

Workgroup: MPLS Working Group

Internet-Draft:

draft-mirsky-mpls-bfd-bootstrap-clarify-03

Updates: [5884](#) (if approved)

Published: 6 January 2023

Intended Status: Standards Track

Expires: 10 July 2023

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Clarifying Use of LSP Ping to Bootstrap BFD over MPLS LSP

Abstract

This document, if approved, updates RFC 5884 by clarifying procedures for using MPLS LSP ping to bootstrap Bidirectional Forwarding Detection (BFD) over MPLS Label Switch Path.

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1. Introduction

[[RFC5884](#)] defines how LSP Ping [[RFC8029](#)] uses BFD Discriminator TLV to bootstrap Bidirectional Forwarding Detection (BFD) session over MPLS Label Switch Path (LSP). Implementation and operational experiences suggest that two aspects of using LSP ping to bootstrap BFD session can benefit from clarification. This document updates [[RFC5884](#)] in use of Return Mode field in MPLS LSP echo request message and use of BFD Discriminator TLV in MPLS LSP echo reply.

2. Requirements Language

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in BCP 14 [[RFC2119](#)] [[RFC8174](#)] when, and only when, they appear in all capitals, as shown here.

3. Use of Return Mode Field

[[RFC5884](#)] does not define the value for the Return Mode field [[RFC8029](#)] when LSP ping is used to bootstrap a BFD session of MPLS LSP. When an LSP echo request is used to detect defects in the MPLS data plane and verify consistency between the control plane and the data plane, an echo reply is needed to confirm the correct state and provide positive acknowledgment. But when an LSP echo request is used to bootstrap a BFD session, the positive acknowledgment, according to [[RFC5884](#)], is provided by the egress transmitting BFD control message. Thus LSP echo reply is not used to bootstrap the BFD session, and hence the Return Mode field in the echo request message SHOULD be set to 1 (Do not reply) [[RFC8029](#)] when LSP echo request is used to bootstrap a BFD session. If bootstrapping a BFD session is combined with the periodic verification of a FEC as described in [[RFC8029](#)], the Return Mode field MAY be set to 2 (Reply

via an IPv4/IPv6 UDP packet). Furthermore, as proposed in [I-D.kompella-mppls-lsping-norao], the value of the Return Mode field in the echo request used to bootstrap a BFD session MUST NOT be set to 3 (Reply via an IPv4/IPv6 UDP packet with Router Alert).

4. Use of BFD Discriminator TLV in LSP Echo Reply

[RFC5884] in section 6 defines that echo reply by the egress LSR to BFD bootstrapping echo request MAY include BFD Discriminator TLV with locally assigned discriminator value for the BFD session. But the [RFC5884] does not define how the ingress LSR may use the returned value. From a practical point, as discussed in Section 3, the returned value is not useful since the egress is required to send the BFD control message right after successfully validating the FEC and before sending an echo reply message. Secondly, identifying the corresponding BFD session at ingress without returning its discriminator presents an unnecessary challenge for the implementation. Thus the egress LSR SHOULD NOT include BFD Discriminator TLV if sending an echo reply to BFD bootstrapping echo request.

5. Destination IPv6 Address

[RFC5884] requires that the IPv6 Destination Address used in IP/UDP encapsulation of an echo request packet is selected from the IPv4 loopback address range mapped to IPv6. Such packets do not have the same behavior as prescribed in [RFC1122] for an IPv4 loopback addressed packet.

[RFC4291] defines ::1/128 as the single IPv6 loopback address. Considering that this specification updates Section 7 of [RFC5884] regarding the selection of an IPv6 destination address for a BFD Control message:

- *For IPv6, the IPv6 loopback address ::1/128 SHOULD be used.

- *The sender of an echo request MAY select the IPv6 destination address from the 0:0:0:0:0:FFF7:0:0/104 range.

- *To exercise all paths in an ECMP environment, the entropy other than the IP destination address SHOULD use the Entropy Label [RFC6790] to discover multiple alternate paths in an MPLS network.

6. IANA Considerations

This document does not require any action by IANA. This section may be removed.

7. Security Considerations

This document does not introduce new security aspects but inherits all security considerations from [RFC5880], [RFC5884], [RFC8029].

8. Acknowledgements

TBA

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