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(54) **INTER-RAT CELL RESELECTION METHOD, TERMINAL, AND NETWORK SIDE DEVICE**

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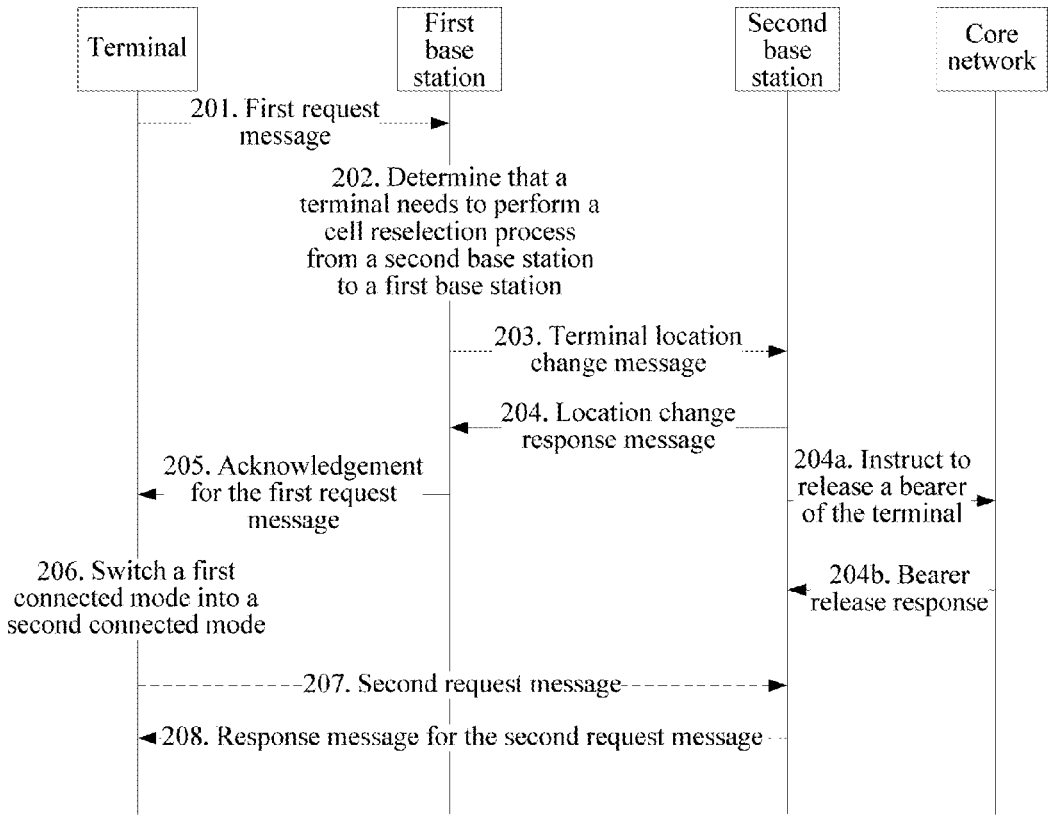
(57) **ABSTRACT**

The present invention discloses an inter-RAT cell reselection method, a terminal, and a network side device. The method is: sending, by a terminal, a first request message to a first base station, where the first request message carries first cause indication information, the first cause indication information indicates that the terminal needs to perform a cell reselection process from a second base station to the first base station, the first base station is located in a first radio access technology (RAT) system, the second base station is located in a second RAT system, the terminal is in a first connected mode when connecting to the second base station, and the first RAT system does not support the first connected mode; and receiving, by the terminal, an acknowledgement returned by the first base station for the first request message, and switching the first connected mode into a second connected mode based on the acknowledgement, where the first RAT system supports the second connected mode.



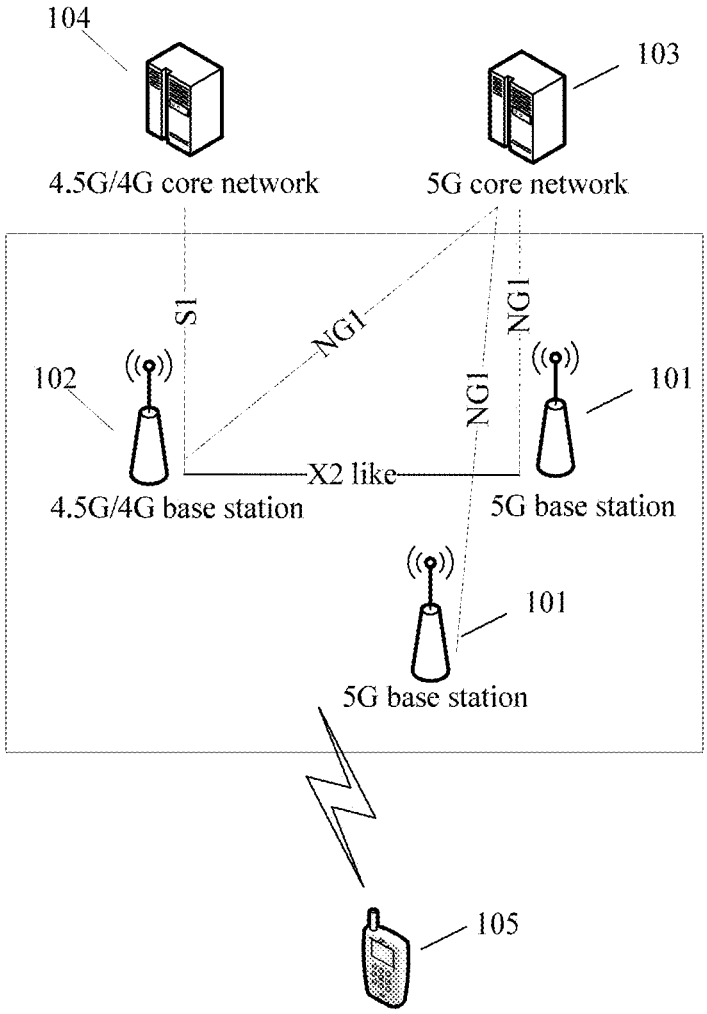

104
103
4.5G/4G core network
5G core network
S1
NG1
NG1
NG1
102
101
X2 like
4.5G/4G base station
5G base station
101
5G base station
105

FIG. 1

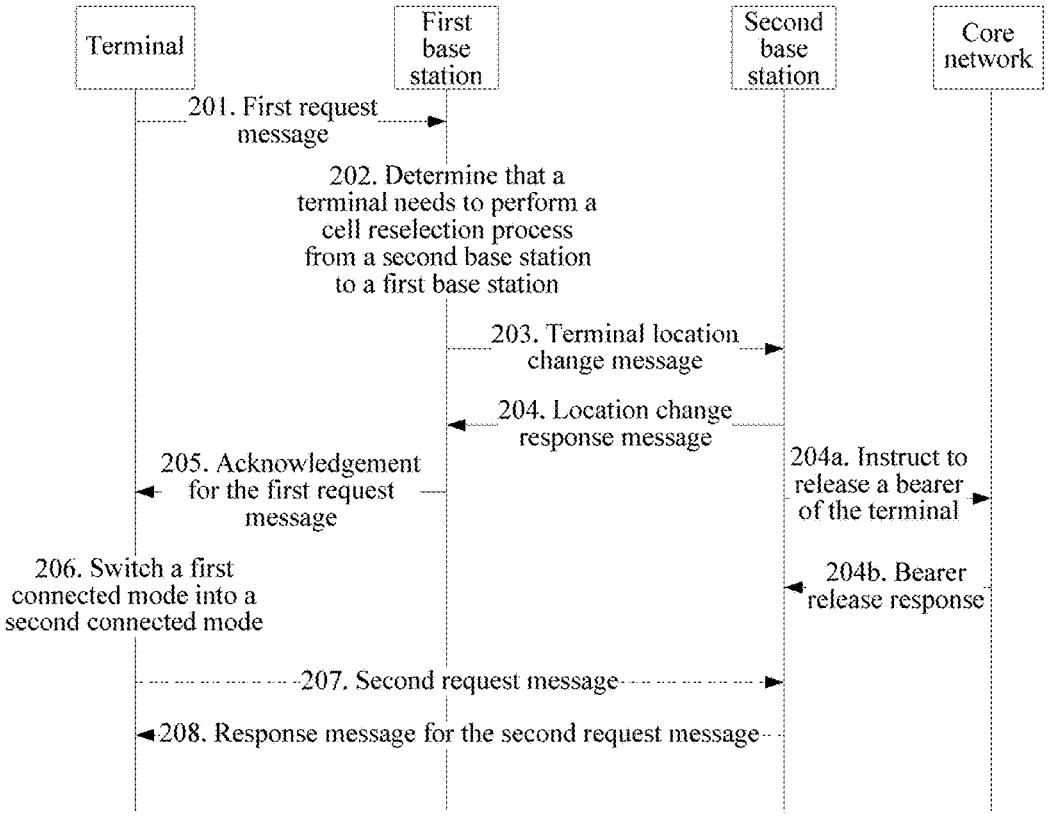

Terminal
First base station
Second base station
Core network
201. First request message
202. Determine that a terminal needs to perform a cell reselection process from a second base station to a first base station
203. Terminal location change message
204. Location change response message
205. Acknowledgement for the first request message
204a. Instruct to release a bearer of the terminal
206. Switch a first connected mode into a second connected mode
204b. Bearer release response
207. Second request message
208. Response message for the second request message

FIG. 2

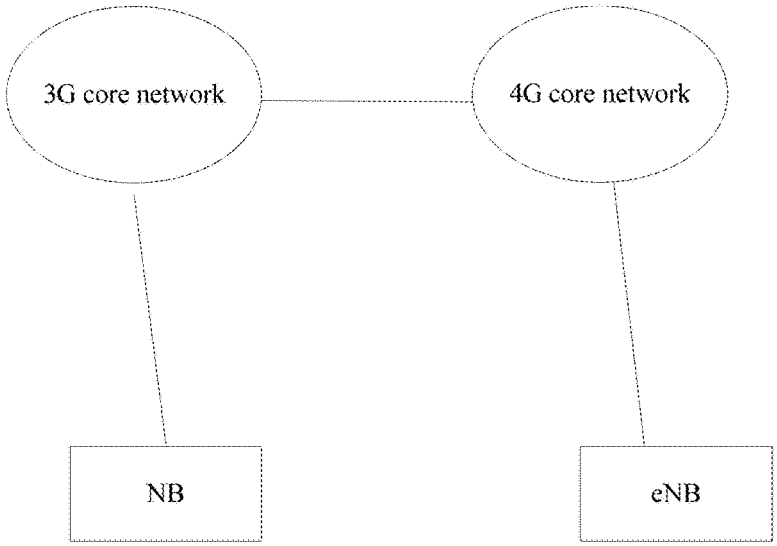

3G core network
4G core network
NB
eNB

FIG. 3

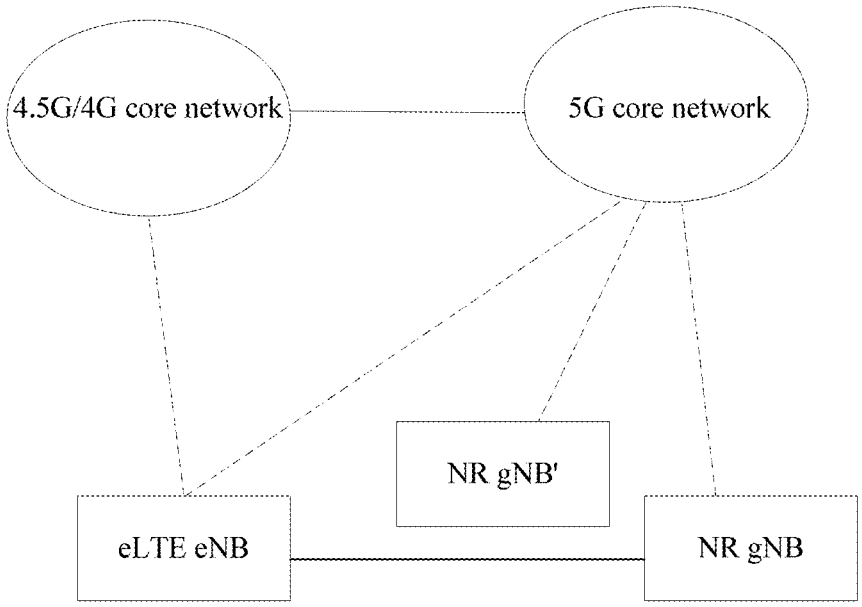

4.5G/4G core network
5G core network
NR gNB'
eLTE eNB
NR gNB

FIG. 4a

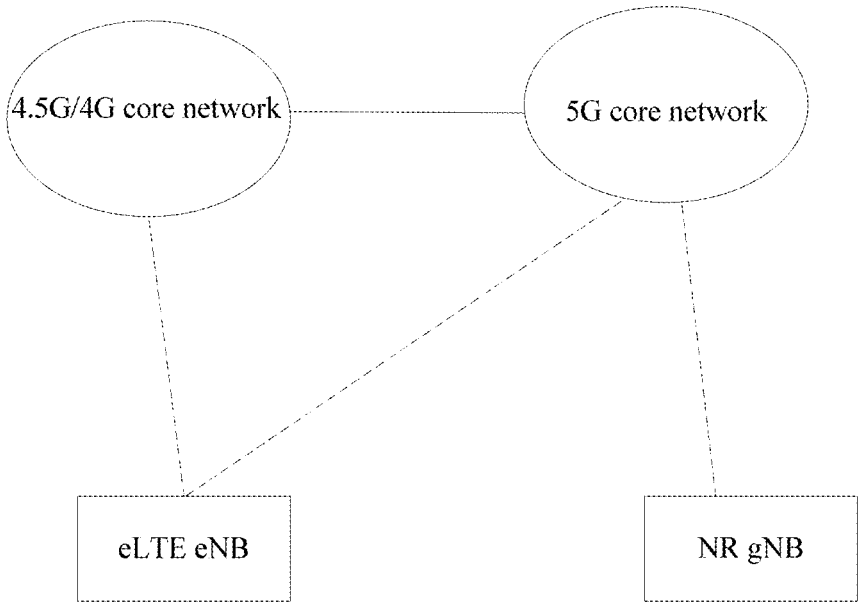

4.5G/4G core network
5G core network
eLTE eNB
NR gNB

FIG. 4b

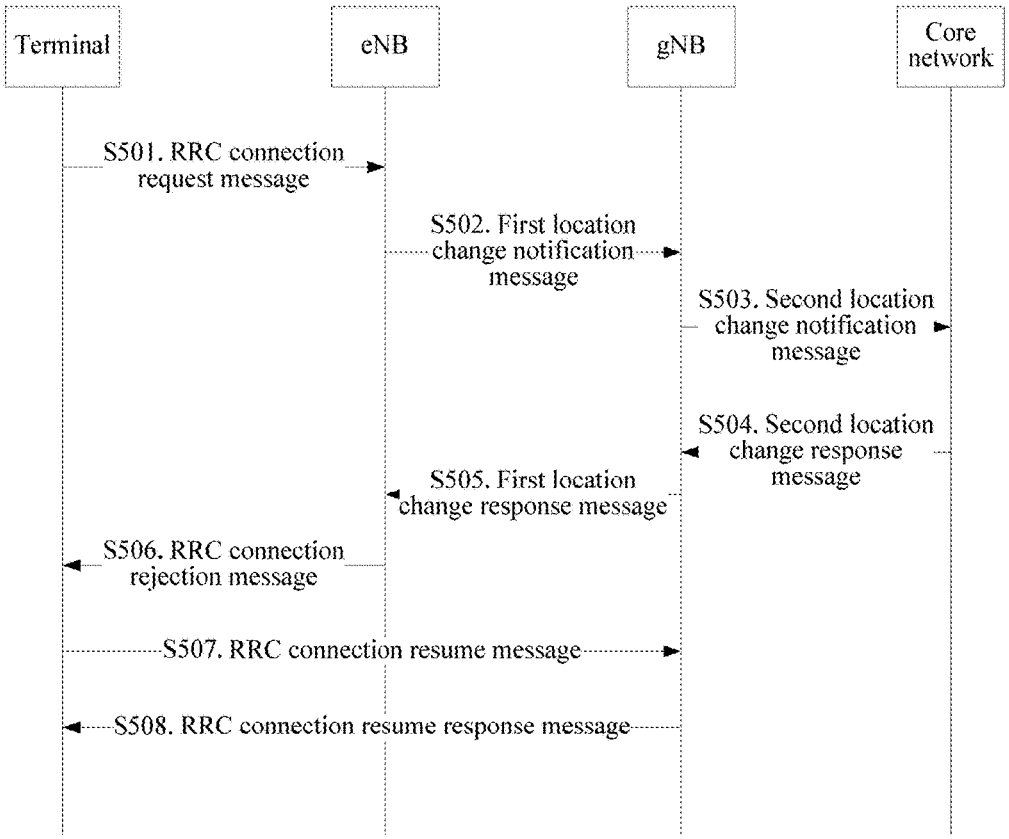

Terminal
eNB
gNB
Core network
S501. RRC connection request message
S502. First location change notification message
S503. Second location change notification message
S504. Second location change response message
S505. First location change response message
S506. RRC connection rejection message
S507. RRC connection resume message
S508. RRC connection resume response message

FIG. 5

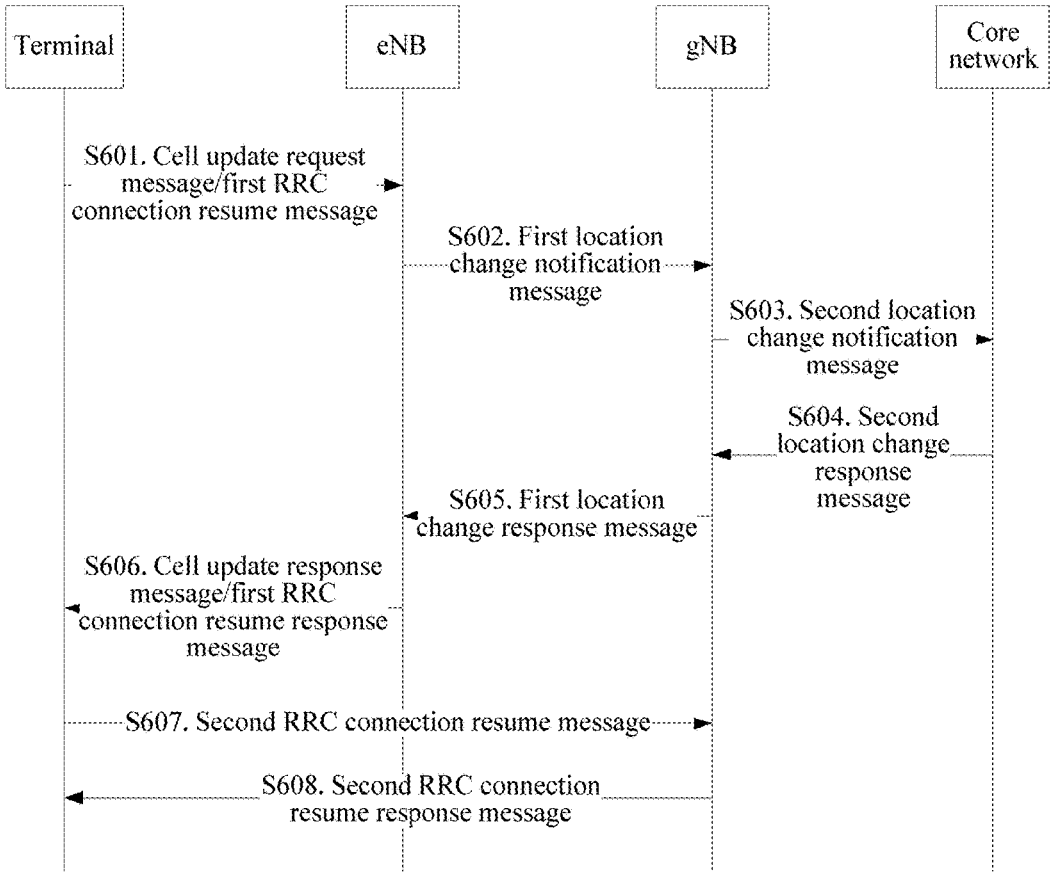

Terminal
eNB
gNB
Core network
S601. Cell update request message/first RRC connection resume message
S602. First location change notification message
S603. Second location change notification message
S604. Second location change response message
S605. First location change response message
S606. Cell update response message/first RRC connection resume response message
S607. Second RRC connection resume message
S608. Second RRC connection resume response message

FIG. 6

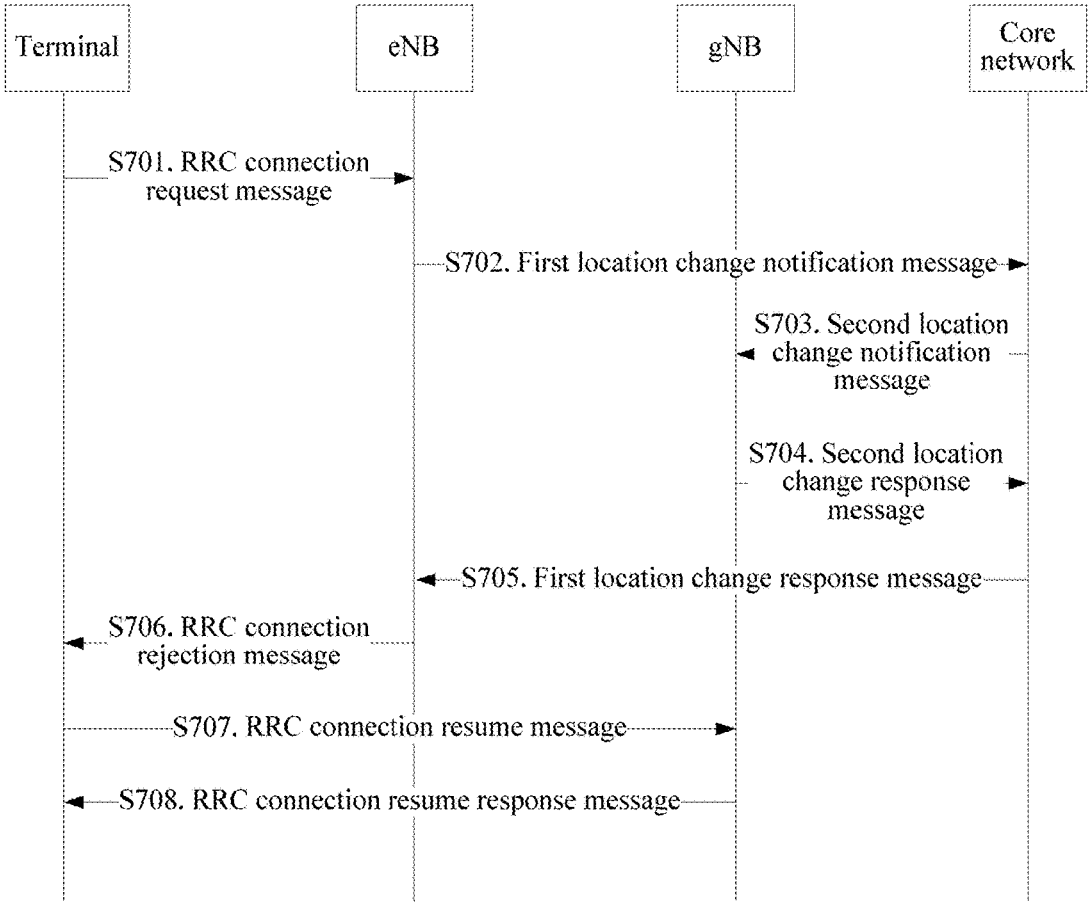

Terminal
eNB
gNB
Core network
S701. RRC connection request message
S702. First location change notification message
S703. Second location change notification message
S704. Second location change response message
S705. First location change response message
S706. RRC connection rejection message
S707. RRC connection resume message
S708. RRC connection resume response message

FIG. 7

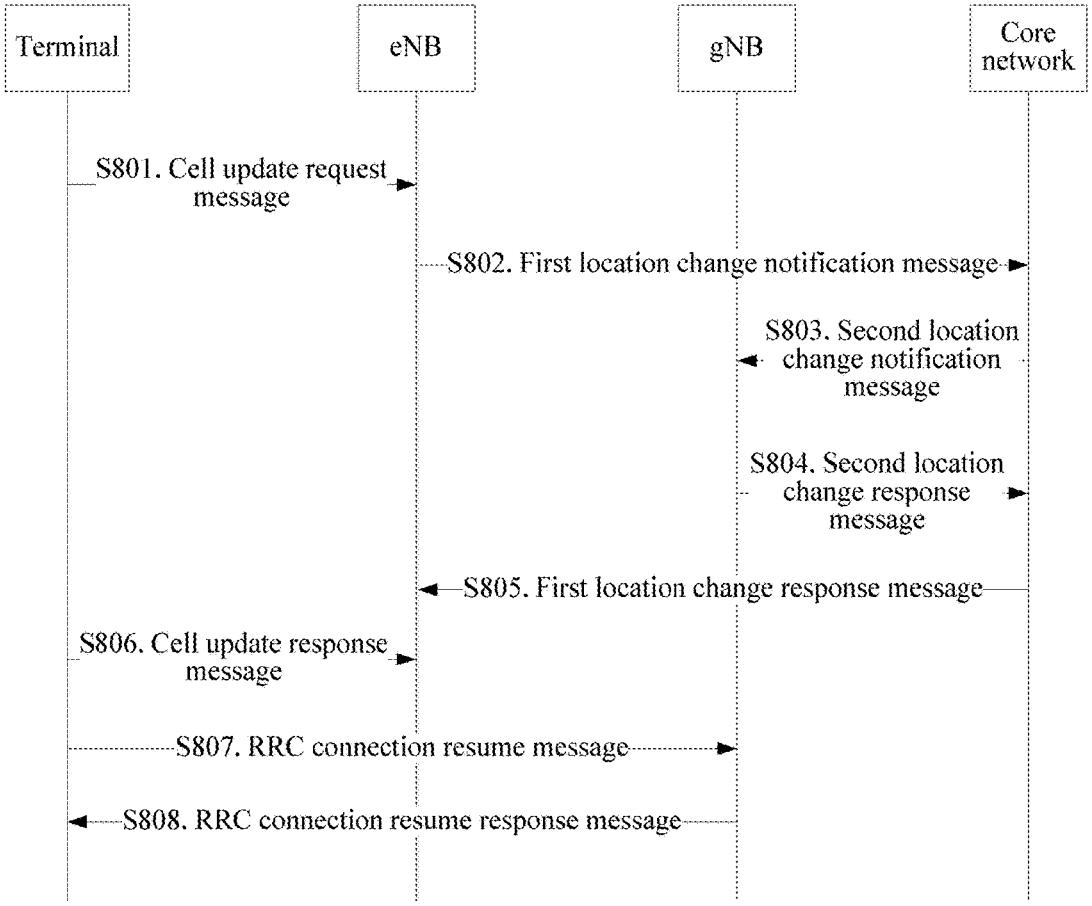

Terminal
eNB
gNB
Core network
S801. Cell update request message
S802. First location change notification message
S803. Second location change notification message
S804. Second location change response message
S805. First location change response message
S806. Cell update response message
S807. RRC connection resume message
S808. RRC connection resume response message

FIG. 8

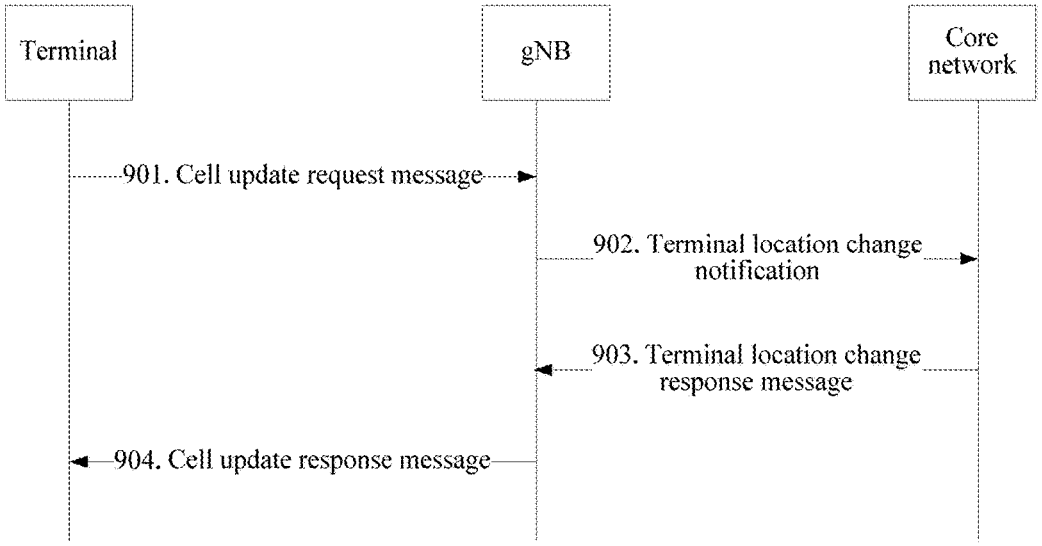

Terminal
gNB
Core network
901. Cell update request message
902. Terminal location change notification
903. Terminal location change response message
904. Cell update response message

FIG. 9

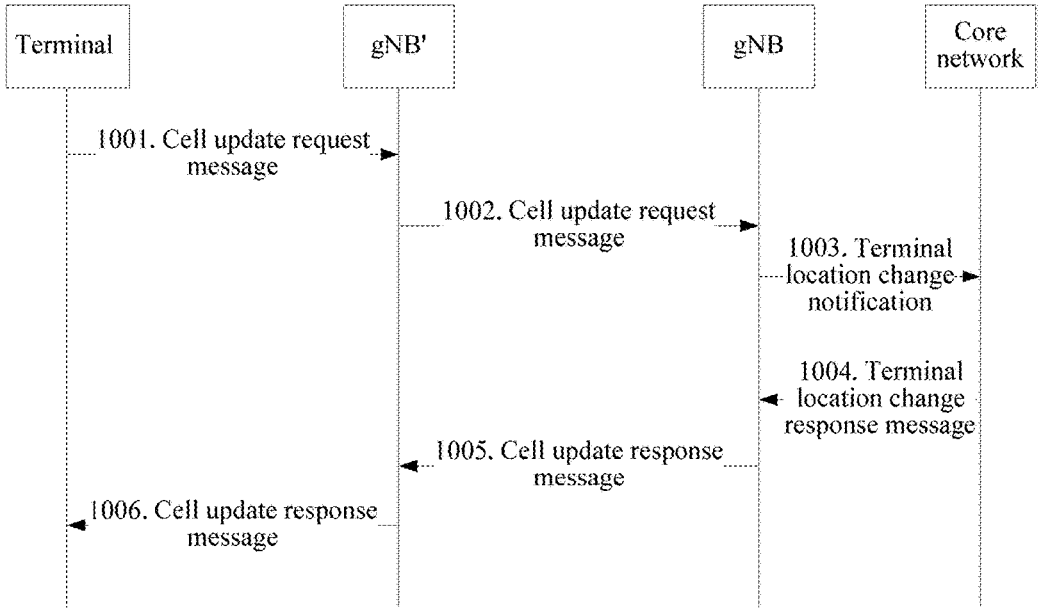

Terminal
gNB'
gNB
Core network
1001. Cell update request message
1002. Cell update request message
1003. Terminal location change notification
1004. Terminal location change response message
1005. Cell update response message
1006. Cell update response message

FIG. 10

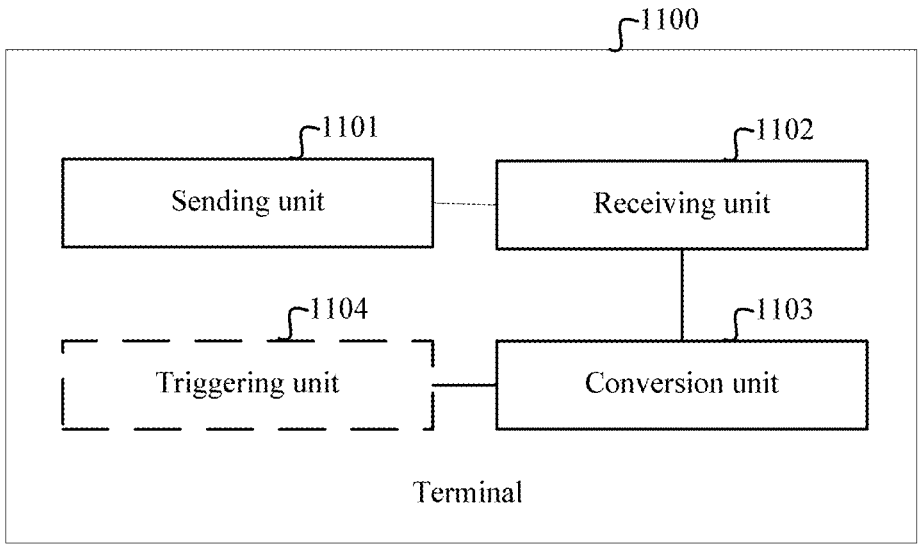

1100
1101
Sending unit
1102
Receiving unit
1104
Triggering unit
1103
Conversion unit
Terminal

FIG. 11

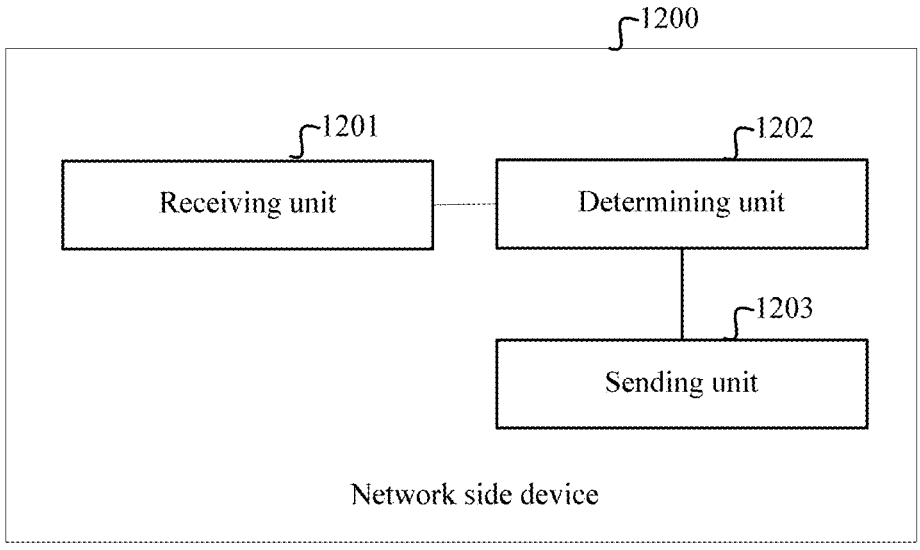

1200
1201
Receiving unit
1202
Determining unit
1203
Sending unit
Network side device

FIG. 12

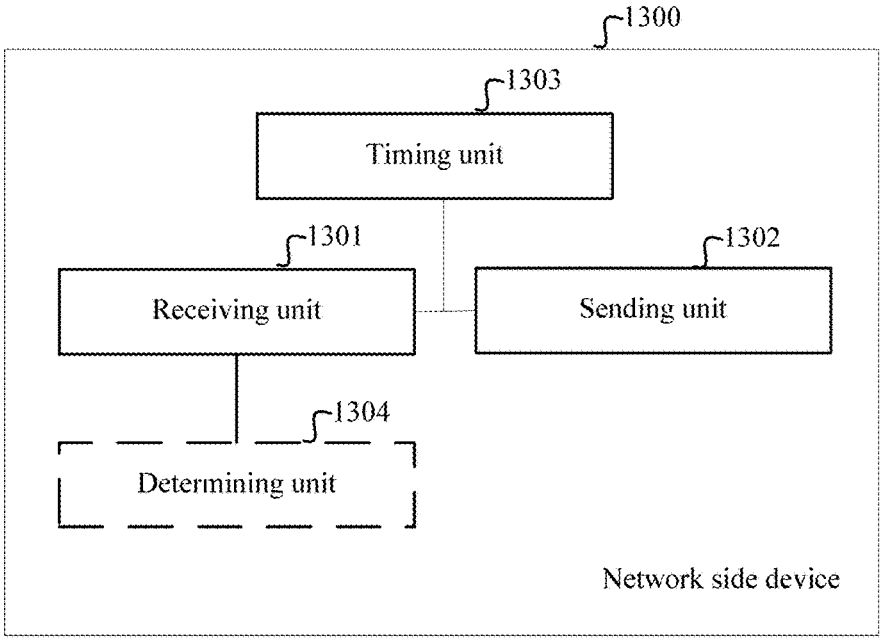

1300
1303
Timing unit
1301
Receiving unit
1302
Sending unit
1304
Determining unit
Network side device

FIG. 13

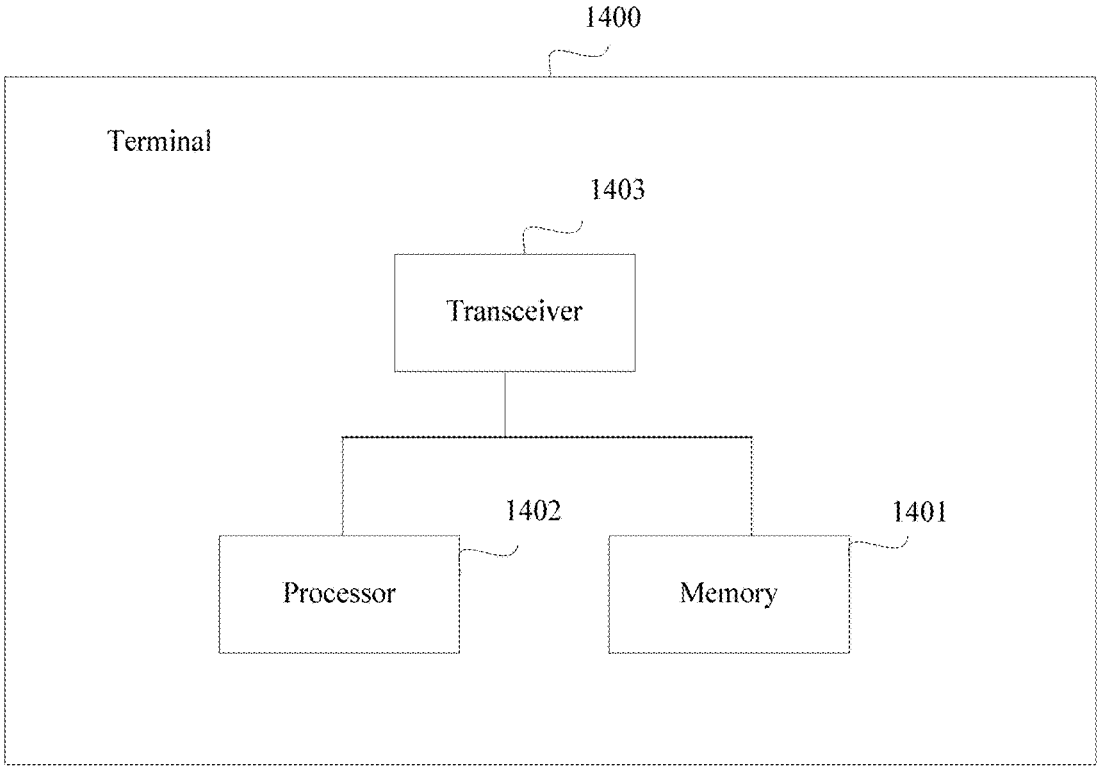

1400
Terminal
1403
Transceiver
1402
Processor
1401
Memory

FIG. 14

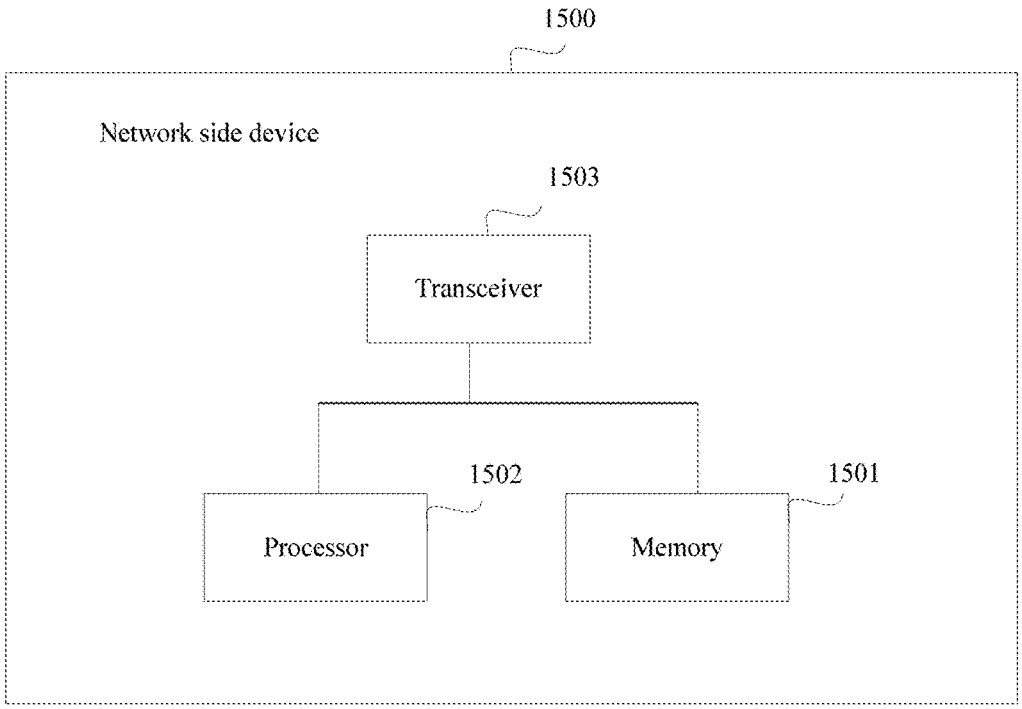

1500
Network side device
1503
Transceiver
1502
Processor
1501
Memory

FIG. 15

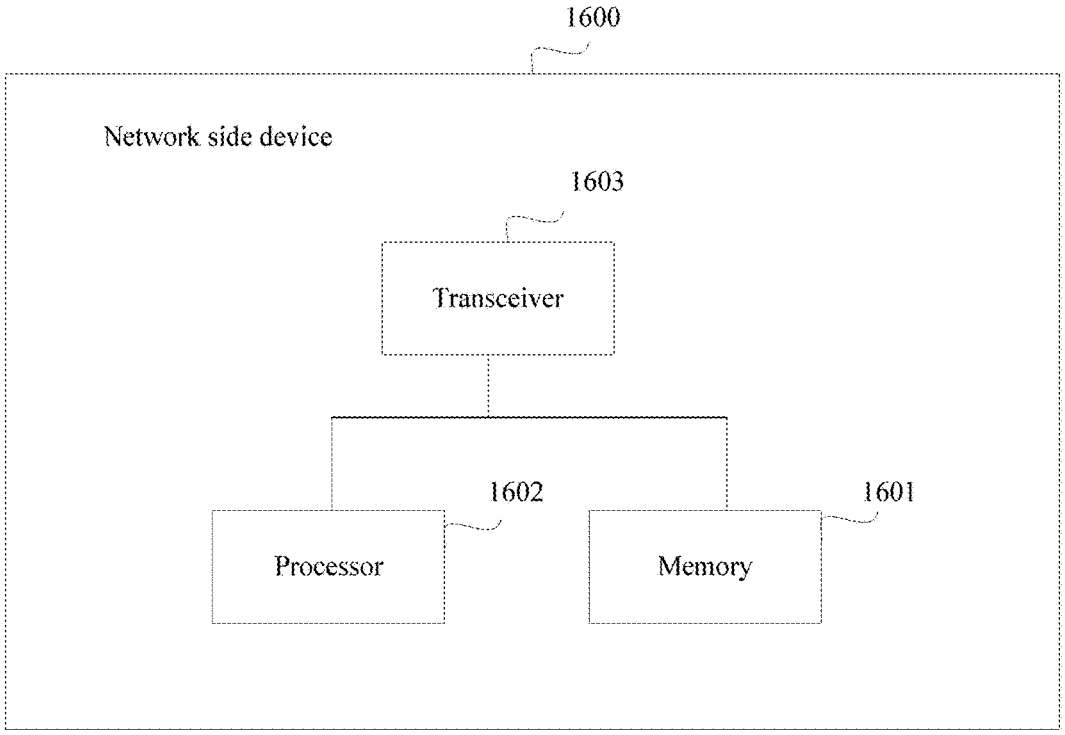

1600
Network side device
1603
Transceiver
1602
1601
Processor
Memory

FIG. 16

INTER-RAT CELL RESELECTION METHOD, TERMINAL, AND NETWORK SIDE DEVICE

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation of International Application No. PCT/CN2017/102261, filed on Sep. 19, 2017, which claims priority to Chinese Patent Application No. 201610879124.0, filed on Sep. 30, 2016. The disclosures of the aforementioned applications are hereby incorporated by reference in their entireties.

TECHNICAL FIELD

[0002] This application relates to the field of communications technologies, and in particular, to an inter-RAT cell reselection method, a terminal, and a network side device.

BACKGROUND

[0003] With a growing number of mobile communications users and accompanied service bandwidth requirements, mobile communications technologies need to be continuously innovated. In an innovation process, a generation change characteristic of mobile communications is very obviously reflected, and a larger quantity of types of radio access technology (RAT for short) systems are also springing up. For example, 3rd generation (namely, 3G) networks and 4th generation (namely, 4G) networks have been widely commercially used in most countries. Long Term Evolution (LTE for short) is a mainstream technology of 4G networks. To enable LTE to be widely applied to enterprise-class applications, an enterprise LTE (eLTE for short) technology accomplishes development of 4.5G networks. Currently, there is an upsurge in studying 5th generation (namely, 5G) networks.

[0004] In 3G and 4G networks, a state of a terminal includes a connected mode (namely, Active) and an idle mode (namely, Idle). When the terminal in the idle mode moves between cells, a cell reselection is triggered. If the terminal moves between cells in different systems, an inter-system cell reselection may be triggered. For example, when the terminal moves from a cell in a 3G system to a cell in a 4G system, an inter-radio access technology (Inter-RAT for short) cell reselection may occur.

[0005] In 5G networks, a new mode, to be specific, an energy conserved operation (ECO) mode, different from the idle mode and the active mode is introduced. The ECO mode has the following characteristics: In the ECO mode, a data plane connection and a control plane connection between a RAN side and a core network (CN) side are kept. A terminal side maintains session-related context information. A base station-based notification area (namely, a RAN-based notification area) exists, and the area includes one or more cells. When the terminal moves within the area, no switching is required and the movement does not need to be notified to the network side. However, the network side needs to learn of whether the terminal moves from one base station-based notification area to another base station-based notification area. When the terminal in the ECO mode moves from a cell in a 5G system to a cell in a 4.5G system, an inter-RAT cell reselection may be triggered. However, there is no ECO mode in the 4.5G network. In an existing solution, when the terminal in the ECO mode moves from a cell in a 5G system to a cell in a 4.5G system, the terminal switches from the ECO mode into the idle mode, or the terminal switches from the ECO mode to a mode close to the ECO mode in the 4.5G network. However, regardless of which solution is used, when an IRAT cell reselection is triggered because the terminal in the ECO mode is handed over from 5G to 4.5G, a large quantity of signaling overheads are consumed, and a waste of system resources is unavoidable.

SUMMARY

[0006] Embodiments of this application provide an inter-RAT cell reselection method, a terminal, and a network side device, to resolve a problem that signaling overheads are relatively high when a terminal in an ECO mode in a 5G system performs an inter-RAT cell reselection.

[0007] Specific technical solutions provided in the embodiments of this application are as follows:

[0008] According to a first aspect, an inter-RAT cell reselection method is provided. When moving from a base station in a first RAT system to a base station in a second RAT system, a terminal triggers an inter-RAT cell reselection process, and sends cause indication information to the base station in the second RAT system, to indicate nature of this cell reselection, so that the base station in the second RAT system can send signaling to instruct the terminal to perform appropriate mode switching. According to the method, when the terminal in a connected mode that is not supported by the base station in the second RAT system reselects the base station, the inter-RAT cell reselection can be implemented by using a relatively small quantity of signaling, thereby reducing signaling overheads, and avoiding a waste of system resources.

[0009] In one embodiment, a first base station is located in the first radio access technology RAT system, the second base station is located in the second RAT system, the terminal is in a first connected mode when connecting to the second base station, and the first RAT system does not support the first connected mode. The method includes: sending, by the terminal, a first request message to the first base station, where the first request message carries first cause indication information, and the first cause indication information indicates that the terminal needs to perform a cell reselection process from the second base station to the first base station; and receiving, by the terminal, an acknowledgement returned by the first base station for the first request message, and switching the first connected mode into a second connected mode based on the acknowledgement, where the first RAT system supports the second connected mode. Signaling in this method procedure is simple. Therefore, a cell reselection between different systems supporting different connected modes can be implemented by using a relatively small quantity of signaling overheads. It should be noted that the second base station is a base station in the second RAT system rather than the last base station on which the terminal camps before the terminal enters the first base station.

[0010] In one embodiment, the first request message is an RRC connection request message, and the acknowledgement is an RRC connection rejection message; or the first request message is a cell update request message, and the acknowledgement is a cell update response message; or the first request message is an RRC connection resume message, and the acknowledgement is an RRC connection resume response message. A larger quantity of possible signaling is provided to carry the cause indication information, thereby

expanding diversity of manners in which the inter-RAT cell reselection can be implemented.

[0011] In one embodiment, the acknowledgement includes information about a timer; and the switching, by the terminal, the first connected mode into a second connected mode based on the acknowledgement is implemented in the following manner: starting, by the terminal, timing of the timer based on the information about the timer; and when the timer times out, releasing a context of a connection relationship between the terminal and the second base station, and switching the first connected mode into the second connected mode. This helps the terminal rapidly establish a connection when reselecting the second base station again within a period, to rapidly restore the first connected mode, thereby reducing the signaling overheads.

[0012] In one embodiment, the acknowledgement does not include the information about the timer, and after receiving the acknowledgement, the terminal immediately switches the first connected mode into the second connected mode.

[0013] In one embodiment, before the switching, by the terminal, the first connected mode into a second connected mode based on the acknowledgement, if the terminal triggers the cell reselection process from the first base station to the second base station when the timer does not time out, the terminal sends a second request message to the second base station. The second request message carries second cause indication information, and the second cause indication information indicates that the terminal reselects, when the timer does not time out, to connect to the second base station. The second cause indication information is carried to indicate, to the second base station, that an objective of this reselection is to reselect, when the timer does not time out, to connect to the second base station, so that the second base station can remain the terminal in the first connected mode instead of switching the first connected mode to another connected mode.

[0014] In one embodiment, the first request message further carries tracking area (TA) indication information, and the TA indication information is used to indicate whether the first base station needs to trigger a TA update process. In this way, after the terminal reselects the first base station, the tracking area update process may be omitted when the process is not required, thereby reducing a large quantity of signaling overheads on a core network side.

[0015] In one embodiment, the first connected mode is an energy conserved operation ECO mode, and the second connected mode is an idle mode.

[0016] According to a second aspect, an inter-RAT cell reselection method is provided. A base station in a first RAT system receives a request message carrying cause indication information that is sent by a terminal, and determines, based on the cause indication information, that nature of sending the request message by the terminal this time is an inter-RAT cell reselection, and the base station in the first RAT system does not support a connected mode of the terminal in a base station on which the terminal recently camps, so that the base station in the first RAT system returns an indication message, to instruct to switch the connected mode of the terminal into a connected mode supported by the base station in the first RAT system. In this way, the inter-RAT cell reselection can be implemented by using a relatively small quantity of signaling, thereby reducing signaling overheads, and avoiding a waste of system resources.

[0017] In one embodiment, a first base station is located in the first radio access technology RAT system, the second base station is located in the second RAT system, the terminal is in a first connected mode when connecting to the second base station, and the first RAT system does not support the first connected mode. The first base station receives a first request message sent by the terminal, and determines, based on first cause indication information carried in the first request message, that the terminal needs to perform a cell reselection process from the second base station to the first base station; and the first base station returns an acknowledgement for the first request message to the terminal, to instruct the terminal to switch the first connected mode into a second connected mode. The first RAT system supports the second connected mode. Signaling in this method procedure is simple. Therefore, a cell reselection between different systems supporting different connected modes can be implemented by using a relatively small quantity of signaling overheads.

[0018] In one embodiment, the receiving, by the first base station, a first request message sent by the terminal and the returning an acknowledgement for the first request message to the terminal may be implemented in the following manners: receiving, by the first base station, an RRC connection request message sent by the terminal, and returning an RRC connection rejection message to the terminal; or receiving, by the first base station, a cell update request message sent by the terminal, and returning a cell update response message to the terminal; or receiving, by the first base station, an RRC resume message sent by the terminal, and returning an RRC resume response message to the terminal. A larger quantity of possible signaling is provided to carry the cause indication information, thereby expanding diversity of manners in which the inter-RAT cell reselection can be implemented.

[0019] In one embodiment, after the determining, by the first base station, that the terminal needs to perform a cell reselection process from the second base station to the first base station and before the returning an acknowledgement for the first request message to the terminal, the first base station notifies the second base station of a terminal location change message, and receives a response message that carries information about a timer and that is sent by the second base station; and the first base station adds the information about the timer to the acknowledgement for the first request message, and returns the acknowledgement to the terminal. The information about the timer is used to instruct the terminal to release, when the timer times out, a context of a connection relationship between the terminal and the second base station, and switch the first connected mode into the second connected mode. This helps the terminal rapidly establish a connection when reselecting the second base station again within a period, to rapidly restore the first connected mode, thereby reducing the signaling overheads.

[0020] In one embodiment, if no direct interface exists between the first base station and the second base station, the first base station notifies the second base station of the terminal location change message by using a core network, and receives the response message that carries the information about the timer and that is sent by the second base station by using the core network. Various application scenarios are considered, so that the method in this application is more widely applicable.

[0021] According to a third aspect, an inter-RAT cell reselection method is provided. The method is applied to a second base station. A first base station is located in a first radio access technology RAT system, the second base station is located in a second RAT system, a terminal is connected to the second base station, a connected mode of the terminal is a first connected mode, and the first RAT system does not support the first connected mode of the terminal and supports a second connected mode of the terminal. The method is implemented by using the following manner: receiving, by the second base station, a terminal location update indication sent by the first base station, where the terminal location update indication is used to indicate that the terminal needs to perform a cell reselection process from the second base station to the first base station; returning, by the second base station, a response message for the terminal location update indication to the first base station, and starting a first timer; and instructing, by the second base station when the first timer times out, a core network to release a bearer of the terminal, where the response message includes information about a second timer, timeout duration of the second timer is determined by timeout duration of the first timer, and the second timer is configured to: instruct the terminal to release, when the second timer times out, a context of a connection relationship between the terminal and the second base station, and switch the first connected mode into the second connected mode. In this way, a waste of signaling overheads caused by repeated cell reselections because the terminal repeatedly moves between the first base station and the second base station after the terminal triggers the cell reselection from the second base station to the first base station is avoided. The method helps the terminal rapidly establish a connection when reselecting the second base station again within a period, to rapidly restore the first connected mode, thereby reducing the signaling overheads.

[0022] In one embodiment, if the second base station receives a connection request message of the terminal when the first timer does not time out, the second base station determines, based on cause indication information carried in the connection request message, that the terminal reselects, when the second timer does not time out, to connect to the second base station, so that the second base station returns a response message for the connection request message to the terminal, to indicate that the terminal is in the first connected mode. The second base station determines, by using the second cause indication information carried in the connection request message sent by the terminal, that an objective of this reselection of the terminal is to reselect, when the second timer does not time out, to connect to the second base station, so that the second base station can remain the terminal in the first connected mode instead of switching the first connected mode to another connected mode.

[0023] In one embodiment, the first connected mode is an energy conserved operation ECO mode, and the second connected mode is an idle mode.

[0024] According to a fourth aspect, a terminal is provided. The terminal has a function of implementing a behavior of the terminal according to any one of the first aspect and the possible designs of the first aspect. The function may be implemented by using hardware, or may be implemented by hardware executing corresponding software. The hardware or software includes one or more modules corresponding to the foregoing function.

[0025] In one embodiment, the terminal includes: a sending unit, configured to send a first request message to a first base station, where the first request message carries first cause indication information, and the first cause indication information indicates that the terminal needs to perform a cell reselection process from a second base station to the first base station; a receiving unit, configured to: after the sending unit sends the first request message, receive an acknowledgement returned by the first base station for the first request message; and a conversion unit, configured to switch the first connected mode into a second connected mode based on the acknowledgement received by the receiving unit, where the first RAT system supports the second connected mode. The first base station is located in the first radio access technology RAT system, the second base station is located in a second RAT system, the terminal is in the first connected mode when connecting to the second base station, and the first RAT system does not support the first connected mode. In this way, the inter-RAT cell reselection can be implemented by using a relatively small quantity of signaling, thereby reducing signaling overheads, and avoiding a waste of system resources.

[0026] In one embodiment, the first request message is an RRC connection request message, and the acknowledgement is an RRC connection rejection message; or the first request message is a cell update request message, and the acknowledgement is a cell update response message; or the first request message is an RRC connection resume message, and the acknowledgement is an RRC connection resume response message. A larger quantity of possible signaling is provided to carry the cause indication information, thereby expanding diversity of manners in which the inter-RAT cell reselection can be implemented.

[0027] In one embodiment, the acknowledgement includes information about a timer; and the conversion unit is configured to: start timing of the timer based on the information about the timer; and when the timer times out, release a context of a connection relationship between the terminal and the second base station, and switch the first connected mode into the second connected mode. This helps the terminal rapidly establish a connection when reselecting the second base station again within a period, to rapidly restore the first connected mode, thereby reducing the signaling overheads.

[0028] In one embodiment, the terminal further includes a triggering unit, configured to: before the conversion unit switches the first connected mode into the second connected mode based on the acknowledgement, trigger the cell reselection process from the first base station to the second base station when the timer does not time out; and the sending unit is further configured to: when the triggering unit triggers the cell reselection process from the first base station to the second base station, send a second request message to the second base station. The second request message carries second cause indication information, and the second cause indication information indicates that the terminal reselects, when the timer does not time out, to connect to the second base station. The second cause indication information is carried to indicate, to the second base station, that an objective of this reselection is to reselect, when the timer does not time out, to connect to the second base station, so that the second base station can remain the terminal in the first connected mode instead of switching the first connected mode to another connected mode.

[0029] In one embodiment, the first request message further carries TA indication information, and the TA indication information is used to indicate whether the first base station needs to trigger a TA update process. In this way, after the terminal reselects the first base station, the tracking area update process may be omitted when the process is not required, thereby reducing a large quantity of signaling overheads on a core network side.

[0030] In one embodiment, the first connected mode is an energy conserved operation ECO mode, and the second connected mode is an idle mode.

[0031] According to a fifth aspect, a network side device is provided. The network side device has a function of implementing a behavior of the first base station according to any one of the second aspect and the possible designs of the second aspect. The function may be implemented by using hardware, or may be implemented by hardware executing corresponding software. The hardware or software includes one or more modules corresponding to the foregoing function.

[0032] In one embodiment, the network side device is a first base station. The network side device includes: a receiving unit, configured to receive a first request message sent by a terminal; a determining unit, configured to determine, based on first cause indication information carried in the first request message received by the receiving unit, that the terminal needs to perform a cell reselection process from a second base station to the first base station, where the first base station is located in a first RAT system, the second base station is located in a second RAT system, the terminal is in a first connected mode when connecting to the second base station, and the first RAT system does not support the first connected mode; and a sending unit, configured to return an acknowledgement for the first request message to the terminal, to instruct the terminal to switch the first connected mode into a second connected mode, where the first RAT system supports the second connected mode. In this way, the inter-RAT cell reselection can be implemented by using a relatively small quantity of signaling, thereby reducing signaling overheads, and avoiding a waste of system resources.

[0033] In one embodiment, the receiving unit and the sending unit are specifically configured to: the receiving unit receives an RRC connection request message sent by the terminal, and the sending unit returns an RRC connection rejection message to the terminal; or the receiving unit receives a cell update request message sent by the terminal, and the sending unit returns a cell update response message to the terminal; or the receiving unit receives an RRC resume message sent by the terminal, and the sending unit returns an RRC resume response message to the terminal. In this way, a larger quantity of possible signaling is provided to carry the cause indication information, thereby expanding diversity of manners in which the inter-RAT cell reselection can be implemented.

[0034] In one embodiment, the receiving unit and the sending unit are further configured to: after the determining unit determines that the terminal needs to perform the cell reselection process from the second base station to the first base station, and before the sending unit returns the acknowledgement for the first request message to the terminal, the sending unit notifies the second base station of a terminal location change message, and the receiving unit receives a response message that carries information about a timer and that is sent by the second base station; and the sending unit is specifically configured to: add the information about the timer to the acknowledgement for the first request message, and return the acknowledgement to the terminal. The information about the timer is used to instruct the terminal to release, when the timer times out, a context of a connection relationship between the terminal and the second base station, and switch the first connected mode into the second connected mode. This helps the terminal rapidly establish a connection when reselecting the second base station again within a period, to rapidly restore the first connected mode, thereby reducing the signaling overheads.

[0035] In one embodiment, if no direct interface exists between the first base station and the second base station, the sending unit is further configured to notify the second base station of the terminal location change message by using a core network, and the receiving unit is further configured to receive the response message that carries the information about the timer and that is sent by the second base station by using the core network. Various application scenarios are considered, so that the method in this application is more widely applicable.

[0036] According to a sixth aspect, a network side device is provided. The network side device is a second base station, a first base station is located in a first radio access technology RAT system, the second base station is located in a second RAT system, a terminal is connected to the second base station, a connected mode of the terminal is a first connected mode, and the first RAT system does not support the first connected mode of the terminal and supports a second connected mode of the terminal. The network side device includes: a receiving unit, configured to receive a terminal location update indication sent by the first base station, where the terminal location update indication is used to indicate that the terminal needs to perform a cell reselection process from the second base station to the first base station; a sending unit, configured to: after the receiving unit receives the terminal location update indication, return a response message for the terminal location update indication to the first base station; a timing unit, configured to: after the receiving unit receives the terminal location update indication, start a first timer.

[0037] The sending unit is further configured to: when the first timer recorded by the timing unit times out, instruct a core network to release a bearer of the terminal. The response message includes information about a second timer, timeout duration of the second timer is determined by timeout duration of the first timer, and the second timer is configured to: instruct the terminal to release, when the second timer times out, a context of a connection relationship between the terminal and the second base station, and switch the first connected mode into the second connected mode. In this way, a waste of signaling overheads caused by repeated cell reselections because the terminal repeatedly moves between the first base station and the second base station after the terminal triggers the cell reselection from the second base station to the first base station is avoided. The method helps the terminal rapidly establish a connection when reselecting the second base station again within a period, to rapidly restore the first connected mode, thereby reducing the signaling overheads.

[0038] In one embodiment, the receiving unit is further configured to: when the first timer does not time out, receive a connection request message of the terminal. The network

side device further includes a determining unit, configured to: after the receiving unit receives the connection request message of the terminal, determine, based on cause indication information carried in the connection request message, that the terminal reselects, when the second timer does not time out, to connect to the second base station. The sending unit is further configured to return a response message for the connection request message to the terminal, to indicate that the terminal is in the first connected mode. The second base station determines, by using the second cause indication information carried in the connection request message sent by the terminal, that an objective of this reselection of the terminal is to reselect, when the second timer does not time out, to connect to the second base station, so that the second base station can remain the terminal in the first connected mode instead of switching the first connected mode to another connected mode.

[0039] In one embodiment, the first connected mode is an energy conserved operation ECO mode, and the second connected mode is an idle mode.

[0040] According to a seventh aspect, a terminal is provided. The terminal has a function of implementing a behavior of the terminal according to any one of the first aspect and the possible designs of the first aspect. The function may be implemented by using hardware, or may be implemented by hardware executing corresponding software. The hardware or software includes one or more modules corresponding to the foregoing function.

[0041] In one embodiment, a structure of the terminal includes a transceiver, a memory, and a processor. The memory is configured to store a group of programs, and the processor is configured to invoke the programs stored in the memory to perform the method according to any one of the first aspect and the possible designs of the first aspect. In this way, a cell reselection between different systems supporting different connected modes can be implemented by using a simple signaling procedure and a relatively small quantity of signaling overheads.

[0042] According to an eighth aspect, a network side device is provided. The network side device has a function of implementing a behavior of the network side device according to any one of the second aspect and the possible designs of the second aspect. The function may be implemented by using hardware, or may be implemented by hardware executing corresponding software. The hardware or software includes one or more modules corresponding to the foregoing function.

[0043] In one embodiment, a structure of the network side device includes a transceiver, a memory, and a processor. The memory is configured to store a group of programs, and the processor is configured to invoke the programs stored in the memory to perform the method according to any one of the second aspect and the possible designs of the second aspect. In this way, a cell reselection between different systems supporting different connected modes can be implemented by using a simple signaling procedure and a relatively small quantity of signaling overheads.

[0044] According to a ninth aspect, a network side device is provided. The network side device has a function of implementing a behavior of the network side device according to any one of the third aspect and the possible designs of the third aspect. The function may be implemented by using hardware, or may be implemented by hardware executing corresponding software. The hardware or software includes one or more modules corresponding to the foregoing function.

[0045] In one embodiment, a structure of the network side device includes a transceiver, a memory, and a processor. The memory is configured to store a group of programs, and the processor is configured to invoke the programs stored in the memory to perform the method according to any one of the third aspect and the possible designs of the third aspect. In this way, a cell reselection between different systems supporting different connected modes can be implemented by using a simple signaling procedure and a relatively small quantity of signaling overheads.

[0046] According to a tenth aspect, a communications system is provided. The communications system includes a terminal, a first base station, and a second base station. The terminal has a function of implementing a function of the terminal according to the first aspect and the possible designs, the first base station has a function of implementing a function of the first base station according to the second aspect and the possible designs, and the second base station has a function of implementing a function of the second base station according to the third aspect and the possible designs.

[0047] In the embodiments of this application, when the terminal in the first connected mode performs the cell reselection process from the base station in the first RAN system to the base station in the second RAT system, because the base station in the second RAT system does not support the first connected mode, the terminal sends the message carrying the cause indication information to the base station in the second RAT system, to indicate the nature of this cell reselection to the base station in the second RAT system by using the cause indication information. In this way, the base station in the second RAT system can send signaling to instruct the terminal to perform appropriate mode switching. According to the method, when the terminal in a connected mode that is not supported by the base station in the second RAT system reselects the base station, the inter-RAT cell reselection can be implemented by using a relatively small quantity of signaling, thereby reducing signaling overheads, and avoiding a waste of system resources.

BRIEF DESCRIPTION OF DRAWINGS

[0048] FIG. **1** is a diagram of a system architecture to which an embodiment of this application is applied;

[0049] FIG. **2** is a first flowchart of an inter-RAT cell reselection method according to an embodiment of this application;

[0050] FIG. **3** is a structural diagram of a 3G network and a 4G network in the prior art;

[0051] FIG. **4***a* and FIG. **4***b* are structural diagrams of a 4.5G/4G network and a 5G network in the prior art;

[0052] FIG. **5** is a first schematic diagram of inter-RAT cell reselection signaling according to an embodiment of this application;

[0053] FIG. **6** is a second schematic diagram of inter-RAT cell reselection signaling according to an embodiment of this application;

[0054] FIG. **7** is a third schematic diagram of inter-RAT cell reselection signaling according to an embodiment of this application;

[0055] FIG. **8** is a fourth schematic diagram of inter-RAT cell reselection signaling according to an embodiment of this application;

[0056] FIG. **9** is a fifth schematic diagram of inter-RAT cell reselection signaling according to an embodiment of this application;

[0057] FIG. **10** is a sixth schematic diagram of inter-RAT cell reselection signaling according to an embodiment of this application;

[0058] FIG. **11** is a first schematic structural diagram of a terminal according to an embodiment of this application;

[0059] FIG. **12** is a first schematic structural diagram of a network side device according to an embodiment of this application;

[0060] FIG. **13** is a second schematic structural diagram of a network side device according to an embodiment of this application;

[0061] FIG. **14** is a second schematic structural diagram of a terminal according to an embodiment of this application;

[0062] FIG. **15** is a third schematic structural diagram of a network side device according to an embodiment of this application; and

[0063] FIG. **16** is a fourth schematic structural diagram of a network side device according to an embodiment of this application.

DESCRIPTION OF EMBODIMENTS

[0064] To make the objectives, technical solutions, and advantages of this application clearer, the following further describes this application in detail with reference to the accompanying drawings. Apparently, the described embodiments are merely some rather than all of the embodiments of this application. All other embodiments obtained by persons of ordinary skill in the art based on the embodiments of this application without creative efforts shall fall within the protection scope of this application.

[0065] In view of a problem in the prior art that signaling overheads are relatively high when a terminal in an ECO mode in a 5G system performs an inter-RAT cell reselection, embodiments of this application provide an inter-RAT cell reselection method, a terminal, and a network side device. When the terminal in a first connected mode performs a cell reselection process from a base station in the 5G system to a base station in a 4.5G system or a 4G system (which is denoted as a 4.5G/4G system), because the base station in the 4.5G/4G system does not support the first connected mode, the terminal sends a message carrying cause indication information to the base station in the 4.5G/4G system, to indicate nature of this cell reselection to the base station in the 4.5G/4G system by using the cause indication information. In this way, the base station in the 4.5G/4G system can send signaling to instruct the terminal to perform appropriate mode switching. According to the method, when the terminal in a connected mode that is not supported by the base station in the 4.5G/4G system reselects the base station, the inter-RAT cell reselection can be implemented by using a relatively small quantity of signaling, thereby reducing signaling overheads, and avoiding a waste of system resources.

[0066] As shown in FIG. **1**, a system architecture to which an embodiment of this application is applied includes a base station **101** in a 5G system, a base station **102** in a 4.5G/4G system, a core network **103** in the 5G system, a core network **104** in the 4.5G/4G system, and a terminal **105**. The base station **101** in the 5G system and the base station **102** in the 4.5G/4G system are apparatuses that are deployed in a radio access network and that are configured to provide a wireless communication function to the terminal. The base station **101** in the 5G system and the base station **102** in the 4.5G/4G system may include various forms of macro base stations, micro base stations, relay stations, access points, and the like. The radio access network may be applied to systems having different radio access technologies, for example, a Long Term Evolution (LTE) system, a 4.5G system, a 5G system, and more possible communications systems. A direct interface, such as an X2-like (X2-like) may exist, or no direct interface may exist between the base station **101** in the 5G system and the base station **102** in the 4.5G/4G system. The base station **102** in the 4.5G/4G system is connected to the core network **104** in the 4.5G/4G system by using an S1 interface, the base station **101** in the 5G system is connected to the core network **103** in the 5G system by using an NG1 interface, and the base station **102** in the 4.5G/4G system may further be connected to the core network **103** in the 5G system by using the NG1 interface. The terminal **102** may include various handheld devices, in-vehicle devices, wearable devices, computing devices, or other processing devices connected to a wireless modem that have a wireless communication function, and various forms of user equipments (UE), mobile stations (MS), and terminal devices. The terminal **102** may wirelessly communicate with the base station **101** in the 5G system and the base station **102** in the 4.5G/4G system.

[0067] Inter-RAT refers to different RAT systems. Inter-RAT mobility of the terminal means that the terminal performs a cell reselection between different systems. When connected modes of the terminal that are supported by the different systems are different, and the terminal moves from one RAT system to another RAT system, the connected mode of the terminal is switched, to be specific, the connected mode of the terminal is switched to a connected mode supported by the another RAT system. An application scenario in this embodiment of this application is inter-RAT mobility of the terminal when the connected modes of the terminal that are supported by the different systems are different.

[0068] The inter-RAT cell reselection method and the apparatus provided in the embodiments of this application are described below in detail with reference to the accompanying drawings.

[0069] For the purpose of illustration, it is assumed that two RAT systems in different systems are respectively referred to as a first RAT system and a second RAT system, a base station in the first RAT system is referred to as a first base station, a base station in the second RAT system is referred to as a second base station, the terminal is initially connected to the second base station, the terminal is in a first connected mode when connecting to the second base station, and the first RAT system does not support the first connected mode and supports a second connected mode. Optionally, when the terminal is in the first connected mode and the second connected mode, the terminal does not send channel state information (CSI for short) to the base station. When the terminal is in the first connected mode, a network side remains a data plane connection and a control plane connection between the base station and a core network. When moving from the second base station to the first base station, the terminal triggers a cell reselection process. The cell

reselection process triggered by the terminal is described below in detail with reference to FIG. **2**.

[0070] A possible system architecture to which an inter-RAT cell reselection method according to an embodiment of this application is applied may be the architecture shown in FIG. **1**, the first RAT system is the 5G system, the second RAT system is the 4.5G/4G system, the first base station is the base station **101** in the 5G system, the second base station is the base station **102** in the 4.5G/4G system, and the terminal is the terminal **105**.

[0071] As shown in FIG. **2**, in this embodiment of this application, a procedure of the inter-RAT cell reselection method is as follows:

[0072] Operation **201**: The terminal sends a first request message to the first base station, and the first base station receives the first request message sent by the terminal.

[0073] The first request message carries cause indication information (Cause). For ease of description, the cause indication information carried in the first request message is denoted as first cause indication information herein, and the first cause indication information indicates that the terminal needs to perform a cell reselection process from the second base station to the first base station. To be specific, the Cause is carried to indicate that a cause of this initiation of the first request message is that the first base station is reselected from the second base station.

[0074] Operation **202**: The first base station determines, based on first cause indication information carried in the first request message, that the terminal needs to perform a cell reselection process from the second base station to the first base station.

[0075] Operation **203**: The first base station sends a terminal location change message to the second base station, and the second base station receives the terminal location change message sent by the first base station.

[0076] A terminal location update indication is used to indicate that the terminal needs to perform the cell reselection process from the second base station to the first base station.

[0077] Operation **204**: Optionally, the second base station returns a response message for the terminal location change message to the first base station, and the first base station receives a location change response message sent by the second base station.

[0078] In one embodiment, the second base station starts a first timer, and adds information about a second timer to the location change response message. In this case, after operation **204**, the procedure may further include operation **204***a* and operation **204***b*.

[0079] Operation **204***a*: The second base station instructs, when a first timer times out, a core network to release a bearer of the terminal, and the core network receives a notification for releasing the bearer of the terminal that is sent by the second base station.

[0080] Operation **204***b*: The core network returns a bearer release response to the second base station, and the second base station receives the bearer release response sent by the core network.

[0081] Timeout duration of the second timer is determined by timeout duration of the first timer. Optionally, the timeout duration of the second timer=the timeout duration of the first timer−duration in which the second base station sends signaling to the first base station−duration in which the first base station sends signaling to the terminal.

[0082] Operation **205**: The first base station returns an acknowledgement for the first request message to the terminal, to instruct the terminal to switch a first connected mode into a second connected mode; and the terminal receives the acknowledgement returned by the first base station for the first request message.

[0083] The first base station adds the information about the second timer to the acknowledgement. The second timer is configured to: after receiving the acknowledgement, instruct the terminal to start the second timer; and when the second timer does not time out, maintain a context of a connection relationship between the terminal and the second base station; or when the second timer times out, release a context of a connection relationship between the terminal and the second base station, and switch the first connected mode into the second connected mode.

[0084] Operation **206**: The terminal switches the first connected mode into the second connected mode based on the received acknowledgement.

[0085] In one embodiment, if the acknowledgement includes the information about the second timer, the terminal starts the second timer for timing; and when the second timer does not time out, maintains the context of the connection relationship between the terminal and the second base station; or when the second timer times out, releases the context of the connection relationship between the terminal and the second base station, and switches the first connected mode into the second connected mode.

[0086] After receiving the terminal location update indication, the second base station respectively instructs the terminal and a core network side to maintain the context for a period instead of immediately releasing the context of the connection relationship between the second base station and the terminal, because this helps the terminal rapidly establish a connection when reselecting the second base station again within a period, and reduce signaling overheads. Specifically, the terminal starts the second timer for timing based on the acknowledgement, and when the second timer does not time out, the terminal reselects the second base station. For a specific process, refer to operation **207** and operation **208**.

[0087] Operation **207**: The terminal triggers a cell reselection process to the second base station, and determines, when a second timer does not time out, to send a second request message to the second base station, and the second base station receives the second request message sent by the terminal.

[0088] The second request message is a connection request message sent by the terminal to the second base station. The second request message carries second cause indication information, and the second cause indication information indicates that the terminal reselects, when the second timer does not time out, to connect to the second base station.

[0089] Operation **208**: When determining that the first timer does not time out, the second base station returns a response message for the second request message to the terminal, and the terminal receives the response message for the second request message returned by the second base station.

[0090] When the second timer does not time out, the terminal does not switch the first connected mode into the second connected mode and is in the first connected mode, and maintains the context of the connection relationship

between the terminal and the second base station. Therefore, when receiving the second request message, the second base station may instruct the terminal to still remain in the first connected mode, and the terminal may further rapidly establish a connection to the second base station. Certainly, when the connected mode of the terminal needs to be switched into another connected mode because the terminal has a service requirement, the second base station may further instruct the terminal to perform appropriate connected mode switching.

[0091] An application scenario of this embodiment of this application is that the first RAT system is a 5G system, and the second RAT system is a 4.5G/4G system. In this scenario, preferably, the first connected mode is an ECO mode, and the second connected mode is an idle mode.

[0092] After the terminal reselects the second base station when the first timer and the second timer do not time out, if determining that the terminal does not need to send data in this case, the second base station continues to remain the terminal in the ECO mode based on the second cause indication information; or if determining that the terminal needs to send data in this case, the second base station instructs the terminal to switch the ECO mode into an active mode.

[0093] In one embodiment, the first request message may be an RRC connection request message, and the acknowledgement is an RRC connection rejection message; or the request message is a cell update request message, and the acknowledgement is a cell update response message; or the request message is an RRC resume message, and the acknowledgement is an RRC resume response message. Certainly, the first request message may alternatively be another signaling message. This is not limited in this embodiment of this application.

[0094] In addition, as shown in FIG. **3**, there is no direct interface between a base station NB in a 3G system and a base station eNB in a 4G system, but an interface exists between a core network in the 3G system and a core network in the 4G system. When the terminal moves from a cell in the 3G system to a cell in the 4G system, a tracking area update (TAU) process is triggered. In the TAU process, the core network in the 4G system in which the cell to which the terminal currently moves is located may obtain a context of the terminal from the core network in the 3G system in which the terminal is originally located. In the TAU process, a core network side needs to consume a large quantity of signaling overheads.

[0095] However, as shown in FIG. **4***a*, an X2-like interface may exist between a base station eLTE eNB in a 4.5G/4G system and a base station NR gNB in a 5G system. In addition, the eLTE eNB and the NR gNB may further be connected to a same core network in the 5G system. Therefore, the base station eLTE eNB in the 4.5G/4G system and the base station NR gNB in the 5G system may share a tracking area, to be specific, when the terminal moves from a cell in the 5G system to a cell in the 4.5G/4G system, the TAU process may not need to be triggered. Therefore, the large quantity of signaling overheads on the core network side can be reduced.

[0096] Therefore, in this embodiment of this application, to further reduce the signaling overheads, the first request message further carries TA indication information. The TA indication information is used to indicate whether a TA to which the terminal in the second base station belongs is the same as a TA to which the first base station belongs. To be specific, the TA indication information may indicate whether the first base station needs to trigger the TA update process. Based on the TA indication information, when different systems share a core network, a cell update process on a core network layer does not need to be performed, thereby reducing unnecessary signaling overheads.

[0097] However, as shown in FIG. **4***b*, alternatively, no direct interface may exist between the first base station and the second base station, to be specific, no X2-like interface exists. In this case, the first base station notifies the second base station of the terminal location change message by using the core network, and receives the response message carrying the information about the timer that is sent by the second base station by using the core network, and broadcasts another signaling message by using the core network.

[0098] According to another embodiment, before reselecting the first base station, the terminal sends signaling to the second base station, and the second base station is notified, by using cause indication information in the signaling, that the terminal performs an inter-RAT cell reselection. In this way, the second base station may perform cell reselection processing of the terminal by directly using the signaling message sent by the terminal, so that inter-RAT mobility of the terminal can be implemented by using a smaller quantity of signaling.

[0099] This embodiment of this application is further described below in detail with reference to a specific application scenario shown in FIG. **4***a*. It is assumed that the first RAT system is a 5G system, the second RAT system is a 4.5G/4G system, the first connected mode is an ECO mode, the second connected mode is an idle mode, a base station in the 4.5G/4G system is an eLTE eNB, which is referred to as eNB for short below, and a base station in the 5G system is an NR gNB, which is referred to as gNB for short below. The terminal is initially connected to the gNB and is in the ECO mode. When moving to the eNB, the terminal triggers an inter-RAT cell reselection.

[0100] Referring to FIG. **5**, when the terminal in the ECO mode moves from the gNB to the eNB, a signaling transmission process of the triggered inter-RAT cell reselection is as follows.

[0101] Operation S**501**: The terminal sends an RRC connection request message (RRC Connection Request) to the eNB, and The eNB receives the RRC connection request message sent by the terminal.

[0102] The RRC connection request message carries cause indication information, TA indication information, a terminal identity (ID for short), a source node base station (SNB) ID, and a core network ID.

[0103] The cause indication information is used to indicate that a cause for sending the RRC connection request message is that the terminal is switched from the gNB to the eNB. The cause indication information further indicates that the terminal is originally in the ECO mode rather than the idle mode, because the terminal in the idle mode does not add the cause indication information when sending the RRC connection request message. The TA indication information indicates whether a TA in which the terminal before the cell reselection is located is the same as a TA to which the eNB which the terminal currently needs to access belongs. The TA indication information may be 1-bit information that directly indicates whether the TA is changed, or may specifically indicate a value of a TA on which the terminal previously camps, or both of them may be included. The

terminal ID indicates identity information of the terminal. The terminal ID may be ID information allocated by the gNB to the terminal, or may be a temporary mobile subscriber identity (TMSI), or may be an international mobile subscriber identity (IMSI). The SNB ID indicates information about a base station on which the terminal recently camps, namely, a gNB ID. The eNB can find the gNB by using information about the SNB ID. It should be noted that if the terminal ID is the ID information allocated by the gNB to the terminal and information about the terminal ID may be used to indicate an SNB, the terminal may not add the SNB ID to the RRC connection request message. Information about the core network ID is used to indicate information about a core network on which the terminal previously camps.

[0104] If the eNB determines, based on the TA indication information, that the TA is not changed, a TAU process is not performed.

[0105] Operation S**502**: The eNB sends a first terminal location change notification message (UE Location Change Notify) to the gNB, and the gNB receives the first location change notification message sent by the eNB.

[0106] The eNB adds the terminal ID to the first location change notification message.

[0107] Operation S**503**: The gNB sends a second terminal location change notification message to the core network, and the core network receives the second location change notification message sent by the gNB.

[0108] The gNB adds the terminal ID and an eNB ID to the second location change notification message.

[0109] In one embodiment, two optional manners of sending the second terminal location change notification message by the gNB to the core network are: After the gNB receives the first location change notification message sent by the eNB, the gNB immediately sends the second terminal location change notification message to the core network. Alternatively, after waiting T1 duration, the gNB sends the second terminal location change notification message to the core network.

[0110] Operation S**504**: After receiving the second terminal location change notification message, the core network disconnects a connection between a gNB side and a core network side, deletes a context of the connection between the gNB side and the core network side, and sends a second location change response message for the second location change notification message to the gNB, and the gNB receives the second terminal location change response message returned by the core network.

[0111] Operation S**505**: Optionally, the gNB returns a first terminal location change response message (UE Location Change Response) to the eNB.

[0112] The gNB adds information about a timer to the first location change response message.

[0113] Operation S**506**: After receiving the first terminal location change response message returned by the gNB, the eNB sends an RRC connection rejection message (RRC Connection Rejection) to the terminal, and the terminal receives the RRC connection rejection message sent by the eNB.

[0114] The RRC connection rejection message carries the information about the timer. Timeout duration T2 of the timer is used in cooperation with the wait duration T1 for sending the second location change notification message by the gNB to the core network. Optionally, T2 and T1 may be configured to enable a moment at which the core network receives the second location change notification message sent by the gNB to be the same as a timeout moment of the timer that is set by the terminal.

[0115] After receiving the RRC connection rejection message, the terminal starts timing of the timer. When the timer times out, the terminal switches the connected mode from the ECO mode into the idle mode.

[0116] If the RRC connection rejection message received by the terminal does not carry the information about the timer, the terminal may immediately switch the connected mode from the ECO mode into the idle mode.

[0117] If the timer does not time out, the terminal moves from the eNB to the gNB again, so that S**507** is performed.

[0118] Operation S**507**: The terminal sends an RRC connection resume message to the gNB, and the gNB receives the RRC connection resume message sent by the terminal.

[0119] The RRC connection resume message carries the cause indication information used to indicate that after the inter-RAT cell reselection, the terminal reselects the gNB again. The RRC connection resume message may further carry information such as the terminal ID.

[0120] Operation S**508**: The gNB sends an RRC connection resume response message (RRC Connection Suspend) to the terminal, and the terminal receives the RRC connection resume response message sent by the gNB.

[0121] Because the timer does not exceed the duration T2, the terminal does not release a context of a connection between the terminal and the gNB, the gNB does not reach the wait duration T1, and the gNB does not release a context of the connection between the gNB and the terminal, the terminal may rapidly return to the ECO mode.

[0122] However, if the terminal needs to send data, the gNB further instructs the terminal to switch the ECO mode into the active mode.

[0123] In conclusion, it can be learned from the signaling transmission process of the inter-RAT cell reselection shown in FIG. **5** that, the inter-RAT cell reselection can be implemented by using a relatively small quantity of signaling, thereby effectively reducing signaling overheads. Further, the gNB sets the wait duration and use of the timer, so that when reselecting the gNB within a period, the terminal may rapidly access the gNB, and rapidly resume an original connected mode, thereby avoiding a waste of signaling overheads caused by repeated mode switching when the terminal repeatedly moves between the gNB and the eNB.

[0124] Based on an invention concept and an application scenario the same as those in FIG. **5**, referring to FIG. **6**, when the terminal in the ECO mode moves from the gNB to the eNB, a signaling transmission process of a triggered inter-RAT cell reselection may alternatively as follows.

[0125] Operation S**601**: The terminal sends a cell update request message (Cell Update Request) or a first RRC connection resume message to the eNB, and the eNB receives the cell update request message or the first RRC connection resume message sent by the terminal.

[0126] The cell update request message or the first RRC connection resume message carries a terminal ID. Optionally, The cell update request message or the first RRC connection resume message may further carry cause indication information, TA indication information, an SNB ID, and a core network ID. The cause indication information only needs to indicate whether the cell update request is an inter-RAT cell reselection or an intra-system cell reselection.

[0127] A process of S**602** to S**605** is similar to a process of S**502** to S**505**, and repetitions are not described herein again.

[0128] Operation S**606**: After receiving a first terminal location change response message returned by the gNB, the eNB sends a cell update response message (Cell Update Response) or a first RRC connection resume response message to the terminal. The cell update response message or the first RRC connection resume response message carries the information about the timer. The terminal receives the cell update response message or the first RRC connection resume response message sent by the eNB.

[0129] After receiving the cell update response message sent by the eNB, the terminal starts timing of the timer. When the timer reaches duration T2, the terminal switches the connected mode from the ECO mode into the idle mode.

[0130] If an RRC connection rejection message received by the terminal does not carry the information about the timer, the terminal may immediately switch the connected mode from the ECO mode into the idle mode.

[0131] Similarly, if the timer does not reach the duration T2, the terminal moves from the eNB to the gNB again, so that S**607** is performed.

[0132] Operation S**607**: The terminal sends a second RRC connection resume message to the gNB, and the gNB receives the second RRC connection resume message sent by the terminal.

[0133] The second RRC connection resume message carries the cause indication information used to indicate that after the inter-RAT cell reselection, the terminal reselects the gNB again. The second RRC connection resume message may further carry information such as the terminal ID.

[0134] Operation S**608**: The gNB sends a second RRC connection resume response message (RRC Connection Suspend) to the terminal, and the terminal receives the second RRC connection resume response message sent by the gNB.

[0135] In the signaling transmission process of the inter-RAT cell reselection shown in FIG. **5** and FIG. **6**, an X2-like direct interface exists between the eNB and the gNB. If no X2-like direct interface exists between the eNB and the gNB, the eNB and the gNB may exchange signaling by using the core network. Therefore, the signaling transmission process of the inter-RAT cell reselection shown in FIG. **5** may be modified to a signaling transmission process shown in FIG. **7**.

[0136] Operation S**701**: Same as operation S**501**.

[0137] Operation S**702**: The eNB sends a first terminal location change notification message to the core network, and the core network receives the first location change notification message sent by the eNB.

[0138] Operation S**703**: The core network sends a second terminal location change notification message to the gNB, and the gNB receives the second location change notification message sent by the core network.

[0139] Specifically, two optional manners of sending the second terminal location change response message by the core network to the gNB are: After receiving the first location change notification message sent by the eNB, the core network immediately sends the second terminal location change notification message to the gNB. Alternatively, after waiting T3 duration, the core network sends the second terminal location change notification message to the gNB.

[0140] Operation S**704**: Optionally, after receiving the second terminal location change notification message sent by the core network, the gNB disconnects a connection between a gNB side and a core network side, deletes a context of the connection between the gNB side and the core network side, and sends a second location change response message for the second location change notification message to the core network, and the core network receives the second location change response message sent by the gNB.

[0141] Operation S**705**: The core network sends a first location change response message to the eNB, and the eNB receives the first location change response message sent by the core network.

[0142] The core network adds information about a timer to the first location change response message, and timeout duration of the timer is T4.

[0143] Operation S**706**: After receiving the first terminal location change response message returned by the core network, the eNB sends an RRC connection rejection message to the terminal.

[0144] The RRC connection rejection message carries the information about the timer. The Timeout duration T4 of the timer is used in cooperation with the wait duration T3 for sending the second location change notification message by the core network to the gNB. Optionally, T4 and T3 may be configured to enable a moment at which the gNB receives the second location change notification message sent by the core network to be the same as a timeout moment of the timer that is set by the terminal.

[0145] After receiving the RRC connection rejection message, the terminal starts timing of the timer. When the timer reaches the duration T4, the terminal switches the connected mode from the ECO mode into the idle mode.

[0146] If the RRC connection rejection message received by the terminal does not carry the information about the timer, the terminal may immediately switch the connected mode from the ECO mode into the idle mode.

[0147] Herein, if the timer does not reach the duration T4, the terminal moves from the eNB to the gNB again, so that S**707** is performed.

[0148] A process of S**707** and S**708** is similar to a process of S**507** and S**508**, and repetitions are not described herein again.

[0149] Similarly, if no X2-like direct interface exists between the eNB and the gNB, the signaling transmission process of the inter-RAT cell reselection shown in FIG. **6** may be modified to a signaling transmission process shown in FIG. **8**.

[0150] In FIG. **8**, operation S**801** is the same as operation S**601**, a process of operation S**802** to operation S**805** is similar to a process of operation S**702** to operation S**705**, operation S**806** is the same as operation S**606**, and a process of operation S**807** and operation S**808** is similar to the process of operation S**707** and operation S**708**, and repetitions are not described herein again.

[0151] In addition, based on an application scenario the same as that of FIG. **5**, a signaling transmission process of another inter-RAT cell reselection according to an embodiment of this application is shown in FIG. **9**. Referring to FIG. **9**, when the terminal in the ECO mode moves from the gNB to the eNB, a signaling transmission process of a triggered inter-RAT cell reselection is as follows.

[0152] Operation S**901**: The terminal sends a cell update request message to the gNB, and the gNB receives the cell update request message sent by the terminal.

[0153] The cell update request message carries a terminal ID and cause indication information. Optionally, the cell update request message may further carry TA indication information, an SNB ID, and a core network ID. The cause indication information herein indicates that the terminal performs an inter-RAT cell reselection process.

[0154] Operation S**902**: The gNB sends a terminal location change notification message (UE Location Change Notify) to the core network, and the core network receives the terminal location change notification message sent by the gNB.

[0155] Specifically, two optional manners of sending the terminal location change notification message by the gNB to the core network are: After the gNB receives the cell update request message, the gNB immediately sends the terminal location change notification message to the core network. Alternatively, after waiting T5 duration, the gNB sends the terminal location change notification message to the core network.

[0156] Operation S**903**: The core network sends a location change response message to the gNB, and the gNB receives the location change response message sent by the core network.

[0157] Operation S**904**: The gNB sends a cell update response message to the terminal, and the terminal receives the cell update response message sent by the gNB.

[0158] If in operation S**902**, the gNB sends the terminal location change notification message to the core network after waiting the T5 duration, the gNB adds information about a timer to the cell update response message sent by the terminal, and timeout duration of the timer is T6. The Timeout duration T6 of the timer is used in cooperation with T5, and the wait duration T5 for sending the terminal location change notification message by the gNB to the core network is enabled to be the same as a timeout moment of the timer that is set by the terminal.

[0159] There is a special case of the signaling transmission process shown in FIG. **9**. For example, in an application scenario shown in FIG. **4***a*, an NR gNB' (which is referred to as gNB' for short below) is also a base station in 5G, the NR gNB' and the gNB are in a same RAN-based notification area, and movement of an ECO user in the same RAN-based notification area does not need to be notified to the core network. Therefore, when the terminal reselects the gNB' from the gNB, this process does not need to be notified to the core network, and the gNB maintains a connection between the gNB and a core network side and a context of the terminal. In this case, signaling between the terminal and the gNB needs to be forwarded by the gNB', because the terminal can communicate with only the gNB'. Except this, another signaling processing process is the same as that shown in FIG. **9**. Specifically, such a signaling processing procedure is shown in FIG. **10**.

[0160] Operation S**1001**: The terminal sends a cell update request message to the gNB', and the gNB' receives the cell update request message sent by the terminal.

[0161] Operation S**1002**: The gNB' sends the cell update request message to the gNB, and the gNB receives the cell update request message sent by the gNB'.

[0162] Operation S**1003**: The gNB sends a terminal location change notification message to the core network, and the core network receives the terminal location change notification message sent by the gNB.

[0163] Operation S**1004**: The core network sends a terminal location change response message to the gNB, and the gNB receives the terminal location change response message sent by the core network.

[0164] Operation S**1005**: Optionally, the gNB sends a cell update response message to the gNB', and the gNB' receives the cell update response message sent by the gNB.

[0165] Operation S**1006**: The gNB' sends the cell update response message to the terminal, and the terminal receives the cell update response message sent by the gNB'.

[0166] Based on an invention concept the same as that of the method shown in FIG. **2**, referring to FIG. **11**, an embodiment of this application further provides a terminal **1100**, and the terminal **1100** has a function of implementing a behavior of the terminal according to the method shown in FIG. **2**. The function may be implemented by using hardware, or may be implemented by hardware executing corresponding software. The hardware or software includes one or more modules corresponding to the foregoing function.

[0167] In one embodiment, the terminal **1100** includes a sending unit **1101**, a receiving unit **1102**, and a conversion unit **1103**.

[0168] The sending unit **1101** is configured to send a first request message to a first base station. The first request message carries first cause indication information, and the first cause indication information indicates that the terminal needs to perform a cell reselection process from a second base station to the first base station.

[0169] The receiving unit **1102** is configured to: after the sending unit **1101** sends the first request message, receive an acknowledgement returned by the first base station for the first request message.

[0170] The conversion unit **1103** is configured to switch a first connected mode into a second connected mode based on the acknowledgement received by the receiving unit **1102**. A first RAT system supports the second connected mode. The first base station is located in the first radio access technology RAT system, the second base station is located in a second RAT system, the terminal is in the first connected mode when connecting to the second base station, and the first RAT system does not support the first connected mode. In this way, the inter-RAT cell reselection can be implemented by using a relatively small quantity of signaling, thereby reducing signaling overheads, and avoiding a waste of system resources.

[0171] In one embodiment, the first request message is a Radio Resource Control RRC connection request message, and the acknowledgement is an RRC connection rejection message; or the first request message is a cell update request message, and the acknowledgement is a cell update response message; or the first request message is an RRC connection resume message, and the acknowledgement is an RRC connection resume response message. A larger quantity of possible signaling is provided to carry the cause indication information, thereby expanding diversity of manners in which the inter-RAT cell reselection can be implemented.

[0172] In one embodiment, the acknowledgement includes information about a timer; and the conversion unit **1103** is configured to: start timing of the timer based on the information about the timer; and when the timer times out, release a context of a connection relationship between the terminal and the second base station, and switch the first

connected mode into the second connected mode. This helps the terminal rapidly establish a connection when reselecting the second base station again within a period, to rapidly restore the first connected mode, thereby reducing the signaling overheads.

[0173] In one embodiment, the terminal further includes a triggering unit **1104**, configured to: before the conversion unit **1103** switches the first connected mode into the second connected mode based on the acknowledgement, trigger the cell reselection process from the first base station to the second base station when the timer does not time out; and the sending unit **1101** is further configured to: when the triggering unit **1104** triggers the cell reselection process from the first base station to the second base station, send a second request message to the second base station. The second request message carries second cause indication information, and the second cause indication information indicates that the terminal reselects, when the timer does not time out, to connect to the second base station. The second cause indication information is carried to indicate, to the second base station, that an objective of this reselection is to reselect, when the timer does not time out, to connect to the second base station, so that the second base station can remain the terminal in the first connected mode instead of switching the first connected mode to another connected mode.

[0174] In one embodiment, the first request message further carries tracking area TA indication information, and the TA indication information is used to indicate whether the first base station needs to trigger a TA update process. In this way, after the terminal reselects the first base station, the tracking area update process may be omitted when the process is not required, thereby reducing a large quantity of signaling overheads on a core network side.

[0175] In one embodiment, the first connected mode is an energy conserved operation ECO mode, and the second connected mode is an idle mode.

[0176] Based on an invention concept the same as that of the method shown in FIG. **2**, referring to FIG. **12**, an embodiment of this application further provides a network side device **1200**, and the network side device **1200** has a function of implementing a behavior of the first base station according to the method shown in FIG. **2**. The function may be implemented by using hardware, or may be implemented by hardware executing corresponding software. The hardware or software includes one or more modules corresponding to the foregoing function.

[0177] In one embodiment, the network side device **1200** is a first base station. The network side device **1200** includes a receiving unit **1201**, a determining unit **1202**, and a sending unit **1203**.

[0178] The receiving unit **1201** is configured to receive a first request message sent by a terminal.

[0179] The determining unit **1202** is configured to determine, based on first cause indication information carried in the first request message received by the receiving unit **1201**, that the terminal needs to perform a cell reselection process from a second base station to a first base station. The first base station is located in a first radio access technology RAT system, the second base station is located in a second RAT system, the terminal is in a first connected mode when connecting to the second base station, and the first RAT system does not support the first connected mode.

[0180] The sending unit **1203** is configured to return an acknowledgement for the first request message to the terminal, to instruct the terminal to switch the first connected mode into a second connected mode. The first RAT system supports the second connected mode.

[0181] In this way, the inter-RAT cell reselection can be implemented by using a relatively small quantity of signaling, thereby reducing signaling overheads, and avoiding a waste of system resources.

[0182] In one embodiment, the receiving unit **1201** and the sending unit **1203** are specifically configured to: the receiving unit **1201** receives a Radio Resource Control RRC connection request message sent by the terminal, and the sending unit **1203** returns an RRC connection rejection message to the terminal; or the receiving unit **1201** receives a cell update request message sent by the terminal, and the sending unit **1203** returns a cell update response message to the terminal; or the receiving unit **1201** receives an RRC resume message sent by the terminal, and the sending unit **1203** returns an RRC resume response message to the terminal. In this way, a larger quantity of possible signaling is provided to carry the cause indication information, thereby expanding diversity of manners in which the inter-RAT cell reselection can be implemented.

[0183] In one embodiment, the receiving unit **1201** and the sending unit **1203** are further configured to: after the determining unit **1202** determines that the terminal needs to perform the cell reselection process from the second base station to the first base station, and before the sending unit **1203** returns the acknowledgement for the first request message to the terminal, the sending unit **1203** notifies the second base station of a terminal location change message, and the receiving unit **1201** receives a response message that carries information about a timer and that is sent by the second base station; and the sending unit **1203** is specifically configured to: add the information about the timer to the acknowledgement for the first request message, and return the acknowledgement to the terminal. The information about the timer is used to instruct the terminal to release, when the timer times out, a context of a connection relationship between the terminal and the second base station, and switch the first connected mode into the second connected mode. This helps the terminal rapidly establish a connection when reselecting the second base station again within a period, to rapidly restore the first connected mode, thereby reducing the signaling overheads.

[0184] In one embodiment, if no direct interface exists between the first base station and the second base station, the sending unit **1203** is further configured to notify the second base station of the terminal location change message by using a core network, and the receiving unit **1201** is further configured to receive the response message that carries the information about the timer and that is sent by the second base station by using the core network. Various application scenarios are considered, so that the method in this application is more widely applicable.

[0185] Based on an invention concept the same as that of the method shown in FIG. **2**, referring to FIG. **13**, an embodiment of this application further provides a network side device **1300**. The network side device **1300** is a second base station, a first base station is located in a first radio access technology RAT system, the second base station is located in a second RAT system, a terminal is connected to the second base station, a connected mode of the terminal is

a first connected mode, and the first RAT system does not support the first connected mode of the terminal and supports a second connected mode of the terminal. The network side device **1300** includes a receiving unit **1301**, a sending unit **1302**, a timing unit **1303**, and a determining unit **1304**.

[0186] The receiving unit **1301** is configured to receive a terminal location update indication sent by the first base station. The terminal location update indication is used to indicate that the terminal needs to perform a cell reselection process from the second base station to the first base station.

[0187] The sending unit **1302** is configured to: after the receiving unit **1301** receives the terminal location update indication, return a response message for the terminal location update indication to the first base station.

[0188] The timing unit **1303** is configured to: after the receiving unit **1301** receives the terminal location update indication, start a first timer.

[0189] The sending unit **1302** is further configured to: when the first timer recorded by the timing unit **1303** times out, instruct a core network to release a bearer of the terminal. The response message includes information about a second timer, timeout duration of the second timer is determined by timeout duration of the first timer, and the second timer is configured to: instruct the terminal to release, when the second timer times out, a context of a connection relationship between the terminal and the second base station, and switch the first connected mode into the second connected mode. In this way, a waste of signaling overheads caused by repeated cell reselections because the terminal repeatedly moves between the first base station and the second base station after the terminal triggers the cell reselection from the second base station to the first base station is avoided. The method helps the terminal rapidly establish a connection when reselecting the second base station again within a period, to rapidly restore the first connected mode, thereby reducing the signaling overheads.

[0190] In one embodiment, the receiving unit **1301** is further configured to: when the first timer does not time out, receive a connection request message of the terminal. The network side device further includes a determining unit **1304**, configured to: after the receiving unit **1301** receives the connection request message of the terminal, determine, based on cause indication information carried in the connection request message, that the terminal reselects, when the second timer does not time out, to connect to the second base station. The sending unit **1302** is further configured to return a response message for the connection request message to the terminal, to indicate that the terminal is in the first connected mode. The second base station determines, by using the second cause indication information carried in the connection request message sent by the terminal, that an objective of this reselection of the terminal is to reselect, when the second timer does not time out, to connect to the second base station, so that the second base station can remain the terminal in the first connected mode instead of switching the first connected mode to another connected mode.

[0191] In one embodiment, the first connected mode is an energy conserved operation ECO mode, and the second connected mode is an idle mode.

[0192] Based on an invention concept the same as that of the method shown in FIG. **2**, referring to FIG. **14**, an embodiment of this application further provides a terminal **1400**, and the terminal **1400** has a function of implementing a behavior of the terminal according to the method shown in FIG. **2**. The function may be implemented by using hardware, or may be implemented by hardware executing corresponding software. The hardware or software includes one or more modules corresponding to the foregoing function.

[0193] In one embodiment, a structure of the terminal **1400** includes a memory **1401**, a processor **1402**, and a transceiver **1403**. The memory **1401** is configured to store a group of programs, and the processor **1402** is configured to invoke the programs stored in the memory **1401**, to perform the following operations:

[0194] sending, by using the transceiver **1403**, a first request message to a first base station, where the first request message carries first cause indication information, and the first cause indication information indicates that the terminal needs to perform a cell reselection process from a second base station to the first base station;

[0195] after sending the first request message by using the transceiver **1403**, receiving, by using the transceiver **1403**, an acknowledgement returned by the first base station for the first request message; and switching a first connected mode into a second connected mode based on the acknowledgement received by using the transceiver **1403**, where a first RAT system supports the second connected mode, the first base station is located in the first radio access technology RAT system, the second base station is located in a second RAT system, the terminal is in the first connected mode when connecting to the second base station, and the first RAT system does not support the first connected mode. In this way, the inter-RAT cell reselection can be implemented by using a relatively small quantity of signaling, thereby reducing signaling overheads, and avoiding a waste of system resources.

[0196] In one embodiment, the first request message is a Radio Resource Control RRC connection request message, and the acknowledgement is an RRC connection rejection message; or the first request message is a cell update request message, and the acknowledgement is a cell update response message; or the first request message is an RRC connection resume message, and the acknowledgement is an RRC connection resume response message. A larger quantity of possible signaling is provided to carry the cause indication information, thereby expanding diversity of manners in which the inter-RAT cell reselection can be implemented.

[0197] In one embodiment, the acknowledgement includes information about a timer; and the processor **1402** is further configured to: start timing of the timer based on the information about the timer; and when the timer times out, release a context of a connection relationship between the terminal and the second base station, and switch the first connected mode into the second connected mode. This helps the terminal rapidly establish a connection when reselecting the second base station again within a period, to rapidly restore the first connected mode, thereby reducing the signaling overheads.

[0198] In one embodiment, the processor **1402** is further configured to: before switching the first connected mode into the second connected mode based on the acknowledgement and when the timer does not time out, trigger the cell reselection process from the first base station to the second base station; and when triggering the cell reselection process from the first base station to the second base station, send a second request message to the second base station by using the transceiver **1403**. The second request message carries

second cause indication information, and the second cause indication information indicates that the terminal reselects, when the timer does not time out, to connect to the second base station. The second cause indication information is carried to indicate, to the second base station, that an objective of this reselection is to reselect, when the timer does not time out, to connect to the second base station, so that the second base station can remain the terminal in the first connected mode instead of switching the first connected mode to another connected mode.

[0199] In one embodiment, the first request message further carries tracking area TA indication information, and the TA indication information is used to indicate whether the first base station needs to trigger a TA update process. In this way, after the terminal reselects the first base station, the tracking area update process may be omitted when the process is not required, thereby reducing a large quantity of signaling overheads on a core network side.

[0200] In one embodiment, the first connected mode is an energy conserved operation ECO mode, and the second connected mode is an idle mode.

[0201] In FIG. **14**, the processor **1402** may be a central processing unit (CPU for short), a network processor (NP for short), or a combination of a CPU and an NP.

[0202] The processor **1402** may further include a hardware chip. The hardware chip may be an application-specific integrated circuit (ASIC for short), a programmable logic device (PLD for short), or a combination thereof. The PLD may be a complex programmable logic device (CPLD for short), a field-programmable gate array (FPGA for short), a generic array logic (GAL for short), or any combination thereof.

[0203] The memory **1401** may include a volatile memory, such as a random access memory (RAM for short). The memory **1401** may alternatively include a non-volatile memory, such as a flash memory, a hard disk (HDD for short), or a solid state disk (SSD for short). The memory **1401** may alternatively include a combination of the foregoing types of memories.

[0204] Based on an invention concept the same as that of the method shown in FIG. **2**, referring to FIG. **15**, an embodiment of this application further provides a network side device **1500**, and the network side device **1500** has a function of implementing a behavior of the first base station according to the method shown in FIG. **2**. The function may be implemented by using hardware, or may be implemented by hardware executing corresponding software. The hardware or software includes one or more modules corresponding to the foregoing function.

[0205] In one embodiment, the network side device **1500** is a first base station. The network side device **1500** includes a memory **1501**, a processor **1502**, and a transceiver **1503**. The memory **1501** is configured to store a group of programs, and the processor **1502** is configured to invoke the programs stored in the memory **1501**, to perform the following operations:

[0206] receiving, by using the transceiver **1503**, a first request message sent by a terminal;

[0207] determining, based on first cause indication information carried in the received first request message, that the terminal needs to perform a cell reselection process from a second base station to a first base station, where the first base station is located in a first radio access technology RAT system, the second base station is located in a second RAT system, the terminal is in a first connected mode when connecting to the second base station, and the first RAT system does not support the first connected mode; and

[0208] returning, by using the transceiver **1503**, an acknowledgement for the first request message to the terminal, to instruct the terminal to switch the first connected mode into a second connected mode, where the first RAT system supports the second connected mode.

[0209] In this way, the inter-RAT cell reselection can be implemented by using a relatively small quantity of signaling, thereby reducing signaling overheads, and avoiding a waste of system resources.

[0210] In one embodiment, the processor **1502** receives, by using the transceiver **1503**, an RRC connection request message sent by the terminal, and returns an RRC connection rejection message to the terminal; or the processor **1502** receives, by using the transceiver **1503**, a cell update request message sent by the terminal, and returns a cell update response message to the terminal; or the processor **1502** receives, by using the transceiver **1503**, an RRC resume message sent by the terminal, and returns an RRC resume response message to the terminal. In this way, a larger quantity of possible signaling is provided to carry the cause indication information, thereby expanding diversity of manners in which the inter-RAT cell reselection can be implemented.

[0211] In one embodiment, after determining that the terminal needs to perform the cell reselection process from the second base station to the first base station and before returning the acknowledgement for the first request message to the terminal by using the transceiver **1503**, the processor **1502** notifies, by using the transceiver **1503**, the second base station of a terminal location change message, and receives a response message that carries information about a timer and that is sent by the second base station; and the processor **1502** adds, by using the transceiver **1503**, the information about the timer to the acknowledgement for the first request message, and returns the acknowledgement to the terminal. The information about the timer is used to instruct the terminal to release, when the timer times out, a context of a connection relationship between the terminal and the second base station, and switch the first connected mode into the second connected mode. This helps the terminal rapidly establish a connection when reselecting the second base station again within a period, to rapidly restore the first connected mode, thereby reducing the signaling overheads.

[0212] In one embodiment, if no direct interface exists between the first base station and the second base station, the processor **1502** notifies, by using the transceiver **1503**, the second base station of the terminal location change message by using a core network, and receives the response message that carries the information about the timer and that is sent by the second base station by using the core network. Various application scenarios are considered, so that the method in this application is more widely applicable.

[0213] In FIG. **15**, the processor **1502** may be a central processing unit (CPU for short), a network processor (NP for short), or a combination of a CPU and an NP.

[0214] The processor **1502** may further include a hardware chip. The hardware chip may be an application-specific integrated circuit (ASIC for short), a programmable logic device (PLD for short), or a combination thereof. The PLD may be a complex programmable logic device (CPLD for

short), a field-programmable gate array (FPGA for short), a generic array logic (GAL for short), or any combination thereof.

[0215] The memory **1501** may include a volatile memory, such as a random access memory (RAM for short). The memory **1501** may alternatively include a non-volatile memory, such as a flash memory, a hard disk (HDD for short), or a solid state disk (SSD for short). The memory **1501** may alternatively include a combination of the foregoing types of memories.

[0216] Based on an invention concept the same as that of the method shown in FIG. **2**, referring to FIG. **16**, an embodiment of this application further provides a network side device **1600**. The network side device **1600** is a second base station, a first base station is located in a first radio access technology RAT system, the second base station is located in a second RAT system, a terminal is connected to the second base station, a connected mode of the terminal is a first connected mode, and the first RAT system does not support the first connected mode of the terminal and supports a second connected mode of the terminal. The network side device **1600** includes a memory **1601**, a processor **1602**, and a transceiver **1603**. The memory **1601** is configured to store a group of programs, and the processor **1602** is configured to invoke the programs stored in the memory **1601**, to perform the following operations:

[0217] receiving, by using the transceiver **1603**, a terminal location update indication sent by the first base station, where the terminal location update indication is used to indicate that the terminal needs to perform a cell reselection process from the second base station to the first base station;

[0218] after receiving the terminal location update indication, returning, by using the transceiver **1603**, a response message for the terminal location update indication to the first base station;

[0219] after receiving the terminal location update indication, starting a first timer; and

[0220] when the recorded first timer times out, instructing a core network to release a bearer of the terminal, where the response message includes information about a second timer, timeout duration of the second timer is determined by timeout duration of the first timer, and the second timer is configured to instruct the terminal to release, when the second timer times out, a context of a connection relationship between the terminal and the second base station, and switch the first connected mode into the second connected mode. In this way, a waste of signaling overheads caused by repeated cell reselections because the terminal repeatedly moves between the first base station and the second base station after the terminal triggers the cell reselection from the second base station to the first base station is avoided. The method helps the terminal rapidly establish a connection when reselecting the second base station again within a period, to rapidly restore the first connected mode, thereby reducing the signaling overheads.

[0221] In one embodiment, when the first timer does not time out, the processor **1602** receives a connection request message of the terminal by using the transceiver **1603**; after receiving the connection request message of the terminal, the processor **1602** determines, based on cause indication information carried in the connection request message, that the terminal reselects, when the second timer does not time out, to connect to the second base station; and the processor **1602** returns a response message for the connection request message to the terminal by using the transceiver **1603**, to indicate that the terminal is in the first connected mode. The second base station determines, by using the second cause indication information carried in the connection request message sent by the terminal, that an objective of this reselection of the terminal is to reselect, when the second timer does not time out, to connect to the second base station, so that the second base station can remain the terminal in the first connected mode instead of switching the first connected mode to another connected mode.

[0222] In one embodiment, the first connected mode is an energy conserved operation ECO mode, and the second connected mode is an idle mode.

[0223] In FIG. **16**, the processor **1602** may be a central processing unit (CPU for short), a network processor (NP for short), or a combination of a CPU and an NP.

[0224] The processor **1602** may further include a hardware chip. The hardware chip may be an application-specific integrated circuit (ASIC for short), a programmable logic device (PLD for short), or a combination thereof. The PLD may be a complex programmable logic device (CPLD for short), a field-programmable gate array (FPGA for short), a generic array logic (GAL for short), or any combination thereof.

[0225] The memory **1601** may include a volatile memory, such as a random access memory (RAM for short). The memory **1601** may alternatively include a non-volatile memory, such as a flash memory, a hard disk (HDD for short), or a solid state disk (SSD for short). The memory **1601** may alternatively include a combination of the foregoing types of memories.

[0226] According to one embodiment, an inter-RAT cell reselection method includes:

[0227] receiving, by a first base station, a first request message from a terminal, wherein the first request message includes first cause indication information;

[0228] determining that the terminal needs to perform a cell reselection process from a second base station to the first base station, wherein the first base station is located in a first radio access technology (RAT) system, the second base station is located in a second RAT system, the terminal is in a first connected mode when connecting to the second base station, and the first RAT system does not support the first connected mode; and

[0229] returning, by the first base station, an acknowledgement for the first request message to the terminal to instruct the terminal to switch the first connected mode into a second connected mode, wherein the first RAT system supports the second connected mode.

[0230] The receiving, by a first base station, a first request message sent by a terminal and the returning an acknowledgement for the first request message to the terminal comprises:

[0231] receiving, by the first base station, a Radio Resource Control (RRC) connection request message from the terminal, and returning an RRC connection rejection message to the terminal; or

[0232] receiving, by the first base station, a cell update request message from the terminal, and returning a cell update response message to the terminal; or

[0233] receiving, by the first base station, an RRC resume message from the terminal, and returning an RRC resume response message to the terminal.

[0234] After the determining, by the first base station, that the terminal needs to perform a cell reselection process from a second base station to the first base station and before the returning an acknowledgement for the first request message to the terminal, the method further comprises:

[0235] notifying, by the first base station, the second base station of a terminal location change message, and receiving a response message that includes information about a timer and that is sent by the second base station; and

[0236] the returning, by the first base station, an acknowledgement for the first request message to the terminal comprises:

[0237] adding, by the first base station, the information about the timer to the acknowledgement for the first request message, and returning the acknowledgement to the terminal, wherein the information about the timer is used to instruct the terminal to release, when the timer times out, a context of a connection relationship between the terminal and the second base station, and switches the first connected mode into the second connected mode.

[0238] The notifying, by the first base station, the second base station of a terminal location change message, and receiving a response message that carries information about a timer and that is sent by the second base station comprises:

[0239] if no direct interface exists between the first base station and the second base station, notifying, by the first base station, the second base station of the terminal location change message by using a core network, and receiving the response message that includes the information about the timer and that is sent by the second base station by using the core network.

[0240] According to another embodiment, an inter-RAT cell reselection method includes:

[0241] receiving, by a second base station, a terminal location update indication from a first base station, wherein the terminal location update indication is used to indicate that a terminal needs to perform a cell reselection process from the second base station to the first base station, wherein the first base station is located in a first radio access technology (RAT) system, the second base station is located in a second RAT system, the terminal is connected to the second base station, a connected mode of the terminal is a first connected mode, the first RAT system does not support the first connected mode of the terminal and supports a second connected mode of the terminal;

[0242] returning, by the second base station, a response message for the terminal location update indication to the first base station, and starting a first timer; and

[0243] instructing, by the second base station when the first timer times out, a core network to release a bearer of the terminal, wherein

[0244] the response message comprises information about a second timer, timeout duration of the second timer is determined by timeout duration of the first timer, and the second timer is configured to instruct the terminal to release, when the second timer times out, a context of a connection relationship between the terminal and the second base station, and switch the first connected mode into the second connected mode.

[0245] The method further includes:

[0246] if the second base station receives a connection request message of the terminal when the first timer does not time out, determining, based on cause indication information carried in the connection request message, that the terminal reselects, when

[0247] the second timer does not time out, to connect to the second base station, so that the second base station returns a response message for the connection request message to the terminal, to indicate that the terminal is in the first connected mode.

[0248] The first connected mode is an energy conserved operation (ECO) mode, and the second connected mode is an idle mode.

[0249] According to another embodiment, a network side device operating as a first base station includes:

[0250] a transceiver;

[0251] a processor; and

[0252] a memory to store a group of instructions, and the processor is configured to invoke the instructions stored in the memory, to perform the following operations:

[0253] receiving, using the transceiver, a first request message from a terminal, wherein the first base station is located in a first radio access technology (RAT) system, the second base station is located in a second RAT system, the terminal is in a first connected mode when connecting to the second base station, and the first RAT system does not support the first connected mode;

[0254] determining, based on first cause indication information carried in the received first request message, that the terminal needs to perform a cell reselection process from the second base station to the first base station; and

[0255] returning an acknowledgement for the first request message to the terminal using the transceiver to instruct the terminal to switch the first connected mode into a second connected mode, wherein the first RAT system supports the second connected mode.

[0256] The processor is configured to:

[0257] receive, by using the transceiver, a Radio Resource Control (RRC) connection request message from the terminal, and return an RRC connection rejection message to the terminal; or

[0258] receive, using the transceiver, a cell update request message from the terminal, and return a cell update response message to the terminal; or

[0259] receive, using the transceiver, an RRC resume message from the terminal, and return an RRC resume response message to the terminal.

[0260] The processor is further configured to:

[0261] after determining that the terminal needs to perform the cell reselection process from the second base station to the first base station and before returning the acknowledgement for the first request message to the terminal, notify, using the transceiver, the second base station of a terminal location change message, and receive a response message that includes information about a timer and that is sent by the second base station; and

[0262] add the information about the timer to the acknowledgement for the first request message, and

return the acknowledgement to the terminal, wherein the information about the timer is used to instruct the terminal to release, when the timer times out, a context of a connection relationship between the terminal and the second base station, and switch the first connected mode into the second connected mode.

[0263] If no direct interface exists between the first base station and the second base station, the processor is further configured to:

[0264] notify the second base station of the terminal location change message by using a core network, and receive, by using the transceiver, the response message that includes the information about the timer and that is sent by the second base station by using the core network.

[0265] According to another embodiment, a network side device operating as a second base station includes:

[0266] a transceiver;

[0267] a processor; and

[0268] a memory to store a group of instructions, and the processor is configured to invoke the instructions stored in the memory, to perform the following operations:

[0269] receiving, using the transceiver, a terminal location update indication from a first base station, wherein the terminal location update indication is used to indicate that a terminal needs to perform a cell reselection process from the second base station to the first base station, wherein the first base station is located in a first radio access technology (RAT) system, the second base station is located in a second RAT system, a terminal is connected to the second base station, a connected mode of the terminal is a first connected mode, and the first RAT system does not support the first connected mode of the terminal and supports a second connected mode of the terminal;

[0270] after receiving the terminal location update indication, returning a response message for the terminal location update indication to the first base station by using the transceiver;

[0271] after receiving the terminal location update indication, starting a first timer; and

[0272] when the recorded first timer times out, instructing a core network to release a bearer of the terminal, wherein

[0273] the response message comprises information about a second timer, timeout duration of the second timer is determined by timeout duration of the first timer, and the second timer is configured to instruct the terminal to release, when the second timer times out, a context of a connection relationship between the terminal and the second base station, and switch the first connected mode into the second connected mode.

[0274] The processor is further configured to:

[0275] when the first timer does not time out, receive a connection request message of the terminal using the transceiver;

[0276] after receiving the connection request message of the terminal, determine, based on cause indication information carried in the connection request message, that the terminal reselects, when the second timer does not time out, to connect to the second base station; and

[0277] returning a response message for the connection request message to the terminal, to indicate that the terminal is in the first connected mode.

[0278] The first connected mode is an energy conserved operation (ECO) mode, and the second connected mode is an idle mode.

[0279] Person skilled in the art should understand that the embodiments of this application may be provided as a method, a system, or a computer program product. Therefore, this application may use a form of hardware only embodiments, software only embodiments, or embodiments with a combination of software and hardware. Moreover, this application may use a form of a computer program product that is implemented on one or more computer-usable storage media (including but not limited to a disk memory, a CD-ROM, an optical memory, and the like) that include computer-usable program code.

[0280] This application is described with reference to the flowcharts and/or block diagrams of the method, the device (system), and the computer program product according to the embodiments of this application. It should be understood that computer program instructions may be used to implement each process and/or each block in the flowcharts and/or the block diagrams and a combination of a process and/or a block in the flowcharts and/or the block diagrams. These computer program instructions may be provided for a general-purpose computer, a dedicated computer, an embedded processor, or a processor of another programmable data processing device to generate a machine, so that the instructions executed by the computer or the processor of the another programmable data processing device generate an apparatus for implementing a specific function in one or more processes in the flowcharts and/or in one or more blocks in the block diagrams.

[0281] These computer program instructions may be stored in a computer-readable memory that can instruct the computer or the another programmable data processing device to work in a specific manner, so that the instructions stored in the computer-readable memory generate an artifact that includes an instruction apparatus. The instruction apparatus implements a specific function in one or more processes in the flowcharts and/or in one or more blocks in the block diagrams.

[0282] These computer program instructions may be loaded onto a computer or another programmable data processing device, so that a series of operations and steps are performed on the computer or the another programmable device, thereby generating computer-implemented processing. Therefore, the instructions executed on the computer or another programmable device provide steps for implementing a specific function in one or more processes in the flowcharts and/or in one or more blocks in the block diagrams.

[0283] Although some preferred embodiments of this application have been described, persons skilled in the art can make changes and modifications to these embodiments once they learn the basic inventive concept. Therefore, the following claims are intended to be construed as to cover the preferred embodiments and all changes and modifications falling within the scope of this application.

[0284] Obviously, persons skilled in the art can make various modifications and variations to the embodiments of this application without departing from the spirit and scope of the embodiments of the present invention. This applica-

tion is intended to cover these modifications and variations provided that they fall within the scope of protection defined by the following claims and their equivalent technologies.

What is claimed is:

1. An inter-RAT cell reselection method, comprising:

sending, by a terminal, a first request message to a first base station, wherein the first request message includes first cause indication information to indicate that the terminal needs to perform a cell reselection process from a second base station to the first base station, the first base station is located in a first radio access technology (RAT) system, the second base station is located in a second RAT system, the terminal is in a first connected mode when connecting to the second base station, and the first RAT system does not support the first connected mode; and

receiving, by the terminal, an acknowledgement returned by the first base station for the first request message, and switching the first connected mode into a second connected mode based on the acknowledgement, wherein the first RAT system supports the second connected mode.

2. The method according to claim 1, wherein the first request message is a Radio Resource Control (RRC) connection request message, and the acknowledgement is an RRC connection rejection message; or

the first request message is a cell update request message, and the acknowledgement is a cell update response message; or

the first request message is an RRC connection resume message, and the acknowledgement is an RRC connection resume response message.

3. The method according to claim 1, wherein the acknowledgement comprises information about a timer; and

the switching, by the terminal, the first connected mode into a second connected mode based on the acknowledgement comprises:

starting, by the terminal, timing of the timer based on the information about the timer; and when the timer times out, releasing a context of a connection relationship between the terminal and the second base station, and switching the first connected mode into the second connected mode.

4. The method according to claim 3, wherein before the switching, by the terminal, the first connected mode into a second connected mode based on the acknowledgement, the method further comprises:

if the terminal triggers the cell reselection process from the first base station to the second base station when the timer does not time out, sending, by the terminal, a second request message to the second base station, wherein the second request message includes second cause indication information to indicate that the terminal reselects, when the timer does not time out, to connect to the second base station.

5. The method according to claim 1, wherein the first request message further includes tracking area (TA) indication information to indicate whether the first base station needs to trigger a TA update process.

6. The method according to claim 1, wherein the first connected mode is an energy conserved operation (ECO) mode, and the second connected mode is an idle mode.

7. A terminal, comprising:

a transceiver;

a processor; and

a memory to store a group of instructions, and the processor is configured to invoke the instructions stored in the memory, to perform the following operations:

sending, by using the transceiver, a first request message to a first base station, wherein the first request message includes first cause indication information to indicate that the terminal needs to perform a cell reselection process from a second base station to the first base station, wherein a first base station is located in a first radio access technology (RAT) system, the second base station is located in a second RAT system, the terminal is in a first connected mode when connecting to the second base station, the first RAT system does not support the first connected mode;

after sending the first request message, receiving, by using the transceiver, an acknowledgement returned by the first base station for the first request message; and

switching the first connected mode into a second connected mode based on the received acknowledgement, wherein the first RAT system supports the second connected mode.

8. The terminal according to claim 7, wherein the first request message is a Radio Resource Control (RRC) connection request message, and the acknowledgement is an RRC connection rejection message; or

the first request message is a cell update request message, and the acknowledgement is a cell update response message; or

the first request message is an RRC connection resume message, and the acknowledgement is an RRC connection resume response message.

9. The terminal according to claim 7, wherein the acknowledgement comprises information about a timer; and

the processor is further configured to:

start timing of the timer based on the information about the timer;

when the timer times out, release a context of a connection relationship between the terminal and the second base station; and

switch the first connected mode into the second connected mode.

10. The terminal according to claim 9, wherein the processor is further configured to:

before switching the first connected mode into the second connected mode based on the acknowledgement and when the timer does not time out, trigger the cell reselection process from the first base station to the second base station; and

when triggering the cell reselection process from the first base station to the second base station, send a second request message to the second base station by using the transceiver, wherein the second request message carries second cause indication information to indicate that the terminal reselects, when the timer does not time out, to connect to the second base station.

11. The terminal according to claim 7, wherein the first request message further includes tracking area (TA) indication information to indicate whether the first base station needs to trigger a TA update process.

12. The terminal according to claim 7, wherein the first connected mode is an energy conserved operation (ECO) mode, and the second connected mode is an idle mode.

13. A non-transitory computer-readable medium having instructions stored therein, which when executed by a processor, cause the processor to perform operations, the operations comprising:

sending, by a terminal, a first request message to a first base station, wherein the first request message includes first cause indication information to indicate that the terminal needs to perform a cell reselection process from a second base station to the first base station, the first base station is located in a first radio access technology (RAT) system, the second base station is located in a second RAT system, the terminal is in a first connected mode when connecting to the second base station, and the first RAT system does not support the first connected mode; and

receiving, by the terminal, an acknowledgement returned by the first base station for the first request message, and switching the first connected mode into a second connected mode based on the acknowledgement, wherein the first RAT system supports the second connected mode.

14. The computer-readable medium according to claim 13, wherein the first request message is a Radio Resource Control (RRC) connection request message, and the acknowledgement is an RRC connection rejection message; or

the first request message is a cell update request message, and the acknowledgement is a cell update response message; or

the first request message is an RRC connection resume message, and the acknowledgement is an RRC connection resume response message.

15. The computer-readable medium according to claim 13, wherein the acknowledgement comprises information about a timer; and

the switching, by the terminal, the first connected mode into a second connected mode based on the acknowledgement comprises:

starting, by the terminal, timing of the timer based on the information about the timer; and when the timer times out, releasing a context of a connection relationship between the terminal and the second base station, and switching the first connected mode into the second connected mode.

16. The computer-readable medium according to claim 15, wherein before the switching, by the terminal, the first connected mode into a second connected mode based on the acknowledgement, the method further comprises:

if the terminal triggers the cell reselection process from the first base station to the second base station when the timer does not time out, sending, by the terminal, a second request message to the second base station, wherein the second request message includes second cause indication information to indicate that the terminal reselects, when the timer does not time out, to connect to the second base station.

17. The computer-readable medium according to claim 13, wherein the first request message further includes tracking area (TA) indication information to indicate whether the first base station needs to trigger a TA update process.

18. The computer-readable medium according to claim 13, wherein the first connected mode is an energy conserved operation (ECO) mode, and the second connected mode is an idle mode.

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