

MPLS-based Service Function Path (SFP) Consistency Verification

draft-1m-mpls-sfc-path-verification-00

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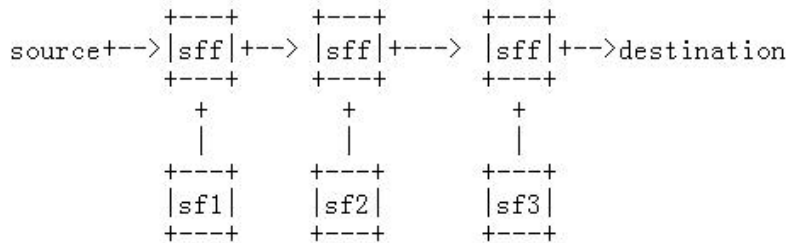
MPLS WG

Interim

Sep, 2020

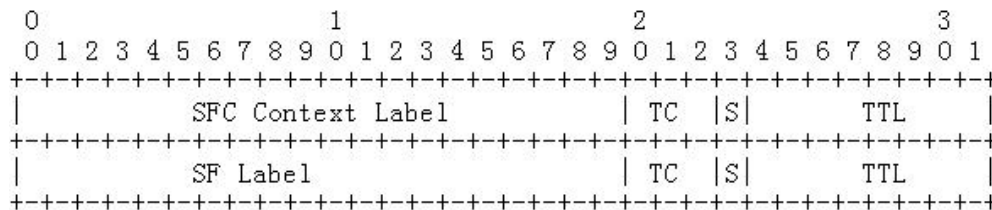
Background

➤ Service Function Chain (SFC)



➤ MPLS-based Forwarding Plane for (SFC)

- SR-MPLS Service Programming: each SF is associated with an MPLS label, an SFP can be encoded as a stack of MPLS labels and pushed on top of the packet. *[draft-ietf-spring-sr-service-programming]*
- MPLS-based Network Service Header (NSH): a basic unit of representation is used, which comprises two MPLS labels, one carries a label to provide a context within the SFC scope, and the other carries a label to show which SF is to be enacted. *[RFC8595]*



The Basic Unit of MPLS Label Stack for SFC

SFC Basic Unit FEC Sub-TLV for MPLS-based NSH

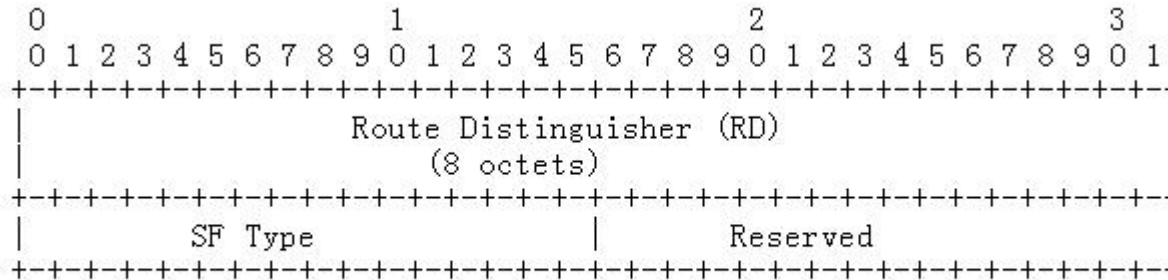


Figure 5: SFC Basic Unit sub-TLV

Route Distinguisher (RD): defined in SFIR Route Type specific NLRI [draft-ietf-bess-nsh-bgp-control-plane] .

SF Type: It is defined in [draft-ietf-bess-nsh-bgp-control-plane] and indicates the type of SF, such as DPI, firewall, etc.

MPLS SFC validation Message

- An MPLS SFC validation request/reply is an MPLS echo request/reply that includes an SFC validation TLV.

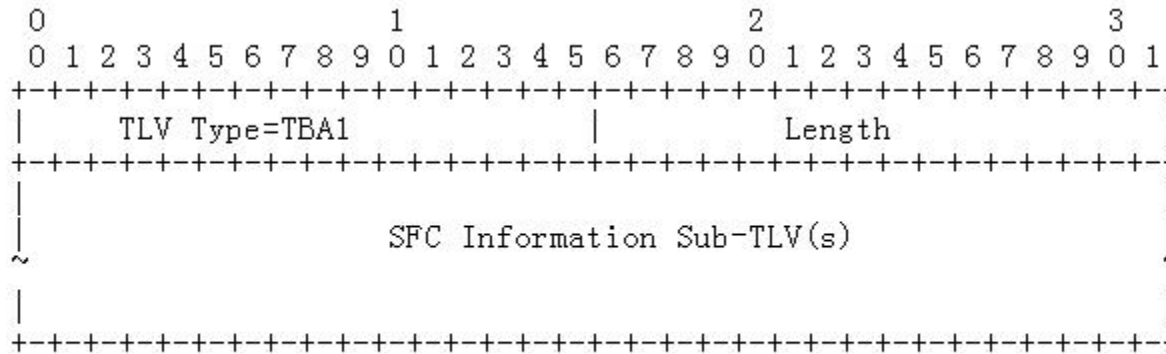


Figure 2: SFC Validation TLV

SFC Information Sub-TLV: MUST NOT be included in an MPLS SFC validation request.

SFC Info Sub-TLV for SR-MPLS-based Service Programming

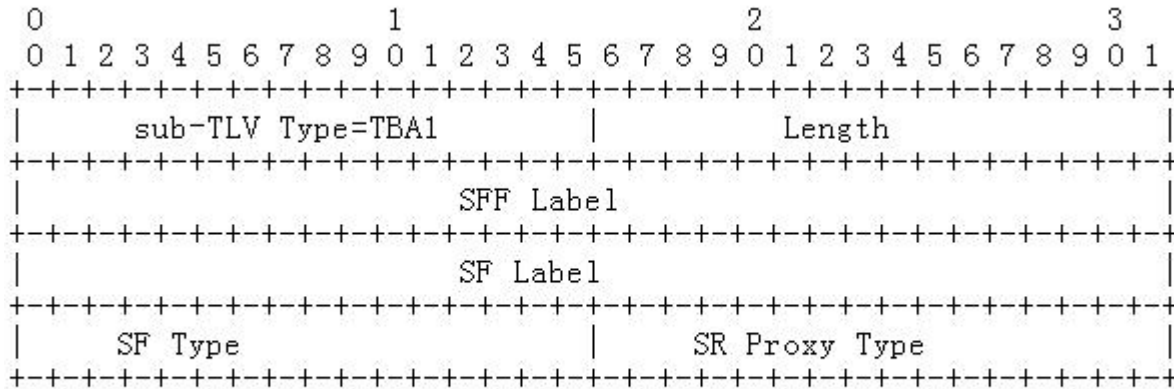


Figure 3: SFC Info Sub-TLV for SR-MPLS-based Service Programming

SFF Label: represents the SID of the SFF

SF Label: represents the service SID of the SF or SR proxy

SF Type: indicates the type of SF, such as DPI, firewall, etc.

SR Proxy Type: It is defined in *[draft-ietf-spring-sr-service-programming]* and indicates the type of SR proxy if it exists.

SFC Info Sub-TLV for MPLS-based NSH

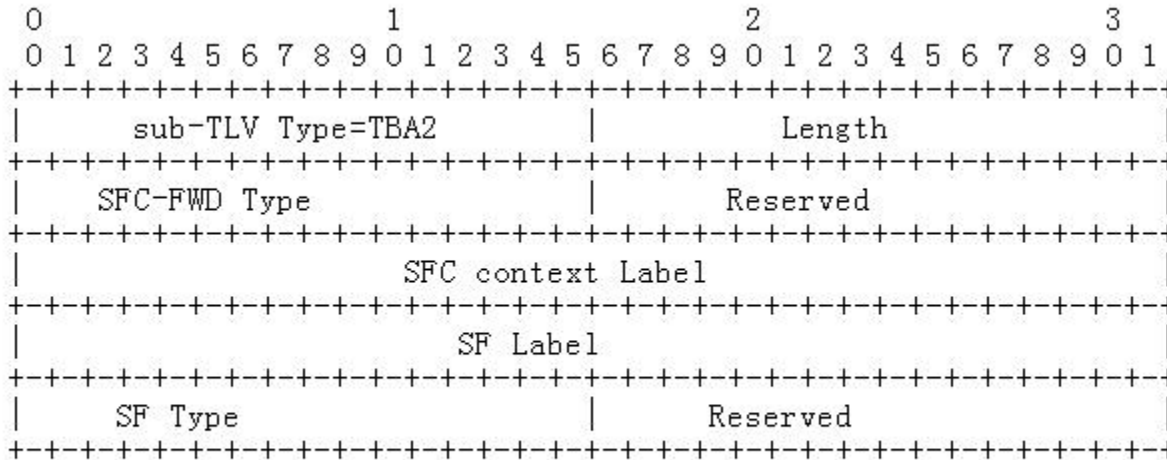


Figure 4: SFC Info Sub-TLV for MPLS-based NSH

SFC-FWD Type: indicates the forwarding type of the basic unit, and has the following values:

0x10: MPLS-based NSH label swapping

0x11: MPLS-based NSH label stacking

SFC context Label: The meaning of the SFC context label depends on the SFC-FWD Type.

SF Label: The meaning of the SF label depends on the SFC-FWD Type.

SF Type: It is defined in [I-D.ietf-bess-nsh-bgp-control-plane] and indicates the type of SF, such as DPI, firewall, etc.

Theory of Operation

- SFFs are responsible for MPLS echo request processing: the packet processing functions supported by most SFs are limited

- An SFF Sends an SFC echo request to its control plane when:
 - the receiver is the terminal SFF for an SFP
 - MPLS TTL expiration: *RFC8595, "If an SFF decrements the TTL to zero, it MUST NOT send the packet and MUST discard the packet"*. To trace SFC, it should be changed to allow punting the packet to the control plane under throttling control.

- Upon receiving the SFC validation request
 - SR Service Programming: an SFF parses through the label stack until the next label is not a local service SID to get all the SFs attached to the SFF
 - MPLS-based NSH: an SFF checks the MPLS label stack to get all the locally attached basic units for SFC

- The SFF sends back a reply message, including SFF and SF information recorded in SFC info sub-TLV

- After all SFFs on the SFP send back MPLS echo reply, the sender collects information about all traversed SFFs and SFs on the rendered service path (RSP)

Summary

- extensions to MPLS LSP ping [RFC8029] mechanisms
- a new FEC Sub-TLV for MPLS-based NSH
- a new SFC validation TLV including:
 - SFC Info Sub-TLV for SR-MPLS-based Service Programming
 - SFC Info Sub-TLV for MPLS-based NSH
- *an update of RFC 8595 (MPLS-based NSH)*

Next Steps

- Request feedbacks and comments
- Which WG is the appropriate place to work on the draft, MPLS or SRPING ?

Thank You !