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Signaling MSD (Maximum SID Depth) using OSPF
draft-tantsura-ospf-segment-routing-msd-01

Abstract

This document proposes a way to expose Maximum SID Depth (MSD) supported by a node at node and/or link level by an OSPF Router. In a Segment Routing (SR) enabled network a centralized controller that programs SR tunnels at the head-end node needs to know the MSD information at node level and/or link level to push the label stack of an appropriate depth . Here the term OSPF means both OSPFv2 and OSPFv3.

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 March 30, 2017.

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1. Introduction

When Segment Routing tunnels are computed by a centralized controller, it is crucial that the controller knows the MSD "Maximum SID Depth" of the node or link SR tunnel exits over, so it doesn't download a path with SID (label stack) of a depth more than the node or link used is capable of imposing. This document describes how to use OSPF to expose the MSD of the node or link to a centralized controller.

PCEP SR extensions [I-D.ietf-pce-segment-routing] has defined MSD, to signal in SR PCE Capability TLV, METRIC Object. However, If PCEP is not supported by a node (head-end of the SR tunnel) and controller does not participate in IGP routing it has no way to learn the MSD of the node or link configured. BGP-LS [RFC7752] defines a way to expose topology and associated different attributes, capabilities of the nodes in that topology to a centralized controller and MSD has been defined in [I-D.tantsura-bgp-ls-segment-routing-msd]. For this information to be advertised by BGP for the all nodes and links of the network, where this is provisioned, OSPF module should have this information in the LSDB.

[I-D.ietf-ospf-mpls-elc] defines, RLSDC which indicates how many labels a node can read to take a decision to insert an Entropy Label (EL) and is different than how many labels a node can push as defined by MSD in this draft.

1.1. Conventions used in this document

1.1.1. Terminology

BGP-LS: Distribution of Link-State and TE Information using Border Gateway Protocol

OSPF: Open Shortest Path First

MSD: Maximum SID Depth

PCC: Path Computation Client

PCE: Path Computation Element

PCEP: Path Computation Element Protocol

SID: Segment Identifier

SR: Segment routing

1.2. 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].

2. Terminology

This memo makes use of the terms defined in [RFC4970].

3. Node MSD TLV

A new TLV within the body of the OSPF RI Opaque LSA, called Node MSD TLV is defined to carry the provisioned SID depth of the router originating the RI LSA. Node MSD is the lowest MSD supported by the node.

The Type (2 bytes) of this TLV is TBD.

Length is 2 bytes, and

the Value field contains MSD of the router originating the RI LSA. Node MSD is a number in the range of 0-254. 0 represents lack of the ability to push MSD of any depth; any other value represents that of the node. This value SHOULD represent the lowest value supported by node.

This TLV is applicable to OSPFv2 and to OSPFv3 [RFC5838] and is optional. The scope of the advertisement is specific to the deployment.

4. LINK MSD sub-TLV

A new sub-TLV called Link MSD sub-TLV is defined to carry the provisioned SID depth of the interface associated with the link.

The Type (2 bytes) of this TLV is TBD.

Length is 2 bytes, and

the Value field contains Link MSD of the router originating the corresponding LSA as specified for OSPFv3 and OSPFv3. Link MSD is a number in the range of 0-254. 0 represents lack of the ability to push MSD of any depth; any other value represents that of the particular link MSD value.

For OSPFv2, the Link level MSD value is advertised as an optional Sub-TLV of OSPFv2 Extended Link TLV as defined in [RFC7684].

For OSPFv3, the Link level MSD value is advertised as an optional Sub-TLV of the Router-Link TLV as defined in [I-D.ietf-ospf-ospfv3-lsa-extend].

5. Acknowledgements

TBD

6. IANA Considerations

This document includes a request to IANA to allocate TLV type codes for the new TLV proposed in Section 3 of this document from OSPF Router Information (RI) TLVs Registry as defined by [RFC4970]. Also for link MSD, we request IANA to allocate new sub-TLV codes as proposed in Section 4 from OSPFv2 Extended Link Opaque LSAs Extended Link TLV registry and from Router-Link TLV defined in OSPFv3 Extend-LSA Sub-TLV registry.

7. Security Considerations

This document describes a mechanism for advertising Segment Routing SID depth supported at node and link level information through OSPF LSAs and does not introduce any new security issues.

8. References

8.1. Normative References

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8.2. Informative References

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[RFC7684] Psenak, P., Gredler, H., Shakir, R., Henderickx, W., Tantsura, J., and A. Lindem, "OSPFv2 Prefix/Link Attribute Advertisement", RFC 7684, DOI 10.17487/RFC7684, November 2015, <http://www.rfc-editor.org/info/rfc7684>.

[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, <http://www.rfc-editor.org/info/rfc7752>.

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