

**BFD for Multipoint Networks over Point-to-Multi-Point MPLS LSP**  
**draft-mirsky-mpls-p2mp-bfd-04**

Abstract

This document describes procedures for using Bidirectional Forwarding Detection (BFD) for multipoint networks to detect data plane failures in Multiprotocol Label Switching (MPLS) point-to-multipoint (p2mp) Label Switched Paths (LSPs). It also describes the applicability of out-band solutions to bootstrap a BFD session in this environment.

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## Table of Contents

<a href="#">1.</a>	<a href="#">Introduction</a>	<a href="#">2</a>
<a href="#">2.</a>	<a href="#">Conventions used in this document</a>	<a href="#">2</a>
<a href="#">2.1.</a>	<a href="#">Terminology</a>	<a href="#">2</a>
<a href="#">2.2.</a>	<a href="#">Requirements Language</a>	<a href="#">3</a>
<a href="#">3.</a>	<a href="#">Multipoint BFD Encapsulation</a>	<a href="#">3</a>
<a href="#">3.1.</a>	<a href="#">IP Encapsulation of Multipoint BFD</a>	<a href="#">3</a>
<a href="#">3.2.</a>	<a href="#">Non-IP Encapsulation of Multipoint BFD</a>	<a href="#">4</a>
<a href="#">4.</a>	<a href="#">Bootstrapping Multipoint BFD</a>	<a href="#">4</a>
<a href="#">4.1.</a>	<a href="#">LSP Ping</a>	<a href="#">4</a>
<a href="#">4.2.</a>	<a href="#">Control Plane</a>	<a href="#">4</a>
<a href="#">5.</a>	<a href="#">Security Considerations</a>	<a href="#">4</a>
<a href="#">6.</a>	<a href="#">IANA Considerations</a>	<a href="#">4</a>
<a href="#">6.1.</a>	<a href="#">Source MEP ID IP Address Type</a>	<a href="#">4</a>
<a href="#">7.</a>	<a href="#">Acknowledgements</a>	<a href="#">5</a>
<a href="#">8.</a>	<a href="#">Normative References</a>	<a href="#">5</a>
	<a href="#">Author's Address</a>	<a href="#">6</a>

## [1.](#) Introduction

[I-D.ietf-bfd-multipoint] defines a method of using Bidirectional Detection (BFD) [[RFC5880](#)] to monitor and detect unicast failures between the sender (head) and one or more receivers (tails) in multipoint or multicast networks. This document describes procedures for using such mode of BFD protocol to detect data plane failures in Multiprotocol Label Switching (MPLS) point-to-multipoint (p2mp) Label Switched Paths (LSPs). The document also describes the applicability of out-band solutions to bootstrap a BFD session in this environment.

## [2.](#) Conventions used in this document

### [2.1.](#) Terminology

MPLS: Multiprotocol Label Switching

LSP: Label Switched Path

BFD: Bidirectional Forwarding Detection

p2mp: Point-to-Multipoint

FEC: Forwarding Equivalence Class

G-ACh: Generic Associated Channel

ACh: Associated Channel Header



GAL: G-ACh Label

## 2.2. 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. Multipoint BFD Encapsulation

[I-D.ietf-bfd-multipoint] defines how the tail of multipoint BFD session demultiplexes received BFD control packet when Your Discriminator is not set, i.e., equals zero. Because [[I-D.ietf-bfd-multipoint](#)] uses BFD in Demand mode the head of BFD multipoint session transmits BFD control packets with Your Discriminator set to zero. As a result, a tail cannot demultiplex BFD sessions using Your Discriminator, as defined in [[RFC5880](#)]. [[I-D.ietf-bfd-multipoint](#)] requires that in order to demultiplex BFD sessions the tail uses the source IP address, My Discriminator and the identity of the multipoint tree which the Multipoint BFD Control packet was received from. The identity of the multipoint tree MAY be provided by the p2mp MPLS LSP label in case of inclusive p-tree or upstream assigned label in case of aggregate p-tree. The source IP address MAY be drawn from the IP header if BFD control packet transmitted by the head using IP/UDP encapsulation as described in [Section 3.1](#). Non-IP encapsulation case described in [Section 3.2](#).

### 3.1. IP Encapsulation of Multipoint BFD

[I-D.ietf-bfd-multipoint] defines IP/UDP encapsulation for multipoint BFD over p2mp MPLS LSP:

UDP destination port MUST be set to 3784;

destination IP address MUST be from the 127/8 range for IPv4 and from the 0:0:0:0:0:FFFF:7F00/104 range for IPv6;

This specification further clarifies that:

if multiple alternative paths for the given p2mp LSP Forwarding Equivalence Class(FEC) exist, the MultipointHead SHOULD use Entropy Label [[RFC6790](#)] used for LSP Ping [[RFC8029](#)] to exercise that particular alternative path;



or the MultipointHead MAY use, as destination IP address, the IP address discovered by LSP Ping traceroute [[RFC8029](#)] to exercise that particular alternate path.

### **3.2. Non-IP Encapsulation of Multipoint BFD**

Non-IP encapsulation for multipoint BFD over p2mp MPLS LSP MUST use Generic Associated Channel (G-ACh) Label (GAL) [[RFC5586](#)] at the bottom of the label stack followed by Associated Channel Header (ACH). Channel Type field in ACH MUST be set to BFD CV [[RFC6428](#)]. To provide the identity of the MultipointHead for the particular multipoint BFD session this document defines new Source MEP ID IP Address type (TBA1) in [Section 6.1](#). If the Length value is 4, then the Value field contains an IPv4 address. If the Length value is 16, then the Value field contains an IPv6 address. Any other value of the Length field MUST be considered as an error, and the BFD control packet MUST be discarded.

## **4. Bootstrapping Multipoint BFD**

### **4.1. LSP Ping**

MultipointHead MAY use LSP Ping [[RFC8029](#)] using in Target FEC TLV, as appropriate, sub-TLVs defined in [Section 3.1](#) [[RFC6425](#)].

### **4.2. Control Plane**

BGP-BFD Attribute [[I-D.ietf-bess-mvpn-fast-failover](#)] MAY be used to bootstrap multipoint BFD session on a tail.

## **5. Security Considerations**

This document does not introduce new security aspects but inherits all security considerations from [[RFC5880](#)], [[RFC5884](#)], [[RFC7726](#)], [[I-D.ietf-bfd-multipoint](#)], [[RFC8029](#)], and [[RFC6425](#)].

## **6. IANA Considerations**

### **6.1. Source MEP ID IP Address Type**

IANA is required to allocate value (TBD) for the Source MEP ID IP Address type from the "CC/CV MEP-ID TLV" registry which is under the "Pseudowire Associated Channel Types" registry.



Value	Description	Reference
TBA1	IP Address	This document

Table 1: Source MEP ID IP Address TLV Type

## 7. Acknowledgements

TBD

## 8. Normative References

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