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**OSPFv3 Extensions for BIER-TE**

## Abstract

This document describes OSPFv3 extensions for distributing BitPositions configured on the links in "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.

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### 1. Introduction

[[I-D.ietf-bier-te-arch](#)] 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. A link in a BIER-TE domain has its BitPositions. For a link between two nodes X and Y, there are two BitPositions for two forward connected adjacencies. These two adjacency BitPositions could be configured on nodes X and Y respectively. The BitPosition configured on X is the forward connected adjacency of Y. The BitPosition configured on Y is the forward connected adjacency of X.

This document proposes OSPFv3 extensions for distributing BitPositions configured on the links in "Bit Index Explicit Replication Traffic Engineering" (BIER-TE) domain.

#### 1.1. Terminology

**BIER:** Bit Index Explicit Replication.

**BIER-TE:** BIER Traffic Engineering.

**BFR:** Bit-Forwarding Router.

**BFIR:** Bit-Forwarding Ingress Router.

**BFER:** Bit-Forwarding Egress Router.

**BFR-id:** BFR Identifier. It is a number in the range [1,65535].

**BFR-NBR:**

BFR Neighbor.

**LSA:** Link State Advertisement.

**OSPF:** Open Shortest Path First.

**2. Extensions to OSPFv3**

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

[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 BIER-TE Sub-TLV below for distributing BIER-TE information. This Sub-TLV has the following format.



Figure 1: BIER-TE Sub-TLV in Router-Link TLV

**Type:** TBD1 is to be assigned by IANA.

**Length:** 8 (octets).

**sub-domain-id:** Unique value identifying a BIER-TE sub-domain.

**MT-ID:** Multi-Topology ID identifying the topology that is associated with the BIER-TE sub-domain.

**BAR:** Single-octet BIER Algorithm used to calculate underlay paths to reach other BFRs. Values are allocated from the "BIER Algorithm" registry defined in [RFC8401].

**IPA:** Single-octet IGP Algorithm used to either modify, enhance, or replace the calculation of underlay paths to reach other BFRs as defined by the BAR value. Values are defined in the "IGP Algorithm Types" registry.

**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 is valid 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 be ignored. The DrEndBitPosition may be configured on the link/interface to a transit network (i.e., broadcast link or say LAN).

Note that if each of BitPosition and DrEndBitPosition uses more than 2 octets, we use 4 or more octets for each of them.

**3. Security Considerations**

TBD.

**4. IANA Considerations**

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

Value	Description	reference
TBD1 (30)	BIER-TE	This document

**5. Acknowledgements**

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