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Fangwei Hu  
Greg Mirsky  
Quan Xiong  
ZTE Corporation  
Chang Liu  
China Unicom  
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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.

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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 [[IS09577](#)].

### [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 processing 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

[I-D.ietf-bfd-multipoint]

Katz, D., Ward, D., Networks, J., and G. Mirsky, "BFD for Multipoint Networks", [draft-ietf-bfd-multipoint-18](#) (work in progress), June 2018.

[I-D.ietf-bier-ping]

Kumar, N., Pignataro, C., Akiya, N., Zheng, L., Chen, M., and G. Mirsky, "BIER Ping and Trace", [draft-ietf-bier-ping-03](#) (work in progress), January 2018.

- [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>>.
- [RFC6213] Hopps, C. and L. Ginsberg, "IS-IS BFD-Enabled TLV", [RFC 6213](#), DOI 10.17487/RFC6213, April 2011, <<https://www.rfc-editor.org/info/rfc6213>>.
- [RFC6328] Eastlake 3rd, D., "IANA Considerations for Network Layer Protocol Identifiers", [BCP 164](#), [RFC 6328](#), DOI 10.17487/RFC6328, July 2011, <<https://www.rfc-editor.org/info/rfc6328>>.
- [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>>.
- [RFC8279] Wijnands, IJ., Ed., Rosen, E., Ed., Dolganow, A., Przygienda, T., and S. Aldrin, "Multicast Using Bit Index Explicit Replication (BIER)", [RFC 8279](#), DOI 10.17487/RFC8279, November 2017, <<https://www.rfc-editor.org/info/rfc8279>>.

## [9.2](#). Informative References

- [ISO9577] ISO/IEC TR 9577:1999,, "International Organization for Standardization "Information technology - Telecommunications and Information exchange between systems - Protocol identification in the network layer"", 1999.

## Authors' Addresses

Fangwei Hu  
ZTE Corporation  
No.889 Bibo Rd  
Shanghai 201203  
China

Phone: +86 21 68896273  
Email: hu.fangwei@zte.com.cn

Greg Mirsky  
ZTE Corporation  
USA

Email: gregimirsky@gmail.com

Quan Xiong  
ZTE Corporation  
No.6 Huashi Park Rd  
Wuhan, Hubei 430223  
China

Phone: +86 27 83531060  
Email: xiong.quan@zte.com.cn

Chang Liu  
China Unicom  
No.9 Shouti Nanlu  
Beijing 100048  
China

Phone: +86-010-68799999-7294  
Email: liuc131@chinaunicom.cn