

Workgroup: MPLS Working Group  
Internet-Draft:  
draft-mirsky-mpls-bfd-bootstrap-clarify-04  
Updates: [5884](#) (if approved)  
Published: 8 July 2023  
Intended Status: Standards Track  
Expires: 9 January 2024  
Authors: G. Mirsky    Y. Zhao                    G. Mishra  
          Ericsson    ZTE Corporation    Verizon Inc.  
          R. Bonica  
          Juniper Networks

## 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.

### Status of This Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF). Note that other groups may also distribute working documents as Internet-Drafts. The list of current Internet-Drafts is at <https://datatracker.ietf.org/drafts/current/>.

Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use Internet-Drafts as reference material or to cite them other than as "work in progress."

This Internet-Draft will expire on 9 January 2024.

### Copyright Notice

Copyright (c) 2023 IETF Trust and the persons identified as the document authors. All rights reserved.

This document is subject to BCP 78 and the IETF Trust's Legal Provisions Relating to IETF Documents (<https://trustee.ietf.org/license-info>) in effect on the date of publication of this document. Please review these documents carefully, as they describe your rights and restrictions with respect to this document. Code Components extracted from this document must include Revised BSD License text as described in

Section 4.e of the Trust Legal Provisions and are provided without warranty as described in the Revised BSD License.

## Table of Contents

- [1. Introduction](#)
- [2. Requirements Language](#)
- [3. Use of Return Mode Field](#)
- [4. Use of BFD Discriminator TLV in LSP Echo Reply](#)
- [5. Destination IPv6 Address](#)
- [6. IANA Considerations](#)
- [7. Security Considerations](#)
- [8. Acknowledgements](#)
- [9. Normative References](#)
- [Authors' Addresses](#)

### 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-mpls-lspping-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:FFF7:7F00/104 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

## 9. Normative References

- [I-D.kompella-mpls-lspping-norao] Kompella, K., Bonica, R., and G. Mirsky, "Deprecating the Use of Router Alert in LSP Ping", Work in Progress, Internet-Draft, draft-kompella-mpls-lspping-norao-02, 10 December 2022, <<https://datatracker.ietf.org/doc/html/draft-kompella-mpls-lspping-norao-02>>.
- [RFC1122] Braden, R., Ed., "Requirements for Internet Hosts - Communication Layers", STD 3, RFC 1122, DOI 10.17487/RFC1122, October 1989, <<https://www.rfc-editor.org/info/rfc1122>>.
- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, DOI 10.17487/RFC2119, March 1997, <<https://www.rfc-editor.org/info/rfc2119>>.
- [RFC4291] Hinden, R. and S. Deering, "IP Version 6 Addressing Architecture", RFC 4291, DOI 10.17487/RFC4291, February 2006, <<https://www.rfc-editor.org/info/rfc4291>>.
- [RFC5880] Katz, D. and D. Ward, "Bidirectional Forwarding Detection (BFD)", RFC 5880, DOI 10.17487/RFC5880, June 2010, <<https://www.rfc-editor.org/info/rfc5880>>.
- [RFC5884] Aggarwal, R., Kompella, K., Nadeau, T., and G. Swallow, "Bidirectional Forwarding Detection (BFD) for MPLS Label Switched Paths (LSPs)", RFC 5884, DOI 10.17487/RFC5884, June 2010, <<https://www.rfc-editor.org/info/rfc5884>>.
- [RFC6790] Kompella, K., Drake, J., Amante, S., Henderickx, W., and L. Yong, "The Use of Entropy Labels in MPLS Forwarding", RFC 6790, DOI 10.17487/RFC6790, November 2012, <<https://www.rfc-editor.org/info/rfc6790>>.
- [RFC8029] Kompella, K., Swallow, G., Pignataro, C., Ed., Kumar, N., Aldrin, S., and M. Chen, "Detecting Multiprotocol Label Switched (MPLS) Data-Plane Failures", RFC 8029, DOI

10.17487/RFC8029, March 2017, <<https://www.rfc-editor.org/info/rfc8029>>.

[RFC8174] Leiba, B., "Ambiguity of Uppercase vs Lowercase in RFC 2119 Key Words", BCP 14, RFC 8174, DOI 10.17487/RFC8174, May 2017, <<https://www.rfc-editor.org/info/rfc8174>>.

#### Authors' Addresses

Greg Mirsky  
Ericsson

Email: [gregimirsky@gmail.com](mailto:gregimirsky@gmail.com)

Yanhua Zhao  
ZTE Corporation

Email: [zhao.yanhua3@zte.com.cn](mailto:zhao.yanhua3@zte.com.cn)

Gyan Mishra  
Verizon Inc.

Email: [gyan.s.mishra@verizon.com](mailto:gyan.s.mishra@verizon.com)

Ron Bonica  
Juniper Networks  
1133 Innovation Way  
Sunnyvale, CA 94089  
United States

Email: [rbonica@juniper.net](mailto:rbonica@juniper.net)