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BIER BFD
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Abstract

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

Status of This Memo

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

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   material or to cite them other than as "work in progress."

   This Internet-Draft will expire on January 31, 2019.

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1. Introduction

Bit Index Explicit Replication(BIER)[RFC8279] 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 verify 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)). The BIER BFD only supports the
unidirectional multicast. 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 [RFC8279] along with the
following:

BFD: Bidirectional Forwarding Detection.

NLPID: Network Layer Protocol Identifier.

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

BIER BFD encapsulation uses the BIER OAM packet format defined in
[I-D.ietf-bier-ping]. If the Msg type field is 3(TBD, it is assigned
by IANA), it indicates that the OAM packet is BIER BFD packet.

The message type of OAM packet is defined as the following:

```
            +-------+----------+---------------+
            | Type  |  Value   |   Reference   |
            +-------+----------+---------------+
            |   3   | BIER BFD | This document |
            +-------+----------+---------------+
```

                            Table 1

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. The NLPIDs encoded in the TLV are defined in
[ISO9577].

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

For BIER OAM packet procssing security considerations, see
[I-D.ietf-bier-ping].

For general multipoint BFD security considerations, see
[I-D.ietf-bfd-multipoint].

No additional security issues are raised in this document beyond
those that exist in the referenced BFD documents.

7. Acknowledgements

Authors would like to thank the comments and suggestions from Jeffrey
(Zhaohui) Zhang, Donald Eastlake 3rd.

8. IANA Considerations

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

```
+--------+-------------+-----------------+
| Value  | Description |    Reference    |
+--------+-------------+-----------------+
|  TBD   |   BIER BFD  | [this document] |
+--------+-------------+-----------------+
```

                              Table 2

9. References

9.1. Normative References

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9.2. Informative References

   [ISO9577] ISO/IEC TR 9577:1999,, "International Organization for
              Standardization "Information technology -
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