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ISIS Extensions for Broadcast Inter-AS TE Link
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Abstract

This document presents extensions to the ISIS protocol for advertising broadcast inter-AS Traffic Engineering (TE) links.

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1. Introduction

Connections among different Autonomous Systems (ASes) may be point-to-point (P2P) links and broadcast links. For a P2P inter-AS TE link, RFC 5316 defines a new TLV, the inter-AS reachability TLV, for advertising the link.

It also defines three new sub-TLVs for inclusion in the inter-AS reachability TLV to carry the information about the neighboring AS number and the remote ASBR ID of an inter-AS link.

For a P2P inter-AS link, the information about its remote ASBR may be configured. For a broadcast inter-AS link, no item configured corresponds to the designated router (DR) of the link in ISIS. Since no ISIS runs over any broadcast inter-AS link, no DR is selected. It is hard to configure an item corresponding to the DR on a broadcast link.

This document presents extensions to ISIS for advertising broadcast inter-AS TE links through defining a new sub-TLV for a broadcast link without configuring any item corresponding to the DR on the link.

2. Conventions Used in This Document

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].

3. Information on Inter-AS TE Link

For a broadcast link connecting multiple ASBRs in a number of ASes, on each of the ASBRs X, the following information about the link may be obtained:

1) Link Type: Multi-access
2) Local IP address with mask length
3) Traffic engineering metric
4) Maximum bandwidth
5) Maximum reservable bandwidth
6) Unreserved bandwidth
7) Administrative group
8) SRLG

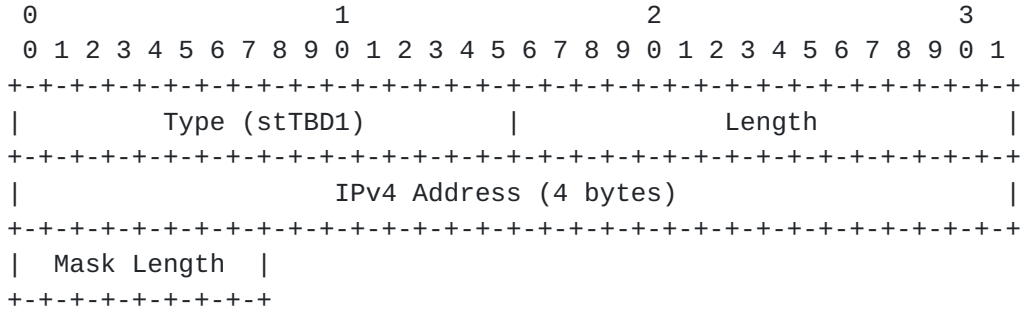
No remote IP address or item corresponding to the DR (i.e., DR's interface address) may be obtained.

4. Extensions to ISIS

4.1. sub-TLVs

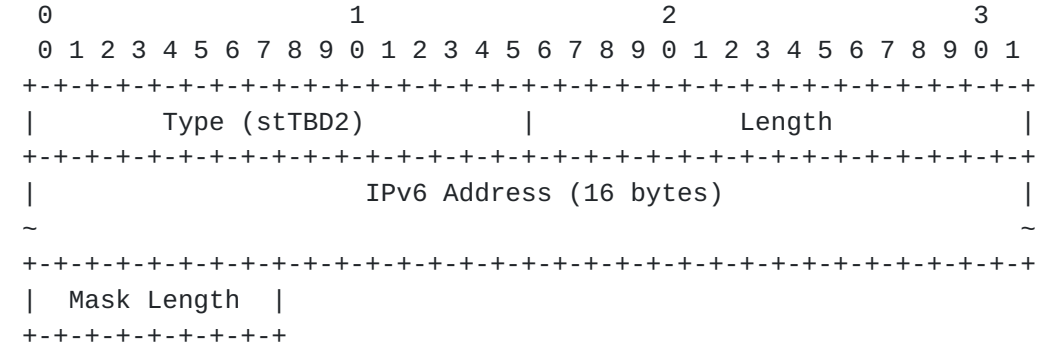
Two new sub-TLVs are defined. One is for local IPv4 address with mask length; and the other is for local IPv6 address with mask length.

The format of the sub-TLV for a local IPv4 address with mask length is shown as follows.



The IPv4 Address indicates the local IPv4 address of a link. The Mask Length indicates the length of the IPv4 address mask.

The format of the sub-TLV for a local IPv6 address with mask length is illustrated below.



The IPv6 Address indicates the local IPv6 address of a link. The Mask Length indicates the length of the IPv6 address mask.

4.2. Procedures

4.2.1. ISIS Router Procedure

For a broadcast inter-AS link connecting to multiple ASBRs, each of the ASBRs as an ISIS router advertises an LSP with an inter-AS reachability TLV, which contains sub-TLVs for the information such as 1) 10 8) about the broadcast link described in Section 3. It does not contain any sub-TLVs indicating remote ASBR, instead, it includes a sub-TLV for the local IP address with network mask.

When TE is enabled on an inter-AS link and the link is up, the ASBR SHOULD advertise this link using the normal procedures for ISIS-TE. When either the link is down or TE is disabled on the link, the ASBR SHOULD withdraw the advertisement. When there are changes to the TE parameters for the link (for example, when the available bandwidth changes), the ASBR SHOULD re-advertise the link but MUST take precautions against excessive re-advertisements.

4.2.2. Super Node Procedure

Suppose that there is a super node, which just receives LSPs from each of ASes (or domains) through a passive ISIS adjacency between the super node and an ASBR or a normal router in the AS or domain.

For a new broadcast link connecting multiple routers, when the super node receives an LSP containing the link attached to router X, it

stores the link from X into its TED. It finds the link's remote end P using the link's local IP address with network mask. P is a Pseudo node identified by the local IP address of the DR selected from the routers connected to the link. After finding P, it associates the link attached to X with P and the link connected to P with X. If P is not found, a new Pseudo node P is created. The super node associates the link attached to X with P and the link attached to P with X. This creates a bidirectional connection between X and P.

The first router and second router from which the super node receives an LSP containing the link are selected as the DR and BDR respectively. After the DR is down, the BDR becomes the DR and the router other than the DR with the largest (or smallest) local IP address connecting to the link is selected as the BDR.

When the old DR is down and the BDR becomes the new DR, the super node updates its TED through removing the link between each of routers X and old P (the Pseudo node corresponding to the old DR) and adding a link between each of routers X (still connecting to the broadcast link) and new P (the Pseudo node corresponding to the new DR).

5. Security Considerations

The mechanism described in this document does not raise any new security issues for the ISIS protocols.

6. IANA Considerations

This section specifies requests for IANA allocation.

7. Acknowledgement

The authors would like to thank all for their valuable comments on this draft.

8. References

8.1. 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>.

[RFC5316] Chen, M., Zhang, R., and X. Duan, "ISIS Extensions in Support of Inter-Autonomous System (AS) MPLS and GMPLS Traffic Engineering", RFC 5316, DOI 10.17487/RFC5316, December 2008, <https://www.rfc-editor.org/info/rfc5316>.

[RFC5305] Li, T. and H. Smit, "IS-IS Extensions for Traffic Engineering", RFC 5305, DOI 10.17487/RFC5305, October 2008, <https://www.rfc-editor.org/info/rfc5305>.

8.2. Informative References

[RFC6805] King, D., Ed. and A. Farrel, Ed., "The Application of the Path Computation Element Architecture to the Determination of a Sequence of Domains in MPLS and GMPLS", RFC 6805, DOI 10.17487/RFC6805, November 2012, <https://www.rfc-editor.org/info/rfc6805>.

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