

In combination with the first aspect, in some implementation modes of the first aspect, the method further includes that: when the resource usage parameter is larger than the fourth threshold value, the first D2D device reports the resource usage parameter to the network device.

5 In combination with the first aspect, in some implementation modes of the first aspect, the method may further includes that: the first D2D device obtains a mapping relationship for indicating a Quality of Service (QoS) requirement of at least one service of the first D2D device and a fourth threshold value of the resource usage parameter.

10 In combination with the first aspect, in some implementation modes of the first aspect, the method may further includes that: the first D2D device determines the fourth threshold value according to a QoS requirement of a present service of the first D2D device and the mapping relationship; when the resource usage parameter is larger than the fourth threshold value, transmitting at least one of the following to the network device: the present service; a QoS requirement of at least a first part of the present service;
15 the resource usage parameter; or a request for switching a working mode in which the first D2D device processes at least a second part of the present service to a mode of performing D2D communication on the basis of a cellular network interface.

In combination with the first aspect, in some implementation modes of the first aspect, the mapping relationship may be pre-configured by the network device, and the
20 operation of obtaining the mapping relationship may include receiving the mapping relationship transmitted by the network device in a broadcast, multicast or unicast manner or through dedicated signaling.

In combination with the first aspect, in some implementation modes of the first aspect, the resource usage parameter may be configured to indicate a proportion of the
25 occupied resource to total resources of the resource pool in a specific time period, or the resource usage parameter may be configured to indicate a proportion of the collision resource to the total resources of the resource pool in the specific time period.

A second aspect provides a D2D communication method, which includes that: a
30 network device receives an event, reported by first D2D device, that a resource usage parameter of a resource pool is larger than a fourth threshold value, wherein the resource pool is used for D2D communication, the resource usage parameter is configured to indicate a proportion of an occupied resource of the resource pool to total resources of the resource pool, or the resource usage parameter is configured to indicate a proportion
35 of a collision resource of the resource pool to the total resources of the resource pool, wherein the collision resource is a resource, that is simultaneously occupied by multiple D2D signals, in the resource pool; and the network device adjusts the resources in the resource pool or a service of device using the resource pool according to the event.

In combination with the second aspect, in some implementation modes of the second aspect, the method further includes that: the network device receives a present
40 service(s) reported by the first D2D device.

In combination with the second aspect, in some implementation modes of the second aspect, the method further includes that: the network device receives a request
45 message sent by the first D2D device, the request message being configured to request the network device to switch a working mode in which the first D2D device processes a target service from a second working mode to a third working mode, wherein the target service is at least part of the present service(s) of the first D2D device, a resource used by the first D2D device in the second working mode is autonomously selected by the first D2D device, and the first D2D device in the third working mode performs D2D

communication on the basis of a cellular network interface.

In combination with the second aspect, in some implementation modes of the second aspect, the method further includes that: the network device receives a QoS requirement corresponding to at least part of the present service(s) reported by the first D2D device.

In combination with the second aspect, in some implementation modes of the second aspect, the operation that the network device adjusts the resources in the resource pool or the service of the device using the resource pool according to the event includes that: the network device switches a working mode in which the first D2D device processes at least part of the present service(s) from the second working mode to the third working mode according to the event, wherein the resource used by the first D2D device in the second working mode is autonomously selected by the first D2D device, and the first D2D device in the third working mode performs D2D communication on the basis of the cellular network interface.

In combination with the second aspect, in some implementation modes of the second aspect, the present service(s) is/are a present V2V service(s) of the first D2D device.

In combination with the second aspect, in some implementation modes of the second aspect, the event that the resource usage parameter of the resource pool is larger than the fourth threshold value is determined by the first D2D device on the basis of a configured mapping table, wherein the mapping table is configured to indicate a mapping between the QoS requirement corresponding to the present service(s) of the

first D2D device and the fourth threshold value.

In combination with the second aspect, in some implementation modes of the second aspect, the method further includes that: the network device receives a resource usage parameter, periodically reported by the first D2D device, of a target resource pool.

In combination with the second aspect, in some implementation modes of the second aspect, the method further includes that: when the resource usage parameter is larger than the fourth threshold value, the network device receives the resource usage parameter reported by the first D2D device.

A third aspect provides a D2D device, which includes units configured to execute the method in the first aspect.

A fourth aspect provides a network device, which includes units configured to execute the method in the second aspect.

A fifth aspect provides a D2D device, which includes a memory, a processor and a transceiver, the memory is configured to store a program, the processor is configured to execute the program, and when the program is executed, the processor executes the method in the first aspect in conjunction with the transceiver.

A sixth aspect provides network device, which includes a memory, a processor and a transceiver, the memory is configured to store a program, the processor is configured to execute the program, and when the program is executed, the processor executes the method in the second aspect in conjunction with the transceiver.

A seventh aspect provides a computer-readable medium, which is configured to execute program codes executable by a D2D device, the program codes including instructions for executing the method in the first aspect.

An eighth aspect provides a computer-readable medium, which is configured to store program codes executable by a D2D device, the program codes including instructions for executing the method in the second aspect.

A ninth aspect provides a chip, which includes a processor configured to call a computer program from a memory and run the computer program, to cause a device provided with the chip to execute the method in the first aspect.

BRIEF DESCRIPTION OF DRAWINGS

In order to describe the technical solutions of the embodiments of the application more clearly, the drawings required to be used in the embodiments of the application will be simply introduced below. Obviously, the drawings described below are only some embodiments of the application. Other drawings may further be obtained by those of ordinary skilled in the art according to these drawings without creative work.

FIG. 1 illustrates a schematic flowchart of a D2D communication method according to an embodiment of the application.

FIG. 2 illustrates a schematic flowchart of a D2D communication method according to an embodiment of the application.

FIG. 3 illustrates a schematic structure diagram of a D2D device according to an embodiment of the application.

FIG. 4 illustrates a schematic structure diagram of network device according to an embodiment of the application.

FIG. 5 illustrates a schematic structure diagram of a D2D device according to an embodiment of the application.

FIG. 6 illustrates a schematic structure diagram of a network device according to an embodiment of the application.

CLAIMS

- 5 1. A Device to Device (D2D) communication method, comprising:
determining, by a first D2D device, a target resource from a resource pool, wherein the
resource pool is used for D2D communication and the target resource is an occupied resource in
the resource pool or a collision resource in the resource pool, wherein the collision resource is a
resource, that is simultaneously occupied by multiple D2D signals, in the resource pool; and
10 determining, by the first D2D device, a resource usage parameter of the resource pool
according to the target resource, wherein the resource usage parameter indicates a proportion of
the occupied resource to total resources of the resource pool, or a proportion of the collision
resource to the total resources of the resource pool.
- 15 2. The method according to claim 1, further comprising:
when the resource usage parameter is smaller than a first threshold value, reporting, by the
first D2D device, an event that the resource usage parameter is smaller than the first threshold
value to a network device.
- 20 3. The method according to claim 1 or 2, further comprising:
when the resource usage parameter is smaller than the first threshold value over a preset
time period, reporting, by the first D2D device, the event that the resource usage parameter is
smaller than the first threshold value to a network device.
- 25 4. The method according to claim 2 or 3, wherein the event that the resource usage parameter is
smaller than the first threshold value is used to trigger the network device to shrink the resource
pool or combine the resource pool with one or more other resource pools.
- 30 5. The method according to any one of claims 2-4, wherein after reporting, by the first D2D device,
the event that the resource usage parameter is smaller than the first threshold value to the network
device, the method further comprises:
temporally stopping, by the first D2D device, using the resource pool.
- 35 6. The method according to claim 5, wherein temporally stopping, by the D2D device, using the
resource pool comprises:
receiving, by the first D2D device, first indication information sent by the network device,
wherein the first indication information indicates the D2D device to temporally stop using the
resource pool; and
temporally stopping, by the first D2D device, using the resource pool according to the first
40 indication information.
7. The method according to any one of claims 1-6, further comprising: when the resource usage
parameter is larger than a second threshold value,
reporting, by the first D2D device, an event that the resource usage parameter is larger than
45 the second threshold value to a network device, so as for the network device to reconfigure the
resources in the resource pool.
8. The method according to any one of claims 1-7, further comprising:
when the resource usage parameter is larger than the second threshold value, reselecting,
50 by the first D2D device, a resource pool.

9. The method according to any one of claims 1-8, further comprising: when the resource usage parameter is smaller than the second threshold value and larger than a third threshold value, performing, by the first D2D device, at least one of the following:

reporting, by the first D2D device, an event that the resource usage parameter is smaller than the second threshold value and larger than the third threshold value to a network device, so as for the network device to indicate D2D devices in the resource pool to use the resources in the resource pool in a collision avoiding manner;

sending second indication information to one or more other D2D devices in the resource pool, wherein the second indication information indicates the other D2D devices to use the resources in the resource pool in a collision avoiding manner.

reporting the event that the resource usage parameter is smaller than the second threshold value and larger than the third threshold value to a network device, so as for the network device to reconfigure the resources in the resource pool.

10. The method according to any one of claims 1-9, wherein determining, by the first D2D device, the resource usage parameter of the resource pool comprises:

receiving, by the first D2D device, scheduling information sent by another D2D device in the resource pool on a preset resource of the resource pool, wherein the scheduling information indicate a location of a resource for carrying data of the another D2D device in the resource pool; and

determining, by the D2D device, the resource usage parameter according to the scheduling information.

11. The method according to any one of claims 1-9, wherein determining, by the first D2D device, the resource usage parameter of the resource pool comprises:

detecting, by the first D2D device, power of a D2D signal using a resource in the resource pool; and

determining, by the first D2D device, the resource usage parameter according to the power of the D2D signal.

12. The method according to any one of claims 1-11, wherein content transmitted by each D2D device in the resource pool has a priority, and

when the resource usage parameter is larger than the second threshold value, the first D2D device performs D2D communication in a collision avoiding manner or stops D2D communication; or,

when the resource usage parameter is smaller than the second threshold value and larger than the third threshold value, the first D2D device performs D2D communication in the collision avoiding manner or stops D2D communication.

13. The method according to claim 12, wherein information about the priority of the content transmitted by each D2D device in the resource pool is contained in scheduling information sent by the each D2D device on a preset resource.

14. The method according to claim 12 or 13, further comprising:

receiving, by the first D2D device, third indication information sent by the network device, wherein the third indication information indicates the D2D device, of which the priority of the transmitted content is lower than or equal to a priority threshold value, in the resource pool, to perform D2D communication in the collision avoiding manner or stop D2D communication; and

performing, by the first D2D device, D2D communication in the collision avoiding manner or stopping, by the first D2D device, the D2D communication, according to the third indication information.

15. The method according to any of claims 1-14, further comprising:
obtaining, by the first D2D device, a mapping relationship for indicating a Quality of Service (QoS) requirement of at least one service of the first D2D device and a fourth threshold value of the resource usage parameter.
16. The method according to claim 15, further comprising:
determining, by the first D2D device, the fourth threshold value according to a QoS requirement of a present service of the first D2D device and the mapping relationship;
when the resource usage parameter is larger than the fourth threshold value, transmitting at least one of the following to the network device:
the present service;
a QoS requirement of at least a first part of the present service;
the resource usage parameter; or
a request for switching a working mode in which the first D2D device processes at least a second part of the present service to a mode of performing D2D communication on the basis of a cellular network interface.
17. The method according to claim 15 or 16, wherein the mapping relationship is pre-configured by the network device, and
wherein obtaining, by the first D2D device, the mapping relationship comprises:
receiving the mapping relationship transmitted by the network device in a broadcast, multicast or unicast manner or through dedicated signaling.
18. The method according to any of claims 1-17, wherein the resource usage parameter indicates a proportion of the occupied resource to total resources of the resource pool in a specific time period, or a proportion of the collision resource to the total resources of the resource pool in the specific time period.
19. A Device to Device (D2D) device, comprising:
a memory, configured to store a computer program; and
a processor, configured to execute the computer program stored in the memory, wherein the program, when being executed, causes the processor to execute the method according to any of claims 1-18.
20. A chip, comprising a processor configured to call a computer program from a memory and run the computer program, to cause a device provided with the chip to execute the method according to any of claims 1-18.