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OSPF TE Extension for Area IDs
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Abstract

For multi-area path computation, it is desirable to have the knowledge of the boarder areas and the corresponding boarder routers. This memo defines a TLV to the OSPF TE extensions to meet such need.

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 April 21, 2011.

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1. Introduction

The Traffic Engineering Database (TED) based on OSPF is sufficient for the intra-area path computation. However because TED is of area scope, the path computation cannot be used for inter-area scenarios without the help of area boarder routers.

Although the Router LSA offers a B bit to signify an ABR router, the identity of the attached area is unkown. This will force a router to contact every ABRs if it wants TED info from each area.

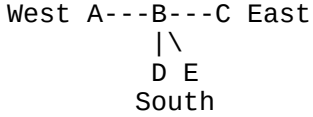

Figure 1: Sample Topology

For example, as shown in Figure 1, the router B has three neighbor areas West, East, and South. It can reach these areas through ABRs A, C, D and E. Both D and E connect to the area South. Ideally B only needs to contact A, c, D (or E) to obtain TED info of the three areas. However, since it does not know that D and E share the boarder between this area and the area South, it has to blindly send the request to both D and E.

If instead each ABR provides its exit area’s information, such as A(West), C(East), D(South), E(South), the router B will be able to make a sound decision to utilize only three ABRs. For this purpose we define an area ID TLV, detailed in Section 2.

Moreover since the TLV is for TE purpose, it is added under the OSPF TE LSA as defined in OSPF TE Extensions [RFC3630].

1.1. 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 RFC 2119 [RFC2119].

1.2. Acronyms

ABR - Area Boarder Router

TE - Traffice Engineering

TED - Traffice Engineering Database

PCE - Path Computation Element

LSP - Label Switched Path

OSPF - Open Shortest Path First

LSA - Link State Advertisement

2. Area ID TLV

[RFC3630] section 2.4 defined two TLVs. This memo adds a third TLV, the Area ID TLV.

The area ID TLV is type TBD (suggest 3), has a length of 4, and a value that is the four octet integer. It may have zero or more occurances in one Traffic Engineering LSA originated by a router.

The value is the area ID of an exit area for which the ABR has TE enabled. An ABR may join multiple areas. Therefore it may generate m-1 area ID TLVs, where m is the total number of areas the router joins. For a non-ABR router, it does not have any exit area, hence its TE TLV has zero occurance of the area ID TLV.

3. Applications

With the area ID TLVs in TED, when performing inter-area path computation, a PCE [RFC4655] will gain additional knowledge of the surrounding areas and the boarder routers to reach each area. The PCE may elect one boarder router for each area and request TE info from it.

Alternatively, the PCE may relay the path computation job to the PCE which is also an ABR.

4. Acknowledgements

TBD

5. IANA Considerations

This document defines the following TLV to the OSPF TE Extensions under TE LSA:

Type	Name	Source
TBD (recommend 3)	Area ID TLV	This document

6. Security Considerations

There are no specific security considerations within the scope of this document.

7. References

7.1. Normative References

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997.

[RFC2328] Moy, J., "OSPF Version 2", STD 54, RFC 2328, April 1998.

[RFC3630] Katz, D., Kompella, K., and D. Yeung, "Traffic Engineering (TE) Extensions to OSPF Version 2", RFC 3630, September 2003.

7.2. Informative References

[RFC4655] Farrel, A., Vasseur, J., and J. Ash, "A Path Computation Element (PCE)-Based Architecture", RFC 4655, August 2006.

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