

BIER Working Group
Internet-Draft
Intended status: Informational
Expires: August 28, 2019

G. Mirsky
ZTE Corp.
E. Nordmark

C. Pignataro
N. Kumar
Cisco Systems, Inc.
S. Aldrin
Google
L. Zheng
M. Chen
Huawei Technologies
N. Akiya
Big Switch Networks
S. Pallagatti
RtBrick
February 24, 2019

**Operations, Administration and Maintenance (OAM) Requirements for Bit
Index Explicit Replication (BIER) Layer
draft-ietf-bier-oam-requirements-07**

Abstract

This document describes a list of functional requirement toward Operations, Administration and Maintenance (OAM) toolset in Bit Index Explicit Replication (BIER) layer of a network.

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[1.](#) Introduction

[RFC8279] introduces and explains Bit Index Explicit Replication (BIER) architecture and how it supports forwarding of multicast data packets.

This document lists the OAM requirements for BIER layer of the multicast domain. The list can further be used to for gap analysis of available OAM tools to identify possible enhancements of existing or whether new OAM tools are required to support proactive and on-demand path monitoring and service validation.

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

1.1.1. Terminology

The term "BIER OAM" used in this document interchangeably with longer version "set of OAM protocols, methods, and tools for BIER layer".

BFR: Bit-Forwarding Router

BFER: Bit-Forwarding Egress Router

BIER: Bit Index Explicit Replication

OAM: Operations, Administration and Maintenance

1.1.2. 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.

2. Requirements

This section lists requirements for OAM of BIER layer:

1. The listed requirements MUST be supported with any type of transport layer over which BIER layer can be realized.
2. It MUST be possible to initialize BIER OAM session from any Bit-Forwarding Router (BFR) of the given BIER domain.
3. It SHOULD be possible to initialize BIER OAM session from a centralized controller.
4. BIER OAM MUST support proactive and on-demand OAM monitoring and measurement methods.
5. BIER OAM MUST support unidirectional OAM methods, both continuity check and performance measurement.
6. BIER OAM packets MUST be in-band, i.e., follow exactly the same path as data plane traffic, in the forward direction, i.e., from ingress toward egress endpoint(s) of the OAM test session.
7. BIER OAM MUST support bi-directional OAM methods. Such OAM methods MAY combine in-band monitoring or measurement in the forward direction and out-of-band notification in the reverse

direction, i.e., from egress to ingress end point of the OAM test session.

8. BIER OAM MUST support proactive monitoring of BFER availability by a BFR in the given BIER domain, e.g., p2mp BFD active tail support.
9. BIER OAM MUST support Path Maximum Transmission Unit discovery.
10. BIER OAM MUST support Reverse Defect Indication (RDI) notification of the source of continuity checking BFR by Bit-Forwarding Egress Routers (BFERs), e.g., by using Diag in p2mp BFD with active tail support.
11. BIER OAM MUST support active and passive performance measurement methods.
12. BIER OAM MUST support unidirectional performance measurement methods to calculate throughput, loss, delay and delay variation metrics. [\[RFC6374\]](#) provides great details for performance measurement and performance metrics.
13. BIER OAM MUST support defect notification mechanism, like Alarm Indication Signal. Any BFR in the given BIER domain MAY originate a defect notification addressed to any subset of BFRs within the domain.
14. BIER OAM MUST support methods to enable survivability of a BIER layer. These recovery methods MAY use protection switching and restoration.

[3.](#) IANA Considerations

This document does not propose any IANA consideration. This section may be removed.

[4.](#) Security Considerations

This document list the OAM requirement for BIER-enabled domain and does not raise any security concerns or issues in addition to ones common to networking.

[5.](#) Acknowledgment

TBD

6. References

6.1. Normative References

- [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>>.
- [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>>.

6.2. Informative References

- [RFC6374] Frost, D. and S. Bryant, "Packet Loss and Delay Measurement for MPLS Networks", [RFC 6374](#), DOI 10.17487/RFC6374, September 2011, <<https://www.rfc-editor.org/info/rfc6374>>.
- [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>>.

Authors' Addresses

Greg Mirsky
ZTE Corp.

Email: gregimirsky@gmail.com

Erik Nordmark

Email: nordmark@acm.org

Carlos Pignataro
Cisco Systems, Inc.

Email: cpignata@cisco.com

Nagendra Kumar
Cisco Systems, Inc.

Email: naikumar@cisco.com

Sam Aldrin
Google

Email: aldrin.ietf@gmail.com

Lianshu Zheng
Huawei Technologies

Email: vero.zheng@huawei.com

Mach Chen
Huawei Technologies

Email: mach.chen@huawei.com

Nobo Akiya
Big Switch Networks

Email: nobo.akiya.dev@gmail.com

Santosh Pallagatti
RtBrick

Email: santosh.palagatti@gmail.com

