CLAIMS

What is claimed is:

1. A message processing method, which is applied to a first network device, the method comprising:

receiving a first service message;

sending a second service message to a second network device, wherein the second service message includes a first in-situ flow detection option and the first service message, wherein the first in-situ flow detection option includes first additional information, the first additional information includes first reverse service flow characteristics, and the first reverse service flow characteristics are used by a head node of a first reverse path for generating a first service flow identification rule for in-situ flow detection;

wherein, the head node is a tail node of a first forward path, and the first network device and the second network device are both on the first forward path and the first reverse path.

2. The method of claim 1, wherein, the first in-situ flow detection option further includes first indication information, the first indication information is used to indicate whether the first in-situ flow detection option includes the first additional information;

when the first indication information has a value of a first value, the first in-situ flow detection option includes the first additional information;

when the first indication information has a value of a second value, the first in-situ flow detection option does not include the first additional information.

3. The method of claim 2, wherein, the first in-situ flow detection option further includes second indication information, the second indication information is used to indicate whether the head node generates the first service flow identification rule;

when the second indication information has a value of the first value, it indicates that the head node generates the first service flow identification rule;

when the second indication information has a value of the second value, it indicates that the head node does not generate the first service flow identification rule.

4. The method of claim 1, wherein after receiving the first service message, the method further comprises:

matching the first service message with the first forward flow characteristics and second forward flow characteristics, the first forward flow characteristics are characteristics of the forward service flow for in-situ flow detection, and the second forward flow characteristics are characteristics of the forward service flow corresponding to the reverse service flow for in-situ flow detection;

encapsulating, if the first service message matches the first forward flow characteristics and the second forward flow characteristics, the first service message with the first in-situ flow detection option in the outer layer of the first service message to obtain the second service message.

5. The method of claim 4, wherein, after matching the first service message with the first forward flow characteristics and the second forward flow characteristics, the method further comprises:

encapsulating, if the first service message matches the first forward flow characteristics and does not match the second forward flow characteristics, the first service message with a second in-situ flow detection option in the outer layer of the first service message to obtain a third service message, and sending the third service message to the second network device; the second in-situ flow detection option includes first indication information and second indication information whose values are both second values; or,

encapsulating, if the first service message matches both the first forward flow characteristics and the second forward flow characteristics and the first network device is not configured with the first reverse service flow characteristics, the first service message with a third in-situ flow detection option to obtain a fourth service message, and sending the fourth service message to the second network device; the third in-situ flow detection option includes the first indication information whose value is the second value and the second indication information whose value is a first value.

6. The method of any one of claims 1-5, wherein the first reverse service flow characteristics include an IP address and a mask for representing an IP subnet, which

are used to indicate the head node to perform in-situ flow detection on the reverse service flow belonging to the IP subnet.

7. The method of claim 5, wherein the first in-situ flow detection option, the second in-situ flow detection option, and the third in-situ flow detection option all include an extended flow detection type field, a service flow direction identification field, and a reserved field, one bit in the extended flow detection type field carries the first indication information, and the service flow direction identification field carries the second indication information.

8. The method of claim 7, wherein the reversed field of the first in-situ flow detection option carries the first additional information.

9. The method of claim 8, wherein the reversed field of the first in-situ flow detection option includes a TLV structure, and a value field of the TLV structure carries the first additional information.

10. The method of claim 1, further comprising:

receiving a fifth service message sent by a third network device, the fifth service message includes a fourth in-situ detection option, and the fourth in-situ detection option includes second additional information, the second additional information includes second reverse service flow characteristics, the first network device and the third network device are both on the second forward path and the second reverse path, the first network device is the head node of the second reverse path; and

generating a second service flow identification rule for in-situ flow detection based on the second reverse service flow characteristics.

11. The method of claim 10, wherein after generating the second service flow identification rule for in-situ flow detection based on the second reverse service flow characteristics, the method further comprises:

storing the second service flow identification rule to a forwarding plane;

encapsulating, when receiving a sixth service message that conforms to the second service flow identification rule, the sixth service message with a fifth in-situ flow detection option, and sending the sixth service message encapsulated with the fifth in-situ flow detection option to the third network device, the fifth in-situ flow detection

option includes first indication information and second indication information whose values are both second values.

12. The method of claim 11, wherein after storing the second service flow identification rule to the forwarding plane, the method further comprises:

deleting, if no service message matching the second service flow identification rule is received within a specified time period, the second service flow identification rule from the forwarding plane.

13. A network device, comprising:

a processor;

a transceiver;

a machine-readable storage medium, which stores machine executable instructions that can be executed by the processor; the machine executable instructions cause the processor to perform the following operations:

receiving a first service message through the transceiver;

sending a second service message to a second network device through the transceiver, wherein the second service message includes a first in-situ flow detection option and the first service message, wherein the first in-situ flow detection option includes first additional information, the first additional information includes first reverse service flow characteristics, and the first reverse service flow characteristics are used by a head node of a first reverse path for generating a first service flow identification rule for in-situ flow detection;

wherein, the head node is a tail node of a first forward path, and the first network device and the second network device are both on the first forward path and the first reverse path.

14. The network device of claim 13, wherein, the first in-situ flow detection option further includes first indication information, the first indication information is used to indicate whether the first in-situ flow detection option includes the first additional information;

when the first indication information has a value of a first value, the first in-situ

flow detection option includes the first additional information;

when the first indication information has a value of a second value, the first in-situ flow detection option does not include the first additional information.

15. The network device of claim 14, wherein, the first in-situ flow detection option further includes second indication information, the second indication information is used to indicate whether the head node generates the first service flow identification rule;

when the second indication information has a value of the first value, it indicates that the head node generates the first service flow identification rule;

when the second indication information has a value of the second value, it indicates that the head node does not generate the first service flow identification rule.

16. The network device of claim 13, wherein the machine executable instructions also cause the processor to perform the following operations:

matching the first service message with the first forward flow characteristics and second forward flow characteristics, the first forward flow characteristics are characteristics of the forward service flow for in-situ flow detection, and the second forward flow characteristics are characteristics of the forward service flow corresponding to the reverse service flow for in-situ flow detection;

encapsulating, if the first service message matches the first forward flow characteristics and the second forward flow characteristics, the first service message with the first in-situ flow detection option in the outer layer of the first service message to obtain the second service message.

17. The network device of claim 16, wherein the machine executable instructions also cause the processor to perform the following blocks:

encapsulating, if the first service message matches the first forward flow characteristics and does not match the second forward flow characteristics, the first service message with a second in-situ flow detection option in the outer layer of the first service message to obtain a third service message, and sending the third service message to the second network device through the transceiver; the second in-situ flow detection option includes first indication information and second indication information

whose values are both second values; or,

encapsulating, if the first service message matches both the first forward flow characteristics and the second forward flow characteristics and the first network device is not configured with the first reverse service flow characteristics, the first service message with a third in-situ flow detection option to obtain a fourth service message, and sending the fourth service message to the second network device through the transceiver; the third in-situ flow detection option includes the first indication information whose value is the second value and the second indication information whose value is a first value.

18. The network device of any one of claims 13-17, wherein the first reverse service flow characteristics include an IP address and a mask for representing an IP subnet, which are used to indicate the head node to perform in-situ flow detection on the reverse service belonging to the IP subnet.

19. The network device of claim 17, wherein the first in-situ flow detection option, the second in-situ flow detection option, and the third in-situ flow detection option all include an extended flow detection type field, a service flow direction identification field, and a reserved field, one bit in the extended flow detection type field carries the first indication information, and the service flow direction identification field carries the second indication information.

20. The network device of claim 19, wherein the reversed field of the first in-situ flow detection option carries the first additional information.

21. The network device of claim 20, wherein the reversed field of the first in-situ flow detection option includes a TLV structure, and a value field of the TLV structure carries the first additional information.

22. The network device of claim 13, wherein the machine executable instructions also cause the processor to perform the following blocks:

receiving a fifth service message sent by a third network device through the transceiver, the fifth service message includes a fourth in-situ detection option, and the fourth in-situ detection option includes second additional information, the second additional information includes second reverse service flow characteristics, the first

network device and the third network device are both on the second forward path and the second reverse path, the first network device is the head node of the second reverse path; and

generating a second service flow identification rule for in-situ flow detection based on the second reverse service flow characteristics.

23. The network device of claim 22, wherein the machine executable instructions also cause the processor to perform the following operations:

storing the second service flow identification rule to a forwarding plane;

encapsulating, when receiving a sixth service message that conforms to the second service flow identification rule through the transceiver, the sixth service message with a fifth in-situ flow detection option, and sending the sixth service message encapsulated with the fifth in-situ flow detection option to the third network device through the transceiver, the fifth in-situ flow detection option includes first indication information and second indication information whose values are both second values.

24. The network device of claim 23, wherein the machine executable instructions also cause the processor to perform the following blocks:

deleting, if no service message matching the second service flow identification rule is received through the transceiver within a specified time period, the second service flow identification rule from the forwarding plane.