remote UE 1 establishes the PC5 link with the relay UE 1, the relay UE 1 allocates a PC5 link identifier to the PC5 link, and establishes a correspondence between the PDU session identifier of the established PDU session and the PC5 link identifier.

[00529] In another possible implementation, the correspondence between PDU session information and the information about the relay connection may be represented by using a correspondence between the address information associated with the PDU session and the address information associated with the PC5 link.

[00530] It should be noted that the correspondence between the PDU session information and the information about the relay connection may be alternatively represented by using a correspondence between other information included in the PDU session information and other information included in the information about the relay connection. This is not limited in this

application.

[00531] Optionally, a correspondence is further established between the relay service code of the remote UE 1 and the PDU session identifier of the PDU session for providing the relay service for the remote UE 1. The correspondence may be used as the context of the PDU session.

5 **[00532]** Optionally, a correspondence is further established between the relay service code of the remote UE 1 and the PC5 link identifier between the remote UE 1 and the relay UE 1. The correspondence may be used as a context of the PC5 link.

[00533] The first relay UE obtains the correspondence between PDU session information and the information about the relay connection by using S21 to S25. When receiving the seventh
10 information, the first relay UE may determine the PDU session information of the first PDU session based on the identifier of the first PDU session in the seventh information, and then determine the relay connection based on the correspondence between the PDU session information and the information about the relay connection.

[00534] If the relay connection released by the first relay UE includes the relay connection
15 between the first relay UE and the first remote UE, during specific implementation, S12 may include: The first relay UE sends eighth information to the first remote UE, where the eighth information is used to release the relay connection between the first relay UE and the first remote UE.

[00535] It should be noted that, during specific implementation of S12, the first relay UE
20 releases the relay connection determined in S11. For example, the relay UE 1 releases the first relay connection to the remote UE 1. If there is a relay connection between the relay UE 1 and another remote UE, but the correspondence between the PDU session information and the information about the relay connection is not obtained (that is, S21 to S25 are not completed), the relay UE 1 does not release the relay connection to the another remote UE. For example, if the
25 relay UE 1 establishes the second relay connection to the remote UE 2, and the relay UE 1 does not store the PDU session information of the first PDU session and information about the second relay connection, the relay UE 1 cannot obtain a correspondence between the PDU session information of the first PDU session and the information about the second relay connection, and does not release the second relay connection after receiving the seventh information.

30 **[00536]** For example, releasing the relay connection between the relay UE 1 and the remote UE 1 may include deleting the context of the PC5 link between the relay UE 1 and the remote UE 1.

[00537] Specifically, the eighth information may include a cause value used to represent a reason for releasing the relay connection (that is, the eighth information includes a relay connection release cause value), and the relay connection release cause value includes: the first PDU session of the first relay UE is released. The eighth information in this application may be a link release message.

[00538] If the relay connection released by the first relay UE includes the relay connection between the first relay UE and the first remote UE, during specific implementation, S12 further may include: The first relay UE releases a communication resource used for the relay connection between the first relay UE and the first remote UE.

[00539] After the correspondence between the PDU session information corresponding to the PDU session 1 and the information about the relay connection between the relay UE 1 and the remote UE 1 is established, when receiving, by using S1801 to S1803, information indicating to release the PDU session used by the first relay UE to provide the relay service for the remote UE, the first relay UE can determine, based on the foregoing correspondence, the relay connection corresponding to the PDU session, and release the relay connection in time, to release the communication resource between the first relay UE and the remote UE in time, and improve resource utilization.

[00540] It should be noted that the method for releasing a relay connection shown in FIG. 18 may be applied to any UE (denoted as UEA), the UEA receives information (for example, may be denoted as ninth information) used to release a PDU session, and the PDU session is a PDU session for data transmission between the UEA and the UPF. The UEA releases the PDU session based on the ninth information, and determines, based on the ninth information, whether the UEA provides one or more relay services for one or more other UEs by using the PDU session. If the UEA provides one or more relay services for one or more other UEs by using the PDU session, the UEA releases, based on the ninth information, some or all relay connections corresponding to the PDU session. If the UEA does not provide one or more relay services for one or more other UEs by using the PDU session, the UEA only needs to complete releasing the PDU session.

[00541] It should be further understood that sequence numbers of the foregoing processes do not mean execution sequences in various embodiments of this application. The execution sequences of the processes should be determined based on functions and internal logic of the processes, and should not be construed as any limitation on the implementation processes of

embodiments of this application.

[00542] It may be understood that to implement the functions of any one of the foregoing embodiments, relay UE, remote UE, an access network device, or another network device (for example, a PCF network element, an SMF network element, or an AMF network element) includes
5 corresponding hardware structures and/or software modules for performing the functions. A person skilled in the art should easily be aware that, in combination with units and algorithm steps of the examples described in embodiments disclosed in this specification, this application can be implemented by hardware or a combination of hardware and computer software. Whether a function is performed by hardware or hardware driven by computer software depends on particular
10 applications and design constraints of the technical solutions. A person skilled in the art may use different methods to implement the described functions for each particular application, but it should not be considered that the implementation goes beyond the scope of this application.

[00543] In embodiments of this application, a device, for example, the relay UE, the remote UE, the access network device, or the another network device may (for example, the PCF network
15 element, the SMF network element, or the AMF network element) may be divided into functional modules. For example, each functional module may be obtained through division based on each corresponding function, or two or more functions may be integrated into one processing module. The integrated module may be implemented in a form of hardware, or may be implemented in a form of a software functional module. It should be noted that, in embodiments of this application,
20 module division is merely an example, and is merely a logical function division. During actual implementation, another division manner may be used.

[00544] For example, when functional module division is performed in an integrated manner, FIG. 16 is a block diagram of a structure of a communication apparatus according to an embodiment of this application. The communication apparatus may be relay UE or remote UE.
25 The communication apparatus may include a transceiver unit 1610 and a processing unit 1620.

[00545] When the communication apparatus is relay UE, the transceiver unit 1610 is configured to support the relay UE in performing the foregoing step S701, S702, S703, S704, S705, S801, S901, S902, S1001, S1002, S1103, S1104, S1105, S1301, S1401, S1501, or S1801, and/or another process of the technology described in this specification. The processing unit 1620 is configured
30 to assist the relay UE in performing the foregoing step S701, S702, S703, S704, S705, S801, S901, S902, S1001, S1002, S1116, S1204A, S1208A, S1205B, S1209B, S1802, or S1803, and/or another

process of the technology described in this specification.

[00546] When the communication apparatus is remote UE, the transceiver unit 1610 is configured to support the remote UE in performing the foregoing step S701, S702, S703, S705, S706, S1105, S1110, or S1112, and/or another process of the technology described in this specification. The processing unit 1620 is configured to assist the remote UE in performing the foregoing step S701, S702, S703, S705, S706, S707, S1107, or S1111, and/or another process of the technology described in this specification.

[00547] FIG. 17 is a block diagram of a structure of a communication apparatus according to an embodiment of this application. The communication apparatus may be the foregoing access network device, AMF network element, PCF network element, SMF network element, or the like. The communication apparatus may include a transceiver unit 1710 and a processing unit 1720.

[00548] When the communication apparatus is the access network device, the transceiver unit 1710 is configured to support the access network device in performing the foregoing step S601, S602, S701, S702, S704, S706, S707, S901, S902, S1001, S1002, S1103, S1104, S1110, S1112, S1115, S1203A, S1207A, S1204B, S1208B, S1301, S1401, S1402, or S1501, and/or another process of the technology described in this specification. The processing unit 1702 is configured to assist the access network device in performing the foregoing step S602, S701, S702, S704, S706, S707, S801, S1001, S1002, S1004, S1005, S1007, or S1101, or support the access network device in performing the foregoing step S1106, S1116, S1204A, S1208A, S1205B, S1209B, or S1403, and/or another process of the technology described in this specification.

[00549] When the communication apparatus is the AMF network element, the transceiver unit 1710 is configured to support the AMF network element in performing the foregoing step S601, S602, S701, S704, S706, S801, S802, S803, S901, S902, S1001, S1002, S1103, S1113, S1115, S1201A, S1203A, S1205A, S1207A, S1201B, S1203B, S1204B, S1206B, S1208B, S1301, S1401, S1501, S1503, S1504, or S1801, and/or another process of the technology described in this specification. The processing unit 1702 is configured to assist the AMF network element in performing the foregoing step S602, S701, S704, S706, S707, S801, S802, S803, S901, S902, S1001, or S1002, or configured to assist the AMF network element in performing the foregoing step S1114, S1202A, S1206A, S1202B, or S1207B, and/or another process of the technology described in this specification.

[00550] When the communication apparatus is the PCF network element, the transceiver unit

1710 is configured to support the PCF network element in performing the foregoing step S601, S602, S704, S1001, S1002, S1101, S1103, S1108, S1110, S1401, S1503, or S1801, and/or another process of the technology described in this specification. The processing unit 1702 is configured to assist the PCF network element in performing the foregoing step S602, S701, S704, S1001, or S1002, or configured to support the PCF network element in performing the foregoing step S1102 or S1109, and/or another process of the technology described in this specification.

[00551] When the communication apparatus is the SMF network element, the transceiver unit 1710 is configured to support the SMF network element in performing the foregoing step S701, S1401, S1501, S1504, or S1801, and/or another process of the technology described in this specification. The processing unit is configured to support the SMF network element in performing the foregoing step S1502 or S1505, and/or another process of the technology described in this specification.

[00552] It should be noted that the transceiver unit 1610 and the transceiver unit 1710 may include a radio frequency circuit. The UE or the network device may receive and send a radio signal by using a radio frequency circuit. The radio frequency circuit usually includes but is not limited to an antenna, at least one amplifier, a transceiver, a coupler, a low noise amplifier, a duplexer, and the like. In addition, the radio frequency circuit may further communicate with another device through wireless communication. The wireless communication may use any communication standard or protocol, including but not limited to a global system for mobile communications, a general packet radio service, code division multiple access, wideband code division multiple access, long term evolution, an e-mail message, a short message service, and the like.

[00553] In an optional manner, when software is used for implementing data transmission, the data transmission may be completely or partially implemented in a 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 procedures or functions according to embodiments of this application are completely or partially implemented. The computer may be a general-purpose computer, a dedicated computer, a computer network, or another programmable apparatus. The computer instructions may be stored in a computer-readable storage medium or may be transmitted from a computer-readable storage medium to another computer-readable storage medium. For example, the computer instructions may be transmitted

from a website, computer, server, or data center to another website, computer, server, or data center in a wired (for example, a coaxial cable, an optical fiber, or a digital subscriber line (DSL)) or wireless (for example, infrared, radio, or microwave) manner. The computer-readable storage medium may be any usable medium accessible by a computer, or a data storage device, such as a server or a data center, integrating one or more usable media. The usable medium may be a magnetic medium (for example, a floppy disk, a hard disk, or a magnetic tape), an optical medium (for example, a DVD), a semiconductor medium (for example, a solid-state drive Solid-State Drive (SSD)), or the like.

[00554] Method or algorithm steps described in combination with embodiments of this application may be implemented by hardware, or may be implemented by a processor by executing software instructions. The software instructions may include a corresponding software module. The software module may be stored in a RAM memory, a flash memory, a ROM memory, an EPROM memory, an EEPROM memory, a register, a hard disk, a removable hard disk, a CD-ROM memory, or a storage medium in any other form well-known in the art. For example, a storage medium is coupled to a processor, so that the processor can read information from the storage medium and write information into the storage medium. Certainly, the storage medium may further be a component of the processor. The processor and the storage medium may be located in the ASIC. In addition, the ASIC may be located in an apparatus. Certainly, the processor and the storage medium may alternatively exist in the apparatus as discrete components.

[00555] The foregoing descriptions about implementations allow a person skilled in the art to clearly understand that, for the purpose of convenient and brief description, division of the foregoing functional modules is used as an example for illustration. During actual application, the foregoing functions can be allocated to different modules and implemented according to a requirement, that is, an inner structure of an apparatus is divided into different function modules to implement all or some of the functions described above.

[00556] This application provides a communication system. The communication system includes an access network device, an AMF network element, and a PCF network element. The communication system is configured to implement the method in any possible implementation provided in this application. For example, the AMF network element or the PCF network element in the communication system is configured to implement steps S601 and S602 shown in FIG. 6. Alternatively, the access network device, the AMF network element, and the PCF network element

in the communication system are configured to assist in implementing the authorization procedure of the remote UE and/or the relay UE shown in FIG. 7, FIG. 8, FIG. 9, or FIG. 10. Alternatively, the access network device, the AMF network element, and the PCF network element in the communication system are configured to assist in implementing the process of releasing a relay connection shown in FIG. 11A and FIG. 11B, FIG. 12A-1 and FIG. 12A-2, FIG. 12B-1 and FIG. 12B-2, FIG. 13, FIG. 14A and FIG. 14B, FIG. 15A and FIG. 15B, or FIG. 18. Further, the communication system may include the remote UE and the relay UE in the foregoing method embodiments.

[00557] This application provides a communication apparatus. The communication apparatus includes a processor and a memory. The memory stores computer program code. When the computer program code is executed by the processor, actions of the first network element, the access network device, or the first UE in the foregoing methods provided in this application are implemented. The communication apparatus may be a chip system. The chip system may include a chip, or may include a chip and another discrete component.

[00558] In the several embodiments provided in this application, it should be understood that the disclosed device and method may be implemented in other manners. For example, the foregoing apparatus embodiments are merely examples. For example, division of the modules or units is merely logical function division. During actual implementation, there may be another division manner. For example, a plurality of units or components may be combined or integrated into another apparatus, or some features may be ignored or not performed. In addition, the displayed or discussed mutual couplings or direct couplings or communication connections may be implemented through some interfaces. The indirect couplings or communication connections between the apparatuses or units may be implemented in electronic, mechanical, or other forms.

[00559] The units described as separate parts may or may not be physically separate, and parts displayed as units may be one or more physical units, may be located in one place, or may be distributed on different places. Some or all of the units may be selected based on actual requirements to achieve the objectives of the solutions of embodiments.

[00560] In addition, functional units in embodiments of this application may be integrated into one processing unit, or each of the units may exist alone physically, or two or more units are integrated into one unit. The integrated unit may be implemented in a form of hardware, or may be implemented in a form of a software functional unit.

[00561] When the integrated unit is implemented in the form of a software functional unit and sold or used as an independent product, the integrated unit may be stored in a readable storage medium. Based on such an understanding, the technical solutions of embodiments of this application essentially, or the part contributing to the conventional technology, or all or some of the technical solutions may be implemented in the form of a software product. The software product is stored in a storage medium and includes several instructions for instructing a device (which may be a single-chip microcomputer, a chip, or the like) or a processor (processor) to perform all or some of the steps of the methods described in embodiments of this application. The foregoing storage medium includes various media that can store program code, for example, a USB flash drive, a removable hard disk, a read-only memory (Read-Only Memory, ROM), a random access memory (Random Access Memory, RAM), a magnetic disk, and an optical disc.

[00562] The foregoing descriptions are merely specific implementations of this application, but are not intended to limit the protection scope of this application. Any variation or replacement within the technical scope disclosed in this application shall fall within the protection scope of this application. Therefore, the protection scope of this application shall be subject to the protection scope of the claims.

CLAIMS

What is claimed is:

1. A method for releasing a relay connection, wherein the method comprises:

obtaining, by a first network element, relay service subscription information of first user
5 equipment UE; and

sending, by the first network element, first information based on the relay service subscription
information of the first UE, wherein

the first information is used to release a relay connection corresponding to the first UE, or
release a relay connection corresponding to a relay service between the first UE and second UE.

10 2. The method according to claim 1, wherein when the first information is used to release the
relay connection corresponding to the first UE, the first information is first relay service
authorization revocation information or first relay connection release information, wherein

the first relay service authorization revocation information indicates to revoke an
authorization of using the first UE as relay UE or remote UE; and

15 the first relay connection release information indicates to release the relay connection
corresponding to the first UE.

3. The method according to claim 1 or 2, wherein the first UE is relay UE, and the sending,
by the first network element, first information based on the relay service subscription information
of the first UE comprises:

20 sending, by the first network element, the first information when the relay service
subscription information of the first UE changes from comprising identification information of
remote UE for which the first UE is allowed to provide a relay service to not comprising the
identification information of the remote UE for which the first UE is allowed to provide the relay
service; or

25 sending, by the first network element, the first information when the first network element
determines, based on the relay service subscription information, that the first UE changes from
being allowed to provide a relay service for remote UE to not being allowed to provide the relay
service for the remote UE, wherein

the first information is used to release the relay connection corresponding to the first UE.

30 4. The method according to claim 1 or 2, wherein the first UE is remote UE, and the sending,

by the first network element, first information based on the relay service subscription information of the first UE comprises:

sending, by the first network element, the first information when the relay service subscription information of the first UE changes from comprising identification information of relay UE whose relay service is allowed to be accepted by the first UE to not comprising the identification information of the relay UE whose relay service is allowed to be accepted by the first UE; or

sending, by the first network element, the first information when the first network element determines, based on the relay service subscription information, that the first UE changes from being allowed to accept a relay service to not being allowed to accept the relay service, wherein the first information is used to release the relay connection corresponding to the first UE.

5. The method according to claim 1, wherein

when the first information is used to release the relay connection corresponding to the relay service between the first UE and the second UE, the first information is second relay service authorization revocation information or second relay connection release information, wherein

the second relay service authorization revocation information indicates to revoke an authorization for the first UE to provide the relay service for the second UE, or revoke an authorization for the first UE to accept the relay service provided by the second UE; and the second relay connection release information indicates to release the relay connection corresponding to the relay service between the first UE and the second UE.

6. The method according to claim 1 or 5, wherein the first UE is relay UE, and the sending, by the first network element, first information based on the relay service subscription information of the first UE comprises:

sending, by the first network element, the first information when the relay service subscription information of the first UE changes from comprising identification information of remote UE for which the first UE is allowed to provide a relay service to not comprising the identification information of the remote UE for which the first UE is allowed to provide the relay service, wherein the identification information of the remote UE comprises identification information of the second UE;

sending, by the first network element, the first information when identification information, in the relay service subscription information of the first UE, of remote UE for which the first UE

is allowed to provide a relay service changes from comprising identification information of the second UE to not comprising the identification information of the second UE; or

sending, by the first network element, the first information when the first network element determines, based on the relay service subscription information of the first UE, that the first UE changes from being allowed to provide the relay service for the second UE to not being allowed to provide the relay service for the second UE, wherein

the first information is used to release the relay connection corresponding to the relay service between the first UE and the second UE.

7. The method according to claim 1 or 5, wherein the first UE is remote UE, and the sending, by the first network element, first information based on the relay service subscription information of the first UE comprises:

sending, by the first network element, the first information when the relay service subscription information of the first UE changes from comprising identification information of relay UE whose relay service is allowed to be accepted by the first UE to not comprising the identification information of the relay UE whose relay service is allowed to be accepted by the first UE, wherein the identification information of the relay UE comprises identification information of the second UE;

sending, by the first network element, the first information when identification information, in the relay service subscription information of the first UE, of relay UE whose relay service is allowed to be accepted by the first UE changes from comprising identification information of the second UE to not comprising the identification information of the second UE; or

sending, by the first network element, the first information when the first network element determines, based on the relay service subscription information of the first UE, that the first UE changes from being allowed to accept the relay service provided by the second UE to not being allowed to accept the relay service provided by the second UE, wherein

the first information is used to release the relay connection corresponding to the relay service between the first UE and the second UE.

8. The method according to claim 6 or 7, wherein the first information comprises the identification information of the second UE.

9. The method according to any one of claims 1 to 8, wherein the sending, by the first network element, the first information comprises:

sending, by the first network element, the first information to an access network device, the first UE, or a session management function SMF network element of the first UE.

10. The method according to any one of claims 1 to 9, wherein the first network element is an access and mobility management function AMF network element or a policy control function PCF network element.

11. The method according to any one of claims 1 to 10, wherein the first information comprises a relay connection release cause value, and the relay connection release cause value is used to represent a reason for releasing the relay connection.

12. The method according to claim 11, wherein the reason for releasing the relay connection comprises: the relay service subscription information of the first UE changes.

13. A method for releasing a relay connection, wherein the method comprises:
receiving, by an access network device, second information, wherein the second information is used to release a relay connection corresponding to first user equipment UE; and
releasing, by the access network device based on the second information, the relay connection corresponding to the first UE.

14. The method according to claim 13, wherein the second information is first relay service authorization revocation information or first relay connection release information, wherein
the first relay service authorization revocation information indicates to revoke an authorization of using the first UE as relay UE or remote UE; and
the first relay connection release information indicates to release the relay connection corresponding to the first UE.

15. The method according to claim 13 or 14, wherein the receiving, by an access network device, second information comprises:
receiving, by the access network device, the second information from a first network element, wherein the first network element is a policy control function PCF network element of the first UE or an access and mobility management function AMF network element of the first UE; or
receiving, by the access network device, the second information from the first UE.

16. The method according to any one of claims 13 to 15, wherein the first UE is relay UE, and the releasing, by the access network device based on the second information, the relay connection corresponding to the first UE comprises:
releasing, by the access network device based on the second information, a communication

resource used for the relay connection between the first UE and the access network device.

17. The method according to claim 16, wherein the releasing, by the access network device based on the second information, the relay connection corresponding to the first UE further comprises:

5 releasing, by the access network device based on the second information, a communication resource used for the relay connection between the first UE and the remote UE.

18. The method according to any one of claims 13 to 15, wherein the first UE is remote UE, and the releasing, by the access network device based on the second information, the relay connection corresponding to the first UE comprises:

10 releasing, by the access network device based on the second information, at least one of the following resources:

a communication resource used by the access network device for the relay connection; and

a communication resource used for the relay connection between the first UE and the relay UE.

15 19. The method according to any one of claims 13 to 18, wherein the second information comprises a relay connection release cause value, and the relay connection release cause value is used to represent a reason for releasing the relay connection, wherein

the reason for releasing the relay connection comprises: relay service subscription information of the first UE changes.

20 20. A method for releasing a relay connection, wherein the method comprises:

receiving, by first user equipment UE, second information, wherein the second information is used to release a relay connection corresponding to a relay service between the first UE and second UE; and

releasing, by the first UE, the relay connection based on the second information.

25 21. The method according to claim 20, wherein the receiving, by first UE, second information comprises:

receiving, by the first UE, the second information from a second network element, wherein

the second network element is an access network device or an access and mobility management function AMF network element of the first UE.

30 22. The method according to claim 20 or 21, wherein the second information is second relay service authorization revocation information or second relay connection release information,

wherein

the second relay service authorization revocation information indicates to revoke an authorization for the first UE to provide the relay service for the second UE, or revoke an authorization for the first UE to accept the relay service provided by the second UE; and

5 the second relay connection release information indicates to release the relay connection corresponding to the relay service between the first UE and the second UE.

23. The method according to any one of claims 20 to 22, wherein the first UE is relay UE, the second UE is remote UE that accepts the relay service provided by the first UE, and the releasing, by the first UE, the relay connection based on the second information comprises:

10 sending, by the first UE, third information to the access network device based on the second information, wherein the third information is used to release a communication resource used for the relay connection between the first UE and the access network device; or

sending, by the first UE, fourth information to the AMF network element of the first UE based on the second information, wherein the fourth information is used to delete a context of the second
15 UE in a PDU session used by the first UE to provide the relay service.

24. The method according to any one of claims 20 to 22, wherein the first UE is remote UE, the second UE is relay UE that provides the relay service for the first UE, and the releasing, by the first UE, the relay connection based on the second information comprises:

sending, by the first UE, fifth information to the access network device based on the second
20 information, wherein

the fifth information is used to release a communication resource used by the access network device for the relay connection.

25. The method according to claim 23 or 24, wherein the method further comprises:

sending, by the first UE, sixth information to the second UE based on the second information,
25 wherein the sixth information is used to release a communication resource used for the relay connection between the first UE and the second UE.

26. The method according to any one of claims 20 to 25, wherein the second information comprises identification information of the second UE.

27. The method according to any one of claims 20 to 26, wherein the second information
30 comprises a relay connection release cause value, and the relay connection release cause value is used to represent a reason for releasing the relay connection, wherein

the reason for releasing the relay connection comprises: relay service subscription information of the first UE changes.

28. A method for releasing a relay connection, wherein the method comprises:

receiving, by first relay user equipment UE, seventh information, wherein the seventh
5 information is used to release a first protocol data unit PDU session, and the first PDU session is used by the first relay UE to provide a relay service for remote UE; and

releasing, by the first relay UE based on the seventh information, a relay connection corresponding to the first PDU session, wherein the relay connection is used for communication between the first relay UE and the remote UE.

10 29. The method according to claim 28, wherein the receiving, by first relay UE, seventh information comprises:

receiving, by the first relay UE, the seventh information from a second network element, wherein

the second network element is an access and mobility management function AMF network
15 element corresponding to the first relay UE, a policy control function PCF network element corresponding to the first relay UE, or a session management function SMF network element corresponding to the first relay UE.

30. The method according to claim 28 or 29, wherein the releasing, by the first relay UE based on the seventh information, a relay connection corresponding to the first PDU session comprises:

20 determining, by the first relay UE, the relay connection based on the seventh information; and

releasing, by the first relay UE, the relay connection.

31. The method according to claim 30, wherein the relay connection comprises a relay connection between the first relay UE and first remote UE, and the releasing, by the first relay UE,
25 the relay connection comprises:

sending, by the first relay UE, eighth information to the first remote UE, wherein the eighth information is used to release the relay connection between the first relay UE and the first remote UE.

32. The method according to claim 31, wherein the eighth information comprises a relay connection release cause value, and the relay connection release cause value is used to represent a
30 reason for releasing the relay connection, wherein

the reason for releasing the relay connection comprises: the first PDU session is released.

33. A communication apparatus, comprising:

a memory, configured to store a computer program; and

a processor, configured to execute the computer program, to implement the method according

5 to any one of claims 1 to 12.

34. A communication apparatus, comprising:

a memory, configured to store a computer program; and

a processor, configured to execute the computer program, to implement the method according

to any one of claims 13 to 19.

10 35. A communication apparatus, comprising:

a memory, configured to store a computer program; and

a processor, configured to execute the computer program, to implement the method according

to any one of claims 20 to 27.

36. A communication apparatus, comprising:

15 a memory, configured to store a computer program; and

a processor, configured to execute the computer program, to implement the method according

to any one of claims 28 to 32.

37. A communication system, wherein the communication system comprises:

the communication apparatus according to claim 33; and

20 the communication apparatus according to claim 34.

38. The communication system according to claim 37, wherein the communication system further comprises:

the communication apparatus according to claim 35.

39. A computer-readable storage medium, wherein the computer-readable storage medium

25 stores computer program code; and when the computer program code is executed by a processing circuit, the method according to any one of claims 1 to 32 is implemented.

40. A chip system, wherein the chip system comprises a processing circuit and a storage medium, wherein the storage medium stores computer program code; and when the computer program code is executed by the processing circuit, the method according to any one of claims 1 to 32 is implemented.