## CLAIMS

What is claimed is:

~~1. A method for guaranteeing data transmission, applied to a terminal and comprising:~~

~~obtaining information of a first internet protocol security (IPsec) tunnel, wherein the first IPsec tunnel is an IPsec tunnel used for transmitting control signaling between the terminal and a second network; and~~

~~performing a first related operation for a tunnel of a first network based on the information of the first IPsec tunnel.~~

~~2. The method according to claim 1, wherein the performing a first related operation for a tunnel of a first network comprises at least one of the following:~~

~~making a request to the first network for establishing a first tunnel;~~

~~making a request to the first network for modifying a third tunnel to a first tunnel;~~

~~transmitting quality of service (QoS) information of a first tunnel to the first network;~~

~~transmitting modified QoS information of a third tunnel to the first network;~~

~~transmitting first QoS information to the first network;~~

~~setting uplink and/or downlink packet filter information in QoS information of a first tunnel to the information of the first IPsec tunnel;~~

~~setting uplink and/or downlink packet filter information in first QoS information to the information of the first IPsec tunnel;~~

~~modifying uplink and/or downlink packet filter information in QoS information of a third tunnel to the information of the first IPsec tunnel;~~

~~setting a traffic descriptor component type identifier in QoS information of a first tunnel to a security parameter index type;~~

~~setting a traffic descriptor component type identifier in first QoS information to a security parameter index type;~~

~~modifying a traffic descriptor component type identifier in QoS information of a third tunnel to a security parameter index type;~~

~~setting a first tunnel to a non-guaranteed bit rate (non-GBR) tunnel;~~

~~setting QoS information of a first tunnel or first QoS information to contain no GBR related QoS parameter information;~~

~~modifying a third tunnel to a non-GBR tunnel;~~

~~setting QoS information of a third tunnel to contain no GBR related QoS parameter information;~~

~~setting QoS class indication information in QoS information of a first tunnel to first QoS class indication information;~~

~~setting QoS class indication information in first QoS information to first QoS class indication information;~~

~~modifying QoS class indication information in QoS information of a third tunnel to first QoS class indication information;~~

~~setting a QoS priority in QoS information of a first tunnel to a first QoS priority;~~

~~setting a QoS priority in first QoS information to a first QoS priority;~~

~~modifying a QoS priority in QoS information of a third tunnel to a first QoS priority; and~~

~~transmitting the information of the first IPsec tunnel to the first network;~~

~~wherein~~

~~the first tunnel is used for transmitting data of the first IPsec tunnel, or used for transmitting control signaling between the terminal and the second network;~~

~~the third tunnel is a tunnel already established for the terminal and the first network; and~~

~~the first QoS information is new QoS information.~~

~~3. The method according to claim 2, wherein~~

~~the QoS information of a first tunnel, the modified QoS information of a third tunnel, and/or the first QoS information contains no GBR related QoS parameter information;~~

~~and/or~~

the QoS information of a first tunnel, the modified QoS information of a third tunnel, and/or the first QoS information comprises at least one of the following: uplink and/or downlink packet filter information, wherein the uplink and/or downlink packet filter information is the information of the first IPsec tunnel; a traffic descriptor component type identifier, wherein the traffic descriptor component type identifier is a security parameter index type; and QoS flow class indication information, wherein the QoS flow class indication information is first QoS class indication information.

4. The method according to claim 2, wherein after establishment of the first tunnel is completed, establishment of the first tunnel is granted, the first QoS information is granted, the modified QoS information of the third tunnel is granted, and/or the third tunnel is modified and converted to the first tunnel, the first related operation for a tunnel of a first network further comprises at least one of the following:

transmitting control signaling between the terminal and the second network or data of the first IPsec tunnel via the first tunnel;

switching control signaling between the terminal and the second network or data of the first IPsec tunnel to the first tunnel for transmission; and

establishing and/or saving an association between the first tunnel and the first IPsec tunnel;

and/or

after establishment of the first tunnel is rejected, modification of the third tunnel is rejected, granting the first QoS information is rejected, and/or the first tunnel is released, the first related operation for a tunnel of a first network further comprises at least one of the following: initiating a de-registration request to the second network, and turning into a de-registered state.

5. The method according to claim 2, wherein

the first tunnel and/or the third tunnel is a QoS flow;

and/or

the first tunnel is a first QoS flow or a QoS flow in a first PDU session;

and/or

the third tunnel is an existing QoS flow in a first PDU session;

~~and/or~~

~~the first tunnel is a first QoS flow, and the making a request to the first network for establishing a first tunnel comprises at least one of the following:~~

~~making a request to the first network for establishing a first QoS flow in a first PDU session; and~~

~~transmitting to the first network a request for modifying a first PDU session or for establishing a first PDU session, wherein the request for modifying a first PDU session or for establishing a first PDU session contains QoS information of a first QoS flow requested to be established or first QoS information;~~

~~and/or~~

~~the first tunnel is a first QoS flow, the third tunnel is an existing QoS flow in a first PDU session, and the making a request to the first network for modifying a third tunnel to a first tunnel comprises at least one of the following:~~

~~making a request to the first network for modifying a third QoS flow in a first PDU session; and~~

~~transmitting to the first network a request for modifying a first PDU session, wherein the request for modifying a first PDU session contains QoS information of a third QoS flow requested to be modified;~~

~~wherein the first PDU session is a PDU session in the first network used for transmitting information between the terminal and the second network;~~

~~and/or~~

~~the first QoS class indication information and/or the first priority is used for indicating a request for a separate radio bearer resource;~~

~~and/or~~

~~the first QoS class indication information comprises at least one of the following: an operator specific QoS class indication; a non-standardized first QoS class indication, wherein the non-standardized first QoS class indication takes a value of 5 or 69; and a non-GBR QoS class indication;~~

~~and/or~~

~~the first priority information takes a value of 5.~~

~~6. The method according to any one of claims 1 to 5, wherein~~

~~the information of the first IPsec tunnel comprises at least one of the following: an identifier of the first IPsec tunnel, a protocol field indicating encapsulating security payload (ESP), a security parameter index (SPI) of the first IPsec tunnel, and information of the second network associated with the first IPsec tunnel.~~

~~7. The method according to claim 1, wherein the obtaining information of a first IPsec tunnel comprises:~~

~~obtaining the information of the first IPsec tunnel from a proxy network element.~~

~~8~~1. A method for guaranteeing data transmission, applied to a terminal and comprising:

obtaining information of an ~~data~~ IPsec tunnel ~~and/or information of a tunnel between the terminal and a second network, wherein the data IPsec tunnel is an IPsec tunnel used for transmitting user plane data between the terminal and the second network, or data of the tunnel between the terminal and the second network~~; and

performing a ~~second~~ related operation for a tunnel of a first network based on the information of the ~~data~~ IPsec tunnel ~~and/or the information of the tunnel between the terminal and the second network;~~.

wherein the obtaining information of the IPsec tunnel comprises: obtaining information of a data IPsec tunnel, or obtaining information of a first IPsec tunnel;

wherein the data IPsec tunnel is an IPsec tunnel used for transmitting user plane data between the terminal and a second network, or data of the tunnel between the terminal and the second network;

wherein the first IPsec tunnel is an IPsec tunnel used for transmitting control signaling between the terminal and the second network;

in a case that the obtaining information of the IPsec tunnel comprises obtaining information of the data IPsec tunnel, performing the related operation for the tunnel of the first network based on the information of the IPsec tunnel comprises: performing a second related operation for the tunnel of the first network based on the information of the data IPsec tunnel;

~~9. The method according to claim 8,~~ wherein the performing a second related operation for a tunnel of a first network comprises at least one of the following:

making a request to the first network for establishing a second tunnel;

~~making a request to the first network for modifying a fourth tunnel;~~

~~transmitting quality of service (QoS) information of a second tunnel to the first network;~~

~~transmitting modified QoS information of a fourth tunnel to the first network;~~

~~transmitting second QoS information to the first network;~~

requesting the first network to provide a standalone second tunnel ~~or separate second QoS information~~ for each data IPsec tunnel;

~~requesting the first network to provide a standalone second tunnel or separate second QoS information for the data IPsec tunnel;~~

~~requesting the first network to provide one second tunnel for a plurality of data IPsec tunnels, or to map data of a plurality of data IPsec tunnels to one second tunnel or one piece of second QoS information;~~

~~modifying a fourth tunnel for the data IPsec tunnel;~~

~~mapping the data IPsec tunnel to a fourth tunnel;~~

wherein ~~setting~~ uplink and/or downlink packet filter information in QoS information of ~~a~~ the second tunnel ~~to~~ is the information of the data IPsec tunnel; or,

~~setting uplink and/or downlink packet filter information in second QoS information to the information of the data IPsec tunnel;~~

~~modifying uplink and/or downlink packet filter information in QoS information of a fourth tunnel to the information of the data IPsec tunnel, or adding the information of the data IPsec tunnel to uplink and/or downlink packet filter information in QoS information of a fourth tunnel;~~

wherein~~setting~~ a traffic descriptor component type identifier in QoS information of the~~a~~ second tunnel ~~to~~ is a security parameter index type; or,

~~setting a traffic descriptor component type identifier in second QoS information to a security parameter index type;~~

~~modifying a traffic descriptor component type identifier in QoS information of a fourth tunnel to a security parameter index type;~~

wherein~~setting~~ QoS parameter information in QoS information of ~~a~~ the second tunnel ~~to~~ is QoS parameter information corresponding to a tunnel, associated with the data IPsec tunnel, between the terminal and the second network;

~~setting QoS parameter information in second QoS information to QoS flow description information corresponding to a tunnel, associated with the data IPsec tunnel, between the terminal and the second network;~~

~~modifying QoS parameter information in QoS information of a fourth tunnel to QoS parameter information corresponding to a tunnel, associated with the data IPsec tunnel, between the terminal and the second network, or adding such QoS parameter information to QoS parameter information in QoS information of a fourth tunnel; and~~

~~transmitting the information of the data IPsec tunnel to the first network;~~

wherein

the second tunnel is used for transmitting data of the data IPsec tunnel;~~, or used for transmitting data of the tunnel between the terminal and the second network, or used for transmitting user plane data between the terminal and the second network;~~

~~the fourth tunnel is a tunnel already established for the terminal and the first network; and~~

~~the second QoS information is new QoS information.~~

in a case that the obtaining information of the IPsec tunnel comprises obtaining information of the first IPsec tunnel, performing the related operation for the tunnel of the first network based on the information of the IPsec tunnel comprises: performing a first related operation for the tunnel of the first network based on the information of the first IPsec tunnel;

wherein the performing thee first related operation for a tunnel of a first network comprises at least one of the following:

making a request to the first network for establishing a first tunnel;

wherein uplink and/or downlink packet filter information in QoS information of the first tunnel is the information of the first IPsec tunnel; or,

wherein a traffic descriptor component type identifier in QoS information of the first tunnel is a security parameter index type;

wherein the first tunnel is used for transmitting data of the first IPsec tunnel, or used for transmitting control signaling between the terminal and the second network.

~~10~~2. The method according to claim ~~9~~1, wherein

the second tunnel is second QoS flow;

wherein making the request to the first network for establishing the second tunnel comprises: sending a second PDU session modification request to the first network, wherein the second PDU session modification request comprises: a QoS rule requesting to establish the second QoS flow, and/or QoS flow description information requesting to establish the second QoS flow.~~the QoS information of a second tunnel, and/or the second QoS information comprises at least one of the following: uplink and/or downlink packet filter information, wherein the uplink and/or downlink packet filter information is the information of the data IPsec tunnel; a traffic descriptor component type identifier, wherein the traffic descriptor component type identifier is a security parameter index type; and QoS parameter information, wherein the QoS parameter information is QoS parameter information corresponding to the tunnel, associated with the data IPsec tunnel, between the terminal and the second network;~~

~~and/or~~

~~the modified QoS information of a fourth tunnel comprises at least one of the following: uplink packet filter information, wherein the uplink packet filter information is the information of the data IPsec tunnel or contains the information of the data IPsec tunnel; downlink packet filter information, wherein the downlink packet filter information is or contains the information of the data IPsec tunnel; a traffic descriptor component type identifier, wherein the traffic descriptor component type identifier is a security parameter index type; and QoS parameter information, wherein the QoS parameter information is or contains QoS parameter information corresponding to the tunnel, associated with the data IPsec tunnel, between the terminal and the second network.~~

3. The method according to claim 2, the QoS flow description information comprises QoS parameter information.

4. The method according to claim 1, wherein

the QoS information comprises at least one of following: a QoS rule, QoS flow description information, wherein the QoS flow description information comprises QoS parameter information;

wherein the QoS rule comprises at least one of following: the uplink and/or downlink packet filter information, the traffic descriptor component type identifier.

5. The method according to any one of claims 1 ~~or~~ ~~4~~, wherein

the QoS parameter information comprises a QoS class indication.

6. The method according to claim 5, wherein

the QoS class indication comprises 5QI or QCI.

~~11~~7. The method according to any one of claims ~~9~~1-6, wherein

after establishment of the second tunnel is completed~~, granted QoS information sent by the first network is received containing second QoS information, second QoS information is granted by the first network, and/or transmission from the first network for granting establishment of the first tunnel is received~~, the performing a second related operation for a tunnel of a first network further comprises at least one of the following:

transmitting, via the second tunnel, data of the data IPsec tunnel~~, data of the tunnel between the terminal and the second network, or user plane data between the terminal and the second network~~;

~~switching data of the data IPsec tunnel, data of the tunnel between the terminal and the second network, or user plane data between the terminal and the second network to the second tunnel for transmission; and~~

establishing and/or saving an association between the second tunnel and the data IPsec tunnel.~~;~~

~~and/or~~

~~after modification of the fourth tunnel is completed, granted QoS information sent by the first network is received containing third QoS information, third QoS information is granted by the first network, and/or transmission from the first network~~

~~for granting modification of a third tunnel is received, the performing a second related operation for a tunnel of a first network further comprises at least one of the following:~~

~~transmitting data of the data IPsec tunnel via the fourth tunnel;~~

~~switching data of the data IPsec tunnel to the fourth tunnel for transmission; and~~

~~updating an association between the fourth tunnel and an IPsec tunnel, wherein the IPsec tunnel associated with the fourth tunnel comprises a data IPsec tunnel;~~

~~and/or~~

~~after establishment of the second tunnel is rejected, modification of the fourth tunnel is rejected, granting the second QoS information is rejected, and/or the second tunnel is released, the second related operation for a tunnel of a first network further comprises at least one of the following: making a request to the second network for releasing a tunnel, associated with a second IPsec tunnel, between the terminal and the second network, and returning to the second network that the tunnel, associated with a second IPsec, between the terminal and the second network fails to be established.~~

~~12~~8. The method according to any one of claims ~~9~~1-6, wherein

when a first condition is met, the first network is requested to provide a standalone second tunnel for the data IPsec tunnel~~, or the first network is requested to provide separate second QoS information for the data IPsec tunnel~~, wherein

the first condition comprises at least one of the following:

the tunnel, associated with the data IPsec tunnel, between the terminal and the second network is a GBR tunnel or contains GBR related QoS parameter information;

a QoS class indication of the tunnel, associated with the data IPsec tunnel, between the terminal and the second network takes a value of N, wherein N is one of the following: 1, 5, 69, and 70;

the tunnel, associated with the data IPsec tunnel, between the terminal and the second network is a tunnel carrying voice traffic;

the tunnel, associated with the data IPsec tunnel, between the terminal and the second network is a tunnel carrying emergency traffic;

the tunnel, associated with the data IPsec tunnel, between the terminal and the second network is a tunnel carrying high priority traffic;

the obtained information of the tunnel between the terminal and the second network contains indication information of a separate bearer resource;

QoS information of the fourth tunnel is different from QoS information of the tunnel, associated with the data IPsec tunnel, between the terminal and the second network;

a QoS class indication of the fourth tunnel is different from a QoS class indication of the tunnel, associated with the data IPsec tunnel, between the terminal and the second network;

GBR related QoS parameter information of the fourth tunnel is different from GBR related QoS parameter information of the tunnel, associated with the data IPsec tunnel, between the terminal and the second network;

a priority of the fourth tunnel is different from a priority of the tunnel, associated with the data IPsec tunnel, between the terminal and the second network;

no fourth tunnel is a non-GBR tunnel, and the tunnel, associated with the data IPsec tunnel, between the terminal and the second network is a non-GBR tunnel; and

uplink and/or downlink packet filter information of the fourth tunnel contains no information of the data IPsec tunnel.~~;~~

9. The method according to any one of claims 1-6, wherein~~and/or~~

when a second condition is met, the first network is requested to provide one second tunnel for a plurality of data IPsec tunnels~~, the first network is requested to provide one piece of second QoS information for a plurality of data IPsec tunnels, to map data of a plurality of data IPsec tunnels to one second tunnel, or to map data of a plurality of data IPsec tunnels to one piece of second QoS information~~,

wherein the second condition comprises at least one of the following:

the tunnel, associated with the data IPsec tunnel, between the terminal and the second network is a non-GBR tunnel or contains no GBR related QoS parameter; and

the obtained information of the tunnel between the terminal and the second network contains no indication information of a separate bearer resource, or contains indication information that no separate bearer resource is needed~~;~~

~~and/or~~

~~when a third condition is met, the fourth tunnel is modified for the data IPsec tunnel, wherein~~

~~the third condition comprises at least one of the following:~~

~~the tunnel, associated with the data IPsec tunnel, between the terminal and the second network is a non-GBR tunnel;~~

~~the obtained information of the tunnel between the terminal and the second network contains no indication information of a separate bearer resource, or contains indication information that no separate bearer resource is needed;~~

~~QoS information of the fourth tunnel is different from QoS information of the tunnel, associated with the data IPsec tunnel, between the terminal and the second network;~~

~~a QoS class indication of the fourth tunnel is the same as a QoS class indication of the tunnel, associated with the data IPsec tunnel, between the terminal and the second network;~~

~~GBR related QoS parameter information of the fourth tunnel is different from GBR related QoS parameter information of the tunnel, associated with the data IPsec tunnel, between the terminal and the second network;~~

~~a priority of the fourth tunnel is different from a priority of the tunnel, associated with the data IPsec tunnel, between the terminal and the second network;~~

~~the existing fourth tunnel is a non-GBR tunnel, and the tunnel, associated with the data IPsec tunnel, between the terminal and the second network is a non-GBR tunnel; and~~

~~uplink and/or downlink packet filter information of the fourth tunnel contains no information of the data IPsec tunnel;~~

~~and/or~~

~~when a fourth condition is met, the data IPsec tunnel is mapped to the fourth tunnel, wherein~~

~~the fourth condition comprises at least one of the following:~~

~~QoS information of the fourth tunnel is the same as QoS information of the tunnel, associated with the data IPsec tunnel, between the terminal and the second network;~~

~~a QoS parameter requirement of the fourth tunnel is higher than or the same as a QoS parameter requirement of the tunnel, associated with the data IPsec tunnel, between the terminal and the second network;~~

~~a QoS class indication of the fourth tunnel is higher than or the same as a QoS class indication of the tunnel, associated with the data IPsec tunnel, between the terminal and the second network;~~

~~the existing fourth tunnel is a non-GBR tunnel, and the tunnel, associated with the data IPsec tunnel, between the terminal and the second network is a non-GBR tunnel; and~~

~~uplink and/or downlink packet filter information of the fourth tunnel contains information of the data IPsec tunnel~~.

~~13~~10. The method according to any one of claims 1-6~~9~~, wherein

when the data IPsec tunnel is associated with one tunnel between the terminal and the second network, the setting QoS parameter information of a second tunnel to QoS parameter information corresponding to a tunnel, associated with the data IPsec tunnel, between the terminal and the second network comprises ~~at least one of the following~~:

setting or modifying a QoS class indication of the second tunnel to a QoS class indication corresponding to the tunnel, associated with the data IPsec tunnel, between the terminal and the second network.~~;~~

~~setting or modifying a priority of the second tunnel to a priority of the tunnel, associated with the data IPsec tunnel, between the terminal and the second network;~~

~~setting or modifying a packet delay budget of the second tunnel to a packet delay budget of the tunnel, associated with the data IPsec tunnel, between the terminal and the second network;~~

~~setting or modifying a packet error rate of the second tunnel to a packet error rate of the tunnel, associated with the data IPsec tunnel, between the terminal and the second network;~~

~~setting or modifying a default maximum data burst volume of the second tunnel to a default maximum data burst volume of the tunnel, associated with the data IPsec tunnel, between the terminal and the second network;~~

~~setting or modifying a default averaging window of the second tunnel to a default averaging window of the tunnel, associated with the data IPsec tunnel, between the terminal and the second network;~~

~~when no averaging window is present for the tunnel, associated with the data IPsec tunnel, between the terminal and the second network, setting or modifying the second tunnel to have no default averaging window;~~

~~setting or modifying an uplink GBR or GFBR of the second tunnel to an uplink GBR or GFBR of the tunnel, associated with the data IPsec tunnel, between the terminal and the second network;~~

~~setting or modifying a downlink GBR or GFBR of the second tunnel to a downlink GBR or GFBR of the tunnel, associated with the data IPsec tunnel, between the terminal and the second network;~~

~~setting or modifying an uplink MBR or MFBR of the second tunnel to an uplink MBR or MFBR of the tunnel, associated with the data IPsec tunnel, between the terminal and the second network; and~~

~~setting or modifying a downlink MBR or MFBR of the second tunnel to a downlink MBR or MFBR of the tunnel, associated with the data IPsec tunnel, between the terminal and the second network;~~

~~and/or~~

11. The method according to any one of claims 1-6, wherein

when a multi-tunnel condition is met, the setting QoS parameter information of a second tunnel to QoS parameter information corresponding to a tunnel, associated with the data IPsec tunnel, between the terminal and the second network comprises at least one of the following:

setting or modifying QoS parameter information of the second tunnel to QoS parameter information having a highest QoS requirement in QoS parameter information corresponding to the tunnels, associated with the data IPsec tunnel, between the terminal and the second network;

setting or modifying a QoS class indication of the second tunnel to a QoS class indication having a highest priority in QoS class indications corresponding to the

tunnels, associated with the data IPsec tunnel, between the terminal and the second network;

when there is no standardized QoS class indication corresponding to a combination of the following QoS parameter information of the second tunnel: a priority, a packet delay budget, a packet error rate, a maximum data burst volume, whether it is GBR, and/or whether a default averaging window requirement is set, setting or modifying a QoS class indication of the second tunnel to be a non-standardized QoS class indication or contain no QoS class indication;

~~when there is no standardized QoS class indication corresponding to QoS parameter information of the second tunnel except for a QoS class indication, setting or modifying the QoS class indication of the second tunnel to be a non-standardized QoS class indication or contain no QoS class indication;~~

~~setting or modifying a priority of the second tunnel to a priority with a highest value in priorities corresponding to the tunnels, associated with the data IPsec tunnel, between the terminal and the second network;~~

~~setting or modifying a packet delay budget of the second tunnel to a packet delay budget with a lowest value in packet delay budgets corresponding to the tunnels, associated with the data IPsec tunnel, between the terminal and the second network;~~

~~setting or modifying a packet error rate of the second tunnel to a packet error rate with a lowest value in packet error rates corresponding to the tunnels, associated with the data IPsec tunnel, between the terminal and the second network; and~~

~~setting or modifying a default maximum data burst volume of the second tunnel to a default maximum data burst volume with a largest value in default maximum data burst volumes corresponding to the tunnels, associated with the data IPsec tunnel, between the terminal and the second network;~~

~~when a tunnel requiring an averaging window is present in the tunnels, associated with the data IPsec tunnel, between the terminal and the second network, setting or modifying the second tunnel to have a default averaging window requirement;~~

~~when a GBR tunnel is present in the tunnels, associated with the data IPsec tunnel, between the terminal and the second network, performing at least one of the following:~~

~~setting or modifying the second tunnel to a GBR tunnel;~~

~~setting or modifying a GFBR or GBR of the second tunnel to a largest value in GFBRs or GBRs corresponding to the plurality of tunnels, associated with the data IPsec tunnel, of the second network;~~

~~setting or modifying an MFBR or MBR of the second tunnel to a largest value in MFBRs or MBRs corresponding to the plurality of tunnels, associated with the data IPsec tunnel, of the second network;~~

~~setting or modifying an uplink GFBR or GBR of the second tunnel to a largest value in uplink GFBRs or GBRs corresponding to the plurality of tunnels, associated with the data IPsec tunnel, of the second network;~~

~~setting or modifying an uplink MFBR or MBR of the second tunnel to a largest value in uplink MFBRs or MBRs corresponding to the plurality of tunnels, associated with the data IPsec tunnel, of the second network;~~

~~setting or modifying a downlink GFBR or GBR of the second tunnel to a largest value in downlink GFBRs corresponding to the plurality of tunnels, associated with the data IPsec tunnel, of the second network; and~~

~~setting or modifying a downlink MFBR or MBR of the second tunnel to a largest value in downlink MFBRs corresponding to the plurality of tunnels, associated with the data IPsec tunnel, of the second network;~~

~~when the data IPsec tunnel is associated with a tunnel having a QoS class indication of N between the terminal and the second network, setting or modifying a QoS class indication of the second tunnel to N, or modifying a QoS class indication of the fourth tunnel to N, wherein a value of N is obtained from the first network or comprises one of the following: 1, 5, 69, and 70;~~

~~when the data IPsec tunnel is associated with a tunnel carrying voice traffic between the terminal and the second network, setting or modifying QoS parameter information of the second tunnel to QoS parameter information corresponding to voice traffic;~~

~~when the data IPsec tunnel is associated with a tunnel carrying emergency traffic between the terminal and the second network, setting or modifying QoS parameter~~

~~information of the second tunnel to QoS parameter information corresponding to emergency traffic;~~

~~when the data IPsec tunnel is associated with a tunnel carrying high priority traffic between the terminal and the second network, setting or modifying QoS parameter information of the second tunnel to QoS parameter information corresponding to high priority traffic;~~

~~when a standardized QoS class indication is present for a QoS flow of the second network contained in the data IPsec tunnel, setting or modifying a QoS class indication of the second tunnel to the standardized QoS class indication; and~~

~~setting QoS parameter information of the second tunnel to QoS parameter information corresponding to a tunnel, newly associated with the data IPsec tunnel, between the terminal and the second network,~~

wherein the multi-tunnel condition comprises at least one of the following:

the data IPsec tunnel is associated with a plurality of tunnels of the second network;

the data IPsec tunnel is newly associated with a tunnel between the terminal and the second network, and the newly associated tunnel between the terminal and the second network has a highest QoS requirement in the tunnels, associated with the data IPsec tunnel, between the terminal and the second network; and

the data IPsec tunnel removes association with a tunnel between the terminal and the second network, and the association-removed tunnel between the terminal and the second network has a higher QoS requirement than the tunnels, associated with the data IPsec tunnel, between the terminal and the second network.

~~14. The method according to claim 9, wherein when the data IPsec tunnel is associated with a plurality of tunnels of the second network, the modifying QoS parameter information of a fourth tunnel to QoS parameter information corresponding to a tunnel, associated with the data IPsec tunnel, between the terminal and the second network comprises at least one of the following:~~

~~modifying the QoS parameter information of the fourth tunnel to QoS parameter information having a highest QoS requirement in QoS parameter information~~

~~corresponding to the tunnels, associated with the data IPsec tunnel, between the terminal and the second network;~~

~~modifying a QoS class indication of the fourth tunnel to a QoS class indication having a highest priority in QoS class indications corresponding to the tunnels, associated with the data IPsec tunnel, between the terminal and the second network;~~

~~when there is no standardized QoS class indication corresponding to a combination of the following QoS parameter information of the fourth tunnel: a priority, a packet delay budget, a packet error rate, a maximum data burst volume, whether a GBR is set, and/or whether a default averaging window requirement is set, modifying a QoS class indication of the fourth tunnel to be a non-standardized QoS class indication or contain no QoS class indication;~~

~~when there is no standardized QoS class indication corresponding to QoS parameter information of the fourth tunnel except for a QoS class indication, modifying the QoS class indication of the fourth tunnel to be a non-standardized QoS class indication or contain no QoS class indication;~~

~~modifying a priority of the fourth tunnel to a priority with a highest value in priorities corresponding to the tunnels, associated with the data IPsec tunnel, between the terminal and the second network;~~

~~modifying a packet delay budget of the fourth tunnel to a packet delay budget with a lowest value in packet delay budgets corresponding to the tunnels, associated with the data IPsec tunnel, between the terminal and the second network;~~

~~modifying a packet error rate of the fourth tunnel to a packet error rate with a lowest value in packet error rates corresponding to the tunnels, associated with the data IPsec tunnel, between the terminal and the second network;~~

~~modifying a default maximum data burst volume of the fourth tunnel to a default maximum data burst volume with a largest value in default maximum data burst volumes corresponding to the tunnels, associated with the data IPsec tunnel, between the terminal and the second network; and~~

~~when a tunnel requiring an averaging window is present in the tunnels, associated with the data IPsec tunnel, between the terminal and the second network, modifying the fourth tunnel to have a default averaging window requirement;~~

~~when a GBR tunnel is present in the tunnels, associated with the data IPsec tunnel, between the terminal and the second network, performing at least one of the following:~~

~~modifying the fourth tunnel to a GBR tunnel;~~

~~modifying a GFBR or GBR of the fourth tunnel to a largest value in GFBRs or GBRs corresponding to the plurality of tunnels, associated with the data IPsec tunnel, of the second network;~~

~~modifying an MFBR or MBR of the fourth tunnel to a largest value in MFBRs or MBRs corresponding to the plurality of tunnels, associated with the data IPsec tunnel, of the second network;~~

~~modifying an uplink GFBR or GBR of the fourth tunnel to a largest value in uplink GFBRs or GBRs corresponding to the plurality of tunnels, associated with the data IPsec tunnel, of the second network;~~

~~modifying an uplink MFBR or MBR of the fourth tunnel to a largest value in uplink MFBRs or MBRs corresponding to the plurality of tunnels, associated with the data IPsec tunnel, of the second network;~~

~~modifying a downlink GFBR or GBR of the fourth tunnel to a largest value in downlink GFBRs corresponding to the plurality of tunnels, associated with the data IPsec tunnel, of the second network; and~~

~~modifying a downlink MFBR or MBR of the fourth tunnel to a largest value in downlink MFBRs corresponding to the plurality of tunnels, associated with the data IPsec tunnel, of the second network;~~

~~when the data IPsec tunnel is associated with a tunnel having a QoS class indication of N between the terminal and the second network, modifying a QoS class indication of the fourth tunnel to N, wherein a value of N is obtained from the first network or comprises one of the following: 1, 5, 69, and 70;~~

~~when the data IPsec tunnel is associated with a tunnel carrying voice traffic between the terminal and the second network, modifying QoS parameter information of the fourth tunnel to QoS parameter information corresponding to voice traffic;~~

~~when the data IPsec tunnel is associated with a tunnel carrying emergency traffic between the terminal and the second network, modifying QoS parameter information of the fourth tunnel to QoS parameter information corresponding to emergency traffic;~~

~~when the data IPsec tunnel is associated with a tunnel carrying high priority traffic between the terminal and the second network, modifying QoS parameter information of the fourth tunnel to QoS parameter information corresponding to high priority traffic; and~~

~~when a standardized QoS class indication is present for a QoS flow of the second network contained in the data IPsec tunnel, modifying a QoS class indication of the fourth tunnel to the standardized QoS class indication.~~

~~15. The method according to any one of claims 9 to 14, wherein~~

~~the second tunnel and/or the fourth tunnel is a QoS flow;~~

~~and/or~~

~~the second tunnel is a second QoS flow or a QoS flow in a first protocol data unit (PDU) session;~~

~~and/or~~

~~the fourth tunnel is an existing QoS flow in a first PDU session;~~

~~and/or~~

~~a tunnel between the terminal and the second network is a QoS flow between the terminal and the second network;~~

~~and/or~~

~~a tunnel between the terminal and the second network is a QoS flow of the second network;~~

~~and/or~~

~~the second tunnel is a second QoS flow, and the making a request to the first network for establishing a second tunnel comprises at least one of the following:~~

~~making a request to the first network for adding a second QoS flow in a first PDU session; and~~

~~transmitting to the first network a request for modifying a first PDU session or for establishing a first PDU session, the request for modifying a first PDU session or for establishing a first PDU session containing QoS information of a second QoS flow requested to be established;~~

~~and/or~~

~~the second tunnel is a second QoS flow, the fourth tunnel is an existing QoS flow in a first PDU session, and the making a request to the first network for modifying a fourth tunnel to a first tunnel comprises at least one of the following:~~

~~making a request to the first network for modifying a fourth QoS flow in a first PDU session; and~~

~~transmitting to the first network a request for modifying a first PDU session, wherein the request for modifying a first PDU session contains QoS information of a fourth QoS flow requested to be modified, and~~

~~the first PDU session is a PDU session in the first network used for transmitting information between the terminal and the second network.~~

~~16~~12. The method according to any one of claims 1-11~~8~~, wherein

the information of the data IPsec tunnel comprises at least one of the following: an identifier of the data IPsec tunnel, a protocol field indicating encapsulating security payload (ESP), a security parameter index of the data IPsec tunnel, and identifier information of a tunnel, associated with the data IPsec tunnel, between the terminal and the second network;

and/or

the information of the first IPsec tunnel comprises: at least one of the following: an identifier of the first IPsec tunnel, a protocol field indicating ~~encapsulating security payload (~~ESP~~)~~, a security parameter index (SPI) of the first IPsec tunnel, and information of the second network associated with the first IPsec tunnel~~the information of the tunnel between the terminal and the second network comprises at least one of the following: an identifier of the data IPsec tunnel associated with the tunnel between the~~

~~terminal and the second network, a security parameter index of the data IPsec tunnel associated with the tunnel between the terminal and the second network, a new tunnel between the terminal and the second network, a removed tunnel between the terminal and the second network, QoS parameter information of the tunnel between the terminal and the second network, indication information of a separate bearer resource, and indication information that no separate bearer resource is needed~~.

~~17~~13. The method according to any one of claims 1-11~~8~~, wherein the obtaining information of ~~a data~~the IPsec tunnel~~ and/or information of a tunnel between the terminal and a second network~~ comprises:

obtaining the information of the ~~data~~ IPsec tunnel from a proxy network element ~~and/or obtaining the information of the tunnel between the terminal and the second network from the second network~~.

14. The method according to claim 1, wherein

the first tunnel is first QoS flow;

wherein the performing a first related operation for a tunnel of a first network comprises: sending a first PDU session modification request to the first network, wherein the first PDU session modification request comprises: a QoS rule requesting to establish a QoS rule of the first QoS flow, and/or QoS flow description information requesting to establish the first QoS flow.

~~18~~15. A terminal, comprising a processor, a memory, and a program that is stored in the memory and capable of running on the processor, wherein when the program is executed by the processor, the processor is configured to implement the method for guaranteeing data transmission according to any one of claims 1-14.~~:~~

~~obtaining information of a data IPsec tunnel and/or information of a tunnel between the terminal and a second network, wherein the data IPsec tunnel is an IPsec tunnel used for transmitting user plane data between the terminal and the second network, or data of the tunnel between the terminal and the second network; and~~

~~performing a second related operation for a tunnel of a first network based on the information of the data IPsec tunnel and/or the information of the tunnel between the terminal and the second network.~~

~~19. The terminal according to claim 18, wherein the performing a second related operation for a tunnel of a first network comprises at least one of the following:~~

~~making a request to the first network for establishing a second tunnel;~~

~~making a request to the first network for modifying a fourth tunnel;~~

~~transmitting quality of service (QoS) information of a second tunnel to the first network;~~

~~transmitting modified QoS information of a fourth tunnel to the first network;~~

~~transmitting second QoS information to the first network;~~

~~requesting the first network to provide a standalone second tunnel or separate second QoS information for each data IPsec tunnel;~~

~~requesting the first network to provide a standalone second tunnel or separate second QoS information for the data IPsec tunnel;~~

~~requesting the first network to provide one second tunnel for a plurality of data IPsec tunnels, or to map data of a plurality of data IPsec tunnels to one second tunnel or one piece of second QoS information;~~

~~modifying a fourth tunnel for the data IPsec tunnel;~~

~~mapping the data IPsec tunnel to a fourth tunnel;~~

~~setting uplink and/or downlink packet filter information in QoS information of a second tunnel to the information of the data IPsec tunnel;~~

~~setting uplink and/or downlink packet filter information in second QoS information to the information of the data IPsec tunnel;~~

~~modifying uplink and/or downlink packet filter information in QoS information of a fourth tunnel to the information of the data IPsec tunnel, or adding the information of the data IPsec tunnel to uplink and/or downlink packet filter information in QoS information of a fourth tunnel;~~

~~setting a traffic descriptor component type identifier in QoS information of a second tunnel to a security parameter index type;~~