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BGP-LS Advertisement of IGP Traffic Engineering Performance Metric Extensions
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Abstract

This document defines new BGP-LS TLVs in order to carry the IGP Traffic Engineering Extensions defined in the IS-IS and OSPF protocols.

Status of This Memo

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

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This Internet-Draft will expire on June 3, 2019.

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1. Introduction

BGP-LS ([RFC7752]) defines NLRI and attributes in order to carry link-state information. New BGP-LS Link-Attribute TLVs are required in order to carry the Traffic Engineering Metric Extensions defined in [I-D.ietf-lsr-isis-rfc7810bis] and [RFC7471].

2. Link Attribute TLVs for TE Metric Extensions

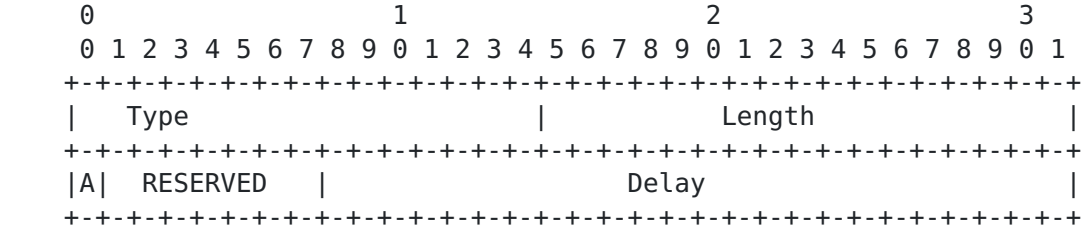
The following new Link Attribute TLVs are defined:

TLV code-point	Value
1114	Unidirectional Link Delay
1115	Min/Max Unidirectional Link Delay
1116	Unidirectional Delay Variation
1117	Unidirectional Link Loss
1118	Unidirectional Residual Bandwidth
1119	Unidirectional Available Bandwidth
1120	Unidirectional Bandwidth Utilization

TLV formats are described in detail in the following sub-sections. TLV formats follow the rules defined in [RFC7752].

2.1. Unidirectional Link Delay TLV

This TLV advertises the average link delay between two directly connected IGP link-state neighbors. The semantics of the value field in the TLV are described in [I-D.ietf-lsr-isis-rfc7810bis] and [RFC7471].



where:

Figure 1

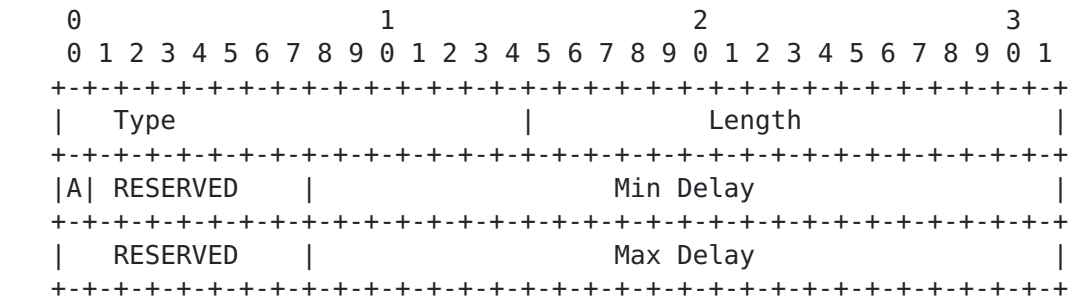
Type: 1114

Length: 4.

2.2. Min/Max Unidirectional Link Delay TLV

This sub-TLV advertises the minimum and maximum delay values between two directly connected IGP link-state neighbors. The semantics of

the value field in the TLV are described in [I-D.ietf-lsr-isis-rfc7810bis] and [RFC7471].



where:

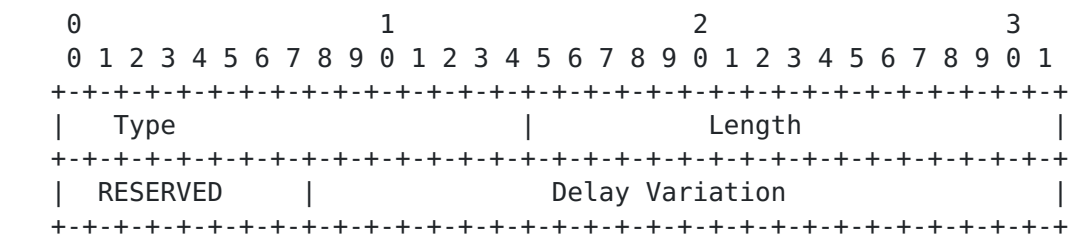
Figure 2

Type: 1115

Length: 8.

2.3. Unidirectional Delay Variation TLV

This sub-TLV advertises the average link delay variation between two directly connected IGP link-state neighbors. The semantics of the value field in the TLV are described in [I-D.ietf-lsr-isis-rfc7810bis] and [RFC7471].



where:

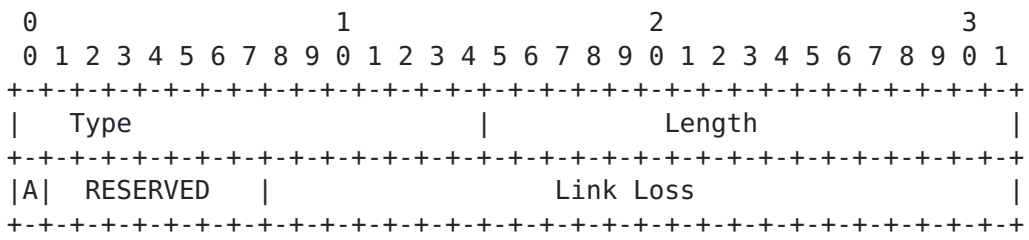
Figure 3

Type: 1116

Length: 4.

2.4. Unidirectional Link Loss TLV

This sub-TLV advertises the loss (as a packet percentage) between two directly connected IGP link-state neighbors. The semantics of the value field in the TLV are described in [I-D.ietf-lsr-isis-rfc7810bis] and [RFC7471].



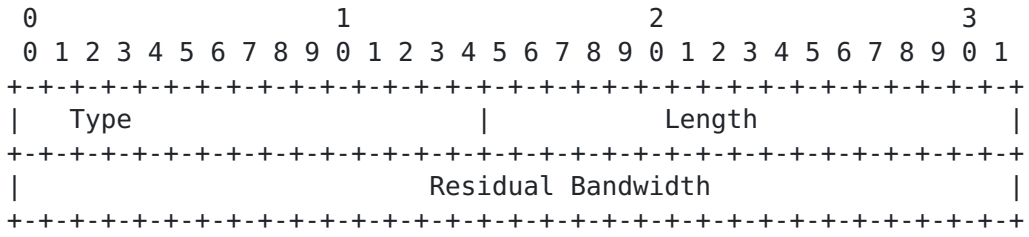
where:

Type:1117

Length: 4.

2.5. Unidirectional Residual Bandwidth TLV

This sub-TLV advertises the residual bandwidth between two directly connected IGP link-state neighbors. The semantics of the value field in the TLV are described in [I-D.ietf-lsr-isis-rfc7810bis] and [RFC7471].



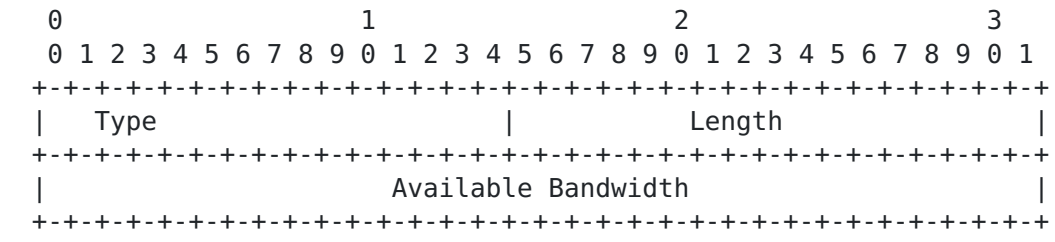
where:

Type: 1118

Length: 4.

2.6. Unidirectional Available Bandwidth TLV

This sub-TLV advertises the available bandwidth between two directly connected IGP link-state neighbors. The semantics of the value field in the TLV are described in [I-D.ietf-lsr-isis-rfc7810bis] and [RFC7471].



where:

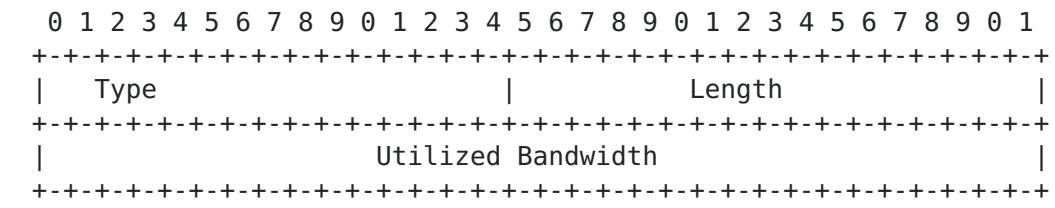
Figure 4

Type: 1119

Length: 4.

2.7. Unidirectional Utilized Bandwidth TLV

This sub-TLV advertises the bandwidth utilization between two directly connected IGP link-state neighbors. The semantics of the value field in the TLV are described in [I-D.ietf-lsr-isis-rfc7810bis] and [RFC7471].



where:

Figure 5

Type: 1120

Length: 4.

3. 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 analysis of security issues for BGP. Security considerations for acquiring and distributing BGP-LS information are discussed in [RFC7752].

The TLVs introduced in this document are used to propagate IGP defined information ([I-D.ietf-lsr-isis-rfc7810bis] and [RFC7471].) These TLVs represent the state and resources availability of the IGP link. The IGP instances originating these TLVs are assumed to have all the required security and authentication mechanism (as described in [I-D.ietf-lsr-isis-rfc7810bis] and [RFC7471]) in order to prevent any security issue when propagating the TLVs into BGP-LS. The advertisement of the link attribute information defined in this document presents no additional risk beyond that associated with the existing set of link attribute information already supported in [RFC7752].

4. IANA Considerations

IANA has made temporary assignments in the registry "BGP-LS Node Descriptor, Link Descriptor, Prefix Descriptor, and Attribute TLVs" for the new Link Attribute TLVs defined in the table below:

TLV code-point	Value
1114	Unidirectional Link Delay
1115	Min/Max Unidirectional Link Delay
1116	Unidirectional Delay Variation
1117	Unidirectional Link Loss
1118	Unidirectional Residual Bandwidth
1119	Unidirectional Available Bandwidth
1120	Unidirectional Bandwidth Utilization

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6. Acknowledgements

The authors wish to acknowledge comments from Ketan Talaulikar.

7. References

7.1. Normative References

[I-D.ietf-lsr-isis-rfc7810bis]
Ginsberg, L., Previdi, S., Giacalone, S., Ward, D., Drake, J., and Q. Wu, "IS-IS Traffic Engineering (TE) Metric Extensions", draft-ietf-lsr-isis-rfc7810bis-03 (work in progress), November 2018.

[RFC7471] Giacalone, S., Ward, D., Drake, J., Atlas, A., and S. Previdi, "OSPF Traffic Engineering (TE) Metric Extensions", RFC 7471, DOI 10.17487/RFC7471, March 2015, <https://www.rfc-editor.org/info/rfc7471>.

[RFC7752] Gredler, H., Ed., Medved, J., Previdi, S., Farrel, A., and S. Ray, "North-Bound Distribution of Link-State and Traffic Engineering (TE) Information Using BGP", RFC 7752, DOI 10.17487/RFC7752, March 2016, <https://www.rfc-editor.org/info/rfc7752>.

7.2. Informative References

[RFC4271] Rekhter, Y., Ed., Li, T., Ed., and S. Hares, Ed., "A Border Gateway Protocol 4 (BGP-4)", RFC 4271, DOI 10.17487/RFC4271, January 2006, <https://www.rfc-editor.org/info/rfc4271>.

[RFC4272] Murphy, S., "BGP Security Vulnerabilities Analysis", RFC 4272, DOI 10.17487/RFC4272, January 2006, <https://www.rfc-editor.org/info/rfc4272>.

[RFC6952] Jethanandani, M., Patel, K., and L. Zheng, "Analysis of BGP, LDP, PCEP, and MSDP Issues According to the Keying and Authentication for Routing Protocols (KARP) Design Guide", RFC 6952, DOI 10.17487/RFC6952, May 2013, <https://www.rfc-editor.org/info/rfc6952>.

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