

BIER WG
Internet-Draft
Intended status: Standards Track
Expires: April 27, 2018

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October 24, 2017

BIER BFD
draft-hu-bier-bfd-00.txt

Abstract

Point to multipoint (P2MP) BFD is designed to verify multipoint connectivity. This document specifies the support of P2MP BFD in BIER network.

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BIER BFD

October 2017

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[1.](#) Introduction

Bit Index Explicit Replication(BIER) [[I-D.ietf-bier-architecture](#)] provides optimal forwarding of multicast data packets through a multicast domain. It does so without requiring any explicit tree-building protocol and without requiring intermediate nodes to maintain any per-flow state.

[[I-D.ietf-bfd-multipoint](#)] defines a method of using Bidirectional Detection(BFD) to monitor and detect unicast failures between the sender (head) and one or more receivers (tails) in multipoint or multicast networks.

This document describes the procedures for using such mode of BFD protocol to provide verification of multipoint or multicast connectivity between a multipoint sender (the "head", Bit-Forwarding Ingress Routers(BFIRs)) and a set of one or more multipoint receivers (the"tails", Bit-Forwarding Egress Routers(BFERs)).This document defines use of the point-to-multipoint BFD for BIER domain.

[2.](#) Conventions used in this document[2.1.](#) Terminology

This document uses the acronyms defined in [\[I-D.ietf-bier-architecture\]](#) along with the following:

BFD: Bidirectional Forwarding Detection.

OAM: Operations, Administration, and Maintenance.

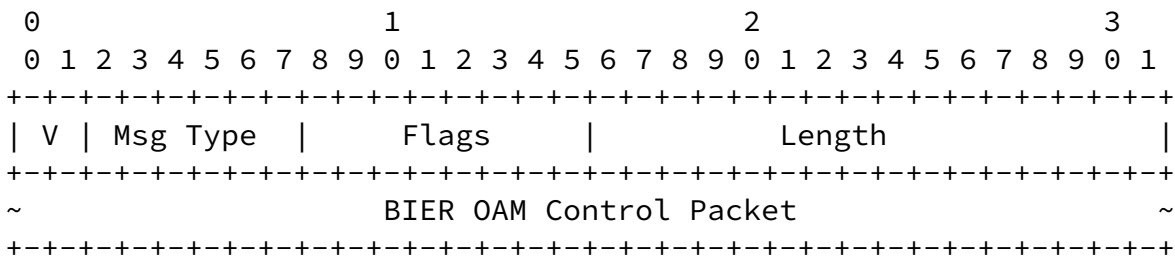
P2MP: Point to Multi-Point.

[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.](#) BIER BFD Encapsulation

The BIER encapsulation is specified in section 2 of [\[I-D.ietf-bier-mpls-encapsulation\]](#). The Proto field identifies the type of the payload. If the proto field is 5, the payload is OAM packet. [\[I-D.ietf-bier-mpls-encapsulation\]](#) does not provide definition for identification of an BIER OAM packet. This document defines the format of BIER OAM packet.



V: two bits long field indicates the current version of the BIER OAM header. The current value is 0.

Msg Type - six bits long field identifies OAM protocol, e.g. Echo Request/Reply or BFD. If the Msg Type is BFD, the BIER OAM

control packet is BIER BFD packet.

Flags - eight bits long field carries bit flags that define optional capability.

Length - two octets long field that is length of the BIER OAM control packet in octets.

[4.](#) Bootstrapping BIER BFD

[4.1.](#) One-hop Bootstrapping

The ISIS BFD-Enable TLV is defined in [[RFC6213](#)], which could be used for BIER BFD bootstrapping if the underlay routing protocol is ISIS routing protocol. When the adjacency between BIER nodes reaches the 2-Way state, ISIS Hellos will already have been exchanged. If an BIER node supports BFD, it will have learned whether the other BIER node has BFD enabled by whether or not a BFD-Enabled TLV was included in its Hellos. The BFD-Enable TLV format is defined in [[RFC6213](#)] and reused in this document. The MT ID is the BIER multi-topology identify. If the BIER node only supports single ISIS topology, the MT ID is zero. NLPID is a Network Layer Protocol ID [[RFC6328](#)] and will be [TBD](IANA assigned, suggesting 0XC2) for BIER, but additional topology and protocol pairs could conceivably be listed.

[4.2.](#) Multi-hop Bootstrapping

The BIER OAM ping could be used for BIER BFD bootstrap. The multipoint header sends the BIER OAM packet with Target SI-Bitstring TLV (section 3.3.2 of [[I-D.ietf-bier-ping](#)]) carrying the set of BFER information (Sub-domain-id, Set ID, BS Len, Bitstring) to the multipoint tails to bootstrap the BIER BFD sessions.

[5.](#) Discriminators and Packet Demultiplexing

The tail(BFER) demultiplexes incoming BFD packets based on a combination of the source address and My discriminator as specified

in [[I-D.ietf-bfd-multipoint](#)]. The source address is BFIR-id and BIER MPLS Label(MPLS network) or BFIR-id and BIFT-id(Non-MPLS network)for BIER BFD.

6. Security Considerations

7. Acknowledgements

8. IANA Considerations

[[IS09577](#)] defines one-octet network layer protocol identifiers that are commonly called NLPIDs and [[RFC6328](#)] defines the NLPID IANA consideration. The code points 0xC0, 0xC1, 0xCC, 0xCF are assigned to TRILL, IEEE 802.1aq , IPv4 and PPP respectively [[RFC6328](#)]. It is requested for IANA to assign 0XC2 to NLPID for BIER in this document.

Code Point	Use
0xC0	TRILL
0xC1	IEEE 802.1aq
0xC2	BIER[This Document]
0xCC	IPv4
0xCF	PPP

Table 1

IANA is requested to create new registry called "BIER OAM Message Type" and assign new type from the BIER OAM Message Type registry as follows:

Value	Description	Reference
TBD1	BIER BFD	[this document]

Table 2

9. References

9.1. Normative References

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[9.2.](#) Informative References

[IS09577] ISO/IEC TR 9577:1999,, "International Organization for Standardization "Information technology - Telecommunications and Information exchange between systems - Protocol identification in the network layer"", 1999.

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