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 BGP-LS Extensions for IS-IS Flood Reflection

Abstract

IS-IS Flood Reflection is a mechanism that allows flat, single-area IS-IS topologies to scale beyond their traditional limitations.

This document defines new BGP-LS (BGP Link-State) TLVs in order to carry IS-IS Flood Reflection information.

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1. Introduction

[IS-IS Flood Reflection](#) [[IS-IS-FR](#)] is a mechanism that allows flat, single-area IS-IS topologies to scale beyond their existing limitations.

Flood Reflection topologies are broken into clusters. The participating nodes must convey their unique Cluster ID signifying their membership in a particular topology as well as their role (e.g. Flood Reflector or Client).

BGP Link-State [RFC7752](#) [[RFC7752](#)] defines mechanisms to advertise information about the underlying IGP in BGP NLRI to an external entity (e.g. a controller). A new BGP-LS TLV is required in order to describe IS-IS Flood Reflection node and link details. This document defines that TLV.

1.1. 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. BGP-LS Extensions for IS-IS Flood Reflection

Controllers may need to compute traffic engineered paths across Flood Reflection clusters. This requires that they be aware of Flood Reflection state (be it operational or configured), such as Cluster ID, C-bit (which indicates Flood Reflector or Client), and any applicable sub-TLVs.

The IS-IS Flood Reflection TLV can be advertised in BGP-LS as either a Node attribute or a Link attribute. When describing a node, values

are derived from the IS-IS Flood Reflection Discovery Sub-TLV. When describing a link, values are derived from the IS-IS Adjacency Sub-TLV. The semantics of any fields within the TLV/sub-TLVs are described in [[IS-IS-FR](#)].

This document defines the following BGP-LS TLVs for use with IS-IS Flood Reflection.

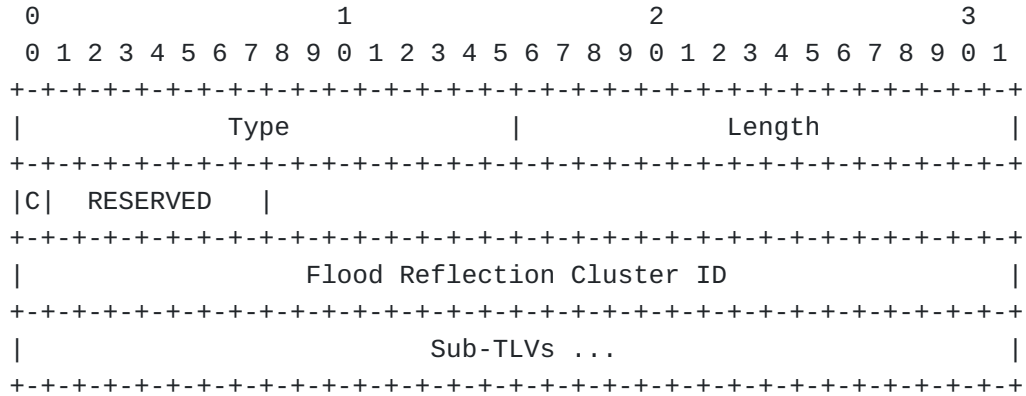


Figure 1: IS-IS Flood Reflection TLV

2.1. IS-IS Flood Reflection TLV

This section defines a BGP-LS Attribute that corresponds to IS-IS Flood Reflection TLVs/sub-TLVs as described in [[IS-IS-FR](#)]

where:

Type: TBD

Length: variable

3. Design Considerations

It is typical that a BGP-LS extension mirror its IGP counterpart. [IS-IS Flood Reflection](#) [[IS-IS-FR](#)] defines an optional "Flood Reflection Discovery Tunnel Type Sub-Sub-TLV" that is capable of facilitating the creation of "L1 Shortcuts" between nodes in a Flood Reflection cluster. This document intentionally excludes a BGP-LS extension of this capability for the following reasons.

For example, shortcuts could be point-to-point IS-IS tunnels or be encapsulated by other means. In deployments where the tunnels are IS-IS based, no additional BGP-LS extension is required as the existing BGP-LS extensions for IS-IS will suffice.

However, for deployments where tunnels are encapsulated by other means it is not desirable for BGP-LS to carry that information as it

is tunnel state and not IGP state. Other existing or new BGP-LS extensions that correspond to the particular tunnel type should be used to fulfill any BGP-LS requirements.

4. IANA Considerations

This section requests the following values from the "BGP-LS Node Descriptor, Link Descriptor, Prefix Descriptor, and Attribute TLVs" registry for the following TLVs:

4.1. Requested TLV Entries

| TLV Code Point | Description | IS-IS TLV/Sub-TLV | Reference |
|----------------|------------------------|--------------------------------|----------------|
| TBD | IS-IS Flood Reflection | (22 23 25 141 222 223 242)/161 | This document. |

Table 1: Requested TLV Entries

5. Security Considerations

Procedures and protocol extensions defined in this document do not affect the BGP security model. See the "Security Considerations" section of [[RFC4271](#)] for a discussion of BGP security. Also, refer to [[RFC4272](#)] and [[RFC6952](#)] for analyses of BGP security issues. Security considerations for acquiring and distributing BGP-LS information are discussed in [[RFC7752](#)].

The TLVs introduced in this document are used to propagate IS-IS Flood Reflection TLVs defined in [[IS-IS-FR](#)]. These TLVs represent IS-IS Flood Reflection state and are therefore assumed to support any/all of the required security and authentication mechanisms as described in [[IS-IS-FR](#)] to prevent any security issues when propagating the TLVs into BGP-LS.

6. Acknowledgements

The authors would like to thank Ketan Talaulikar for several iterations of review and practical suggestions.

7. References

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