

CLAIMS

1. A service chain fault detection method, wherein the service chain comprises a plurality of service function nodes, and a packet passes through according to an order of the plurality of service function nodes, wherein the method comprises:

obtaining, by a service forwarding entity, SFE (111), a first fault tracing detection request packet (1042) sent by a previous-hop SFE of the SFE on the service chain, wherein the first fault tracing detection request packet (1042) comprises a path identifier, ID, and the path ID is used to identify a path of a service chain;

determining, by the SFE (111), a service function, SF, node (121), based on a forwarding entry stored in a memory (1102) of the SFE (111), to which the first fault tracing detection request packet (1042) is to be sent, n;

obtaining, by the SFE (111), an ID of the SF node (121) from the memory (1102) of the SFE (111);

sending, by the SFE (111), a first fault tracing detection response packet (1032) to a device for initiating fault detection (131), wherein the first fault tracing detection response packet (1032) comprises the path ID and the ID of the SF node (121); and

wherein before the sending, by the SFE (111), the first fault tracing detection response packet (1032), the method further comprises: sending, by the SFE (111), a second fault tracing detection response packet to the device for initiating fault detection, wherein the second fault tracing detection response packet comprises an ID of the SFE (111) and the path ID.

2. The method according to claim 1, wherein the determining, by an SFE (111), to communicate with the SF node (121), comprises:

obtaining, by the SFE (111), a correspondence based on the path ID, wherein the correspondence comprises the path ID and an address of the SF node (121);

sending, by the SFE (111), the first fault tracing detection request packet (1042) to the SF node (121) according to the address of the SF node (121); and

receiving, by the SFE (111), a second fault tracing detection request packet from the SF node (121), wherein the second fault tracing detection request packet comprises the path ID.

3. The method according to claim 1, wherein the first fault tracing detection request packet (1042) further comprises a first parameter, the first parameter is used to identify the SF node (121) or is used to identify a previous-hop SF node of the SF node (121) on the service chain; and the determining, by the SFE (111), to communicate with the SF node (121) comprises:

obtaining, by the SFE (111), a correspondence based on the path ID and the first parameter,

wherein the correspondence comprises the path ID, the first parameter and an address of the SF node (121);

sending, by the SFE (111), the first fault tracing detection request packet (1042) to the SF node (121) according to the address of the SF node; and

5 receiving, by the SFE (111), a second fault tracing detection request packet from the SF node (121), wherein the second fault tracing detection request packet comprises the path ID.

4. The method according to claim 3, wherein the first fault tracing detection response packet (1032) further comprises at least one of the first parameter and an ID of the SFE (111).

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5. The method according to any one of claims 1 to 4, wherein the first fault tracing detection request packet (1042) further comprises a node list, and the node list comprises an ID of the previous-hop SF node of the SF node (121) on the service chain; and the first fault tracing detection response packet (1032) further comprises an updated node list, the updated node list comprises the ID of the SF node (121) and the node list, and an order of all SF nodes comprised in the updated node list is the same as an order of all the SF nodes on the service chain.

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6. The method according to any one of claims 1 to 5, wherein the first fault tracing detection request packet (1042) further comprises an ID of an SF node used as an end point; and

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after the sending, by the SFE (111), a first fault tracing detection response packet (1032) to the device for initiating fault detection, the method further comprises:

ending, by the SFE (111), detection on the service chain when the ID of the SF node (121) is the same as the ID of the SF node used as the end point.

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7. The method according to any one of claims 1 to 6, wherein the obtaining, by the SFE (111), a first fault tracing detection request packet (1042) comprises:

receiving, by the SFE (111), the first fault tracing detection request packet (1042) from the device for initiating fault detection; or

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receiving, by the SFE (111), the first fault tracing detection request packet (1042) from a previous-hop SFE of the SFE (111) on the service chain; or

generating, by the SFE (111), the first fault tracing detection request packet (1042).

8. A service chain fault detection method, wherein the service chain comprises a plurality of service function nodes, and a packet passes through according to an order of the plurality of service function nodes, wherein the method comprises:

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sending, by a device for initiating fault detection (131), a first fault tracing detection

request packet (1042) to a service forwarding entity, SFE (111), wherein the first fault tracing detection request packet (1042) comprises a path identifier, ID, and the path ID is used to identify a path of a service chain;

5 sending (502), by the SFE (111), the first fault tracing detection request packet (1042) to a service function, SF, node (121);

adding, by the SF node (121), an ID of the SF node (121) to the first fault tracing detection request packet (1042);

sending (503), by the SF node (121), the first fault tracing detection request packet (1042) to the SFE (111);

10 obtaining, by the SFE (111), the ID of the SF node (121) from the first fault tracing detection request packet (1042);

receiving, by the device for initiating fault detection (131), a first fault tracing detection response packet (1032) from the SFE (111), wherein the first fault tracing detection response packet (1032) comprises the path ID and the ID of the SF node (121);

15 determining, by the device for initiating fault detection (131), that forwarding between the SFE (111) and the SF node (121) is normal based on the received ID of the SF node (121);

wherein before the receiving, by the device for initiating fault detection (131), the first fault tracing detection response packet (1032), the method further comprises:

20 receiving, by the device for initiating fault detection, a second fault tracing detection response packet from the SFE (111), wherein the second fault tracing detection response packet comprises the path ID and an ID of the SFE (111); and

determining, by the device for initiating fault detection, that forwarding between the SFE (111) and the device for initiating fault detection is normal based on the received ID of the SFE (111).

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9. The method according to claim 8, wherein the sending, by a device for initiating fault detection, a first fault tracing detection request packet (1042) to the SFE (111) comprises:

obtaining, by the device for initiating fault detection, a correspondence based on the path ID, wherein the correspondence comprises the path ID and an address of the SFE (111); and

30 sending, by the device for initiating fault detection, the first fault tracing detection request packet (1042) to the SFE according to the address of the SFE (111).

10. The method according to claim 8 or 9, wherein the first fault tracing detection request packet (1042) further comprises a first parameter, and the first parameter is used to identify the SF node (121) or is used to identify a previous-hop SF node of the SF node (121) on the service chain.

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11. The method according to any one of claims 8 to 10, wherein the first fault tracing

detection request packet (1042) further comprises a node list, and the node list comprises an ID of the previous-hop SF node of the SF node (121) on the service chain; and the first fault tracing detection response packet (1032) further comprises an updated node list, the updated node list comprises the ID of the SF node (121) and the node list, and an order of all SF nodes comprised in the updated node list is the same as an order of all the SF nodes on the service chain.

12. A service forwarding apparatus (111), wherein the service forwarding apparatus (111) comprises:

a first communications unit (1103; 1105), configured to: obtain a first fault tracing detection request packet (1042) sent by a previous-hop SFE of the SFE on the service chain, wherein the first fault tracing detection request packet (1042) comprises a path identifier, ID, and the path ID is used to identify a path of a service chain and determine a service function, SF, node (121), based on a forwarding entry stored in a memory (1102) of the SFE (111), to which the first fault tracing detection request packet (1042) is to be sent, wherein the service chain comprises a plurality of service function nodes, and a packet passes through according to an order of the plurality of service function nodes;

a first obtaining unit, configured to obtain an ID of the SF node (121) from the memory (1102) of the SFE (111);

a first sending unit, configured to send a first fault tracing detection response packet (1032) to the device for initiating fault detection (131), wherein the first fault tracing detection response packet (1032) comprises the path ID and the ID of the SF node (121); and

wherein the first sending unit is further configured to send a second fault tracing detection response packet to the device for initiating fault detection before sending the first fault tracing detection response packet (1032), wherein the second fault tracing detection response packet comprises the path ID and an ID of the service forwarding apparatus.

13. The service forwarding apparatus according to claim 12, wherein the first communications unit is specifically configured to:

obtain a correspondence based on the path ID, wherein the correspondence comprises the path ID and an address of the SF node (121);

send the first fault tracing detection request packet (1042) to the SF node according to the address of the SF node (121) comprised in the correspondence; and

receive a second fault tracing detection request packet from the SF node (121), wherein the second fault tracing detection request packet comprises the path ID.

14. The service forwarding apparatus according to claim 12, wherein the first fault tracing detection request packet (1042) further comprises a first parameter, the first parameter is used

to identify the SF node (121) or is used to identify a previous-hop SF node of the SF node (121) on the service chain; and the first communications unit is specifically configured to:

obtain a correspondence based on the path ID and the first parameter, wherein the correspondence comprises the path ID, the first parameter and an address of the SF node (121);

5 send the first fault tracing detection request packet (1042) to the SF node according to the address of the SF node (121) comprised in the correspondence; and

receive a second fault tracing detection request packet from the SF node (121), wherein the second fault tracing detection request packet comprises the path ID.

10 15. The service forwarding apparatus according to claim 14, wherein the first fault tracing detection response packet (1032) further comprises at least one of the first parameter and an ID of the service forwarding apparatus.

15 16. The service forwarding apparatus according to any one of claims 12 to 15, wherein the first fault tracing detection request packet (1042) further comprises a node list, and the node list comprises an ID of the previous-hop SF node of the SF node (121) on the service chain; and the first fault tracing detection response packet (1032) further comprises an updated node list, the updated node list comprises the ID of the SF node (121) and the node list, and an order of all SF nodes comprised in the updated node list is the same as an order of all the SF nodes on
20 the service chain.

17. The service forwarding apparatus according to any one of claims 12 to 16, wherein the first fault tracing detection request packet (1042) further comprises an ID of an SF node used as an end point; and

25 the service forwarding apparatus further comprises:

a control unit, configured to: after the first sending unit sends the first fault tracing detection response packet (1032) to the device for initiating fault detection, determine that the ID of the SF node is the same as the ID of the SF node (121) used as the end point, and end detection on the service chain.

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18. The service forwarding apparatus according to any one of claims 12 to 17, wherein the first communications unit is specifically configured to receive the first fault tracing detection request packet (1042) from the device for initiating fault detection; or

35 the first communications unit is specifically configured to receive the first fault tracing detection request packet (1042) from a previous-hop SFE of the service forwarding apparatus on the service chain; or

the first communications unit is specifically configured to generate the first fault tracing detection request packet (1042).

19. A device for initiating fault detection (131), wherein the device for initiating fault detection (131) comprises:

a sending unit (1306), configured to send a first fault tracing detection request packet (1042) to a service forwarding entity, SFE (111), wherein the first fault tracing detection request packet (1042) comprises a path identifier, ID, and the path ID is used to identify a path of a service chain, wherein the service chain comprises a plurality of service function nodes, and a packet passes through according to an order of the plurality of service function nodes; wherein

sending the first fault tracing detection request packet (1042) to the SFE further comprises;

the SFE (111) sends (502) the first fault tracing detection request packet (1042) to a service function, SF, node (121);

the SF node (121) adds an ID of the SF node (121) to the first fault tracing detection request packet (1042);

the SF node (121) sends (503) the first fault tracing detection request packet (1042) to the SFE (111); and

the SFE (111) obtains the ID of the SF node (121) from the first fault tracing detection request packet (1042);

a first receiving unit (1305), configured to receive a first fault tracing detection response packet (1032) from the SFE (111), wherein the first fault tracing detection response packet (1032) comprises the path ID and the ID of the SF node (121);

a first determining unit (1313), configured to determine that forwarding between the SFE (111) and the SF node (121) is normal based on the received ID of the SF node (121);

wherein the device for initiating fault detection further comprises:

a second receiving unit, configured to receive a second fault tracing detection response packet from the SFE (111) before receiving a first fault tracing detection response packet (1032) from the SFE (111), wherein the second fault tracing detection response packet comprises the path ID and an ID of the SFE; and

the first determining unit is further configured to determine that forwarding between the SFE (111) and the fault detection is normal based on the received ID of the SFE (111).

20. The device for initiating fault detection according to claim 19, wherein the sending unit is specifically configured to:

obtain a correspondence based on the path ID, wherein the correspondence comprises the path ID and an address of the SFE; and

send the first fault tracing detection request packet (1042) to the SFE (111) according to the address of the SFE (111) comprised in the correspondence.

21. The device for initiating fault detection according to claim 19 or 20, wherein the first

fault tracing detection request packet (1042) further comprises a first parameter, and the first parameter is used to identify the SF node (121) or is used to identify a previous-hop SF node of the SF node (121) on the service chain.

- 5 22. The device for initiating fault detection according to any one of claims 19 to 21, wherein the first fault tracing detection request packet (1042) further comprises a node list, wherein the node list comprises an ID of the previous-hop SF node of the SF node (121) on the service chain; and
- 10 the first fault tracing detection response packet (1032) further comprises an updated node list, the updated node list comprises the ID of the SF node (121) and the node list, and an order of all SF nodes comprised in the updated node list is the same as an order of all the SF nodes on the service chain.

- 15 23. A system, comprising a service forwarding apparatus according to any one of claims 12 to 18, and a device for initiating fault detection according to any one of claims 19 to 22.