Workgroup: Network Working Group
Internet-Draft: draft-ietf-bier-te-ospfv3-08
Published: 28 March 2024
Intended Status: Standards Track
Expires: 29 September 2024
Authors: H. Chen (Futurewei), M. McBride (Futurewei), A. Wang (China Telecom)
G. Mishra (Verizon Inc.), Y. Fan (Casa Systems), L. Liu (Fujitsu), X. Liu (Alef Edge)

OSPFv3 Extensions for BIER-TE

Abstract

This document describes OSPFv3 extensions for distributing the BitPositions configured on a Bit-Forwarding Router (BFR) in a "Bit Index Explicit Replication Traffic Engineering" (BIER-TE) domain.

Requirements Language

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC2119] [RFC8174] when, and only when, they appear in all capitals, as shown here.

Status of This Memo

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

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF). Note that other groups may also distribute working documents as Internet-Drafts. The list of current Internet-Drafts is at https://datatracker.ietf.org/drafts/current/.

Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use Internet-Drafts as reference material or to cite them other than as "work in progress."

This Internet-Draft will expire on 29 September 2024.

Copyright Notice

Table of Contents

1. Introduction

[RFC9262] introduces Bit Index Explicit Replication (BIER) Traffic/Tree Engineering (BIER-TE). It is an architecture for per-packet stateless explicit point to multipoint (P2MP) multicast path/tree. There are three types of BitPositions (BPs) in a BIER-TE domain: link BitPosition (BP), routed BP and localdecap BP. A link BP is a BP configured on a link from Bit-Forwarding Router (BFR) X to BFR Y for a forward connected adjacency from X to Y. A routed BP is a BP configured on BFR X for a forward routed adjacency from X to a remote BFR Z not directly connected to X. A localdecap BP is a BP configured on a BFR.

[I-D.ietf-bier-ospfv3-extensions] describes OSPFv3 Extensions for distributing the BFR identifier (BFR-id) configured on a BFR. This document specifies OSPFv3 extensions for distributing the BitPositions configured a BFR in a BIER-TE domain. The BitPositions distributed may be used by a BFR as a Point of Local Repair (PLR) for Fast-ReRoute (FRR).

2. Extensions to OSPFv3

This section describes protocol extensions to OSPFv3 for distributing the BitPositions configured on a BFR in a BIER-TE domain.

2.1. Link BitPosition

[RFC8362] defines OSPFv3 Extended Router LSA, which may include multiple Router-Link TLVs. A Router-Link TLV defines a single router link. A Router-Link TLV may include a Link-BP Sub-TLV below for distributing a link BP.

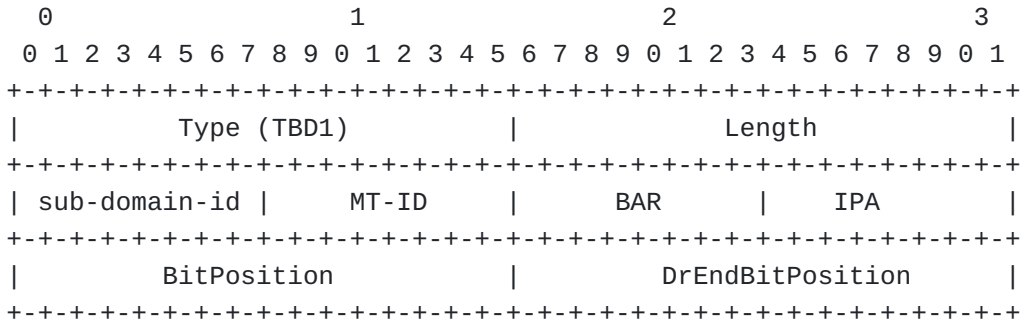

Figure 1: Link-BP Sub-TLV in Router-Link TLV

Type: TBD1 is to be assigned by IANA.

Length: Variable.

sub-domain-id, MT-ID, BAR and IPA: They are defined in Section 2.1 of [I-D.ietf-bier-ospfv3-extensions].

BitPosition: A 2-octet field encoding the BitPosition locally configured on the link/interface when the Link Type of the link in the Router-Link TLV containing this Sub-TLV is 1 (i.e., Point-to-Point connection to another router) or 2 (i.e., connection to Transit Network or say LAN).

DrEndBitPosition: A 2-octet field encoding the BitPosition of the connection on the designated router (DR) end. This field exists when the Link Type in the Router-Link TLV containing this Sub-TLV is 2 (i.e., Transit Network or LAN). For the other value of the Link Type, this field MUST NOT exist. The DrEndBitPosition may be configured on the link/interface to a transit network (i.e., broadcast link or say LAN) as described in [I-D.chen-bier-te-lan].

2.2. Routed and Localdecap BitPositions

The Node BPs TLV, Routed BP Sub-TLV and Localdecap BP Sub-TLV defined in [I-D.ietf-bier-te-ospf] are reused in OSPVv3 for distributing the routed BitPositions and the localdecap BitPosition configured on a BFR.

3. Security Considerations

Protocol extensions defined in this document do not affect the OSPF security other than those as discussed in the Security Considerations section of [RFC8362].

4. IANA Considerations

Under "OSPFv3 Extended-LSA Sub-TLVs" registry as defined in [RFC8362], IANA is requested to assign a new registry value for Link-BP Sub-TLV as follows:

Value	Description	reference
TBD1 (30)	Link-BP	This document

5. References

5.1. Normative References

[I-D.ietf-bier-te-ospf] Chen, H., McBride, M., Zhang, Z., Wang, A., Mishra, G. S., and Y. Fan, "OSPF Extensions for BIER-TE", Work in Progress, Internet-Draft, draft-ietf-bier-te-ospf-10, 1 February 2024, <https://datatracker.ietf.org/doc/html/draft-ietf-bier-te-ospf-10>.

[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>.

[RFC8362] Lindem, A., Roy, A., Goethals, D., Reddy Vallem, V., and F. Baker, "OSPFv3 Link State Advertisement (LSA) Extensibility", RFC 8362, DOI 10.17487/RFC8362, April 2018, <https://www.rfc-editor.org/info/rfc8362>.

[RFC9262] Eckert, T., Ed., Menth, M., and G. Cauchie, "Tree Engineering for Bit Index Explicit Replication (BIER-TE)", RFC 9262, DOI 10.17487/RFC9262, October 2022, <https://www.rfc-editor.org/info/rfc9262>.

5.2. Informative References

[I-D.chen-bier-te-lan]

Chen, H., McBride, M., Wang, A., Mishra, G. S., Liu, L., and X. Liu, "BIER-TE for Broadcast Link", Work in Progress, Internet-Draft, draft-chen-bier-te-lan-08, 18 October 2023, <https://datatracker.ietf.org/doc/html/draft-chen-bier-te-lan-08>.

[I-D.ietf-bier-ospfv3-extensions] Psenak, P., Nainar, N. K., and I. Wijnands, "OSPFv3 Extensions for BIER", Work in Progress, Internet-Draft, draft-ietf-bier-ospfv3-extensions-07, 1 December 2022, <https://datatracker.ietf.org/doc/html/draft-ietf-bier-ospfv3-extensions-07>.

[RFC8401] Ginsberg, L., Ed., Przygienda, T., Aldrin, S., and Z. Zhang, "Bit Index Explicit Replication (BIER) Support via IS-IS", RFC 8401, DOI 10.17487/RFC8401, June 2018, <https://www.rfc-editor.org/info/rfc8401>.

Acknowledgments

The authors would like to thank Acee Lindem, Les Ginsberg, Tony Przygienda, Jeffrey Zhang and Toerless Eckert for their comments on this work.

Authors' Addresses

Huaimo Chen
Futurewei
Boston, MA,
United States of America

Email: hchen.ietf@gmail.com

Mike McBride
Futurewei

Email: michael.mcbride@futurewei.com

Aijun Wang
China Telecom
Beiqijia Town, Changping District
Beijing
102209
China

Email: wangaj3@chinatelecom.cn

Gyan S. Mishra
Verizon Inc.
13101 Columbia Pike
Silver Spring, MD 20904

United States of America

Phone: 301 502-1347
Email: gyan.s.mishra@verizon.com

Yanhe Fan
Casa Systems
United States of America

Email: yfan@casa-systems.com

Lei Liu
Fujitsu
United States of America

Email: liulei.kddi@gmail.com

Xufeng Liu
Alef Edge
United States of America

Email: xufeng.liu.ietf@gmail.com