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Signaling Maximum SID Depth using Border Gateway Protocol Link-State draft-tantsura-idr-bgp-ls-segment-routing-msd-03

Abstract

This document proposes a way to signal Maximum SID Depth (MSD) supported by a node at node and/or link granularity by a BGP-LS speaker. In a Segment Routing (SR) enabled network a centralized controller that programs SR tunnels needs to know the MSD supported by the head-end at node and/or link granularity to push the SID stack of an appropriate depth. MSD is relevant to the head-end of a SR tunnel or Binding-SID anchor node where Binding-SID expansions might result in creation of a new SID stack.

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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1. Introduction

When Segment Routing tunnels are computed by a centralized controller, it is critical that the controller learns the MSD "Maximum SID Depth" of the node or link SR tunnel exits over, so the SID stack depth of a path computed doesn't exceed the number of SIDs the node is capable of imposing. This document describes how to use BGP-LS to signal the MSD of a node or link to a centralized controller.

PCEP SR extensions draft [I-D.ietf-pce-segment-routing] signals MSD in SR PCE Capability TLV and METRIC Object. However, if PCEP is not supported/configured on the head-end of a SR tunnel or a Binding-SID anchor node and controller does not participate in IGP routing, it has no way to learn the MSD of nodes and links which has been configured. BGP-LS [RFC7752] defines a way to expose topology and associated attributes and capabilities of the nodes in that topology to a centralized controller.

MSD of sub-type 1, as defined in Section 3 is used to signal the number of SID's a node is capable of imposing, to be used by a path

computation element/controller and is only relevant to the part of the stack created as the result of the computation. In case, there are additional labels (e.g. service) that are to be pushed to the stack - MSD SHOULD be adjusted to reflect that. In the future, new MSD types could be defined to signal additional capabilities: entropy labels, labels that can be pushed thru recirculation, or another dataplane e.g IPv6.

1.1. Conventions used in this document

1.1.1. Terminology

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

MSD: Maximum SID Depth

PCC: Path Computation Client

PCE: Path Computation Element

PCEP: Path Computation Element Protocol

SID: Segment Identifier

SR: Segment routing

1.1.2. 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 [RFC2119].

2. Problem Statement

In existing technology only PCEP has extension to signal the MSD (SR PCE Capability TLV/ METRIC Object as defined in [I-D.ietf-pce-segment-routing],If PCEP is not supported by the node (head-end of the SR tunnel) controller has no way to learn the MSD of the node/link configured. OSPF and IS-IS extensions are defined in:

[I-D.ietf-ospf-segment-routing-msd]

[I-D.ietf-isis-segment-routing-msd]

3. MSD supported by a node

Node MSD is encoded in a new Node Attribute TLV, as defined in [RFC7752]

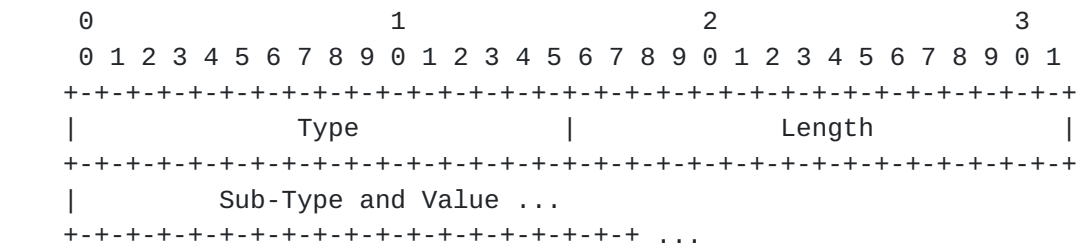

Figure 1: Node attribute format

Type : A 2-octet field specifiying code-point of the new TLV type. Code-point: 1050 (Suggested value - to be assigned by IANA) from BGP-LS Node Descriptor, Link Descriptor, Prefix Descriptor, and Attribute TLVs registry

Length: A 2-octet field that indicates the length of the value portion

Sub-Type and value fields are as defined in corresponding OSPF [I-D.ietf-ospf-segment-routing-msd] and IS-IS [I-D.ietf-isis-segment-routing-msd] extensions.

4. MSD supported on a link

Link MSD is encoded in a New Link Attribute TLV, as defined in [RFC7752]

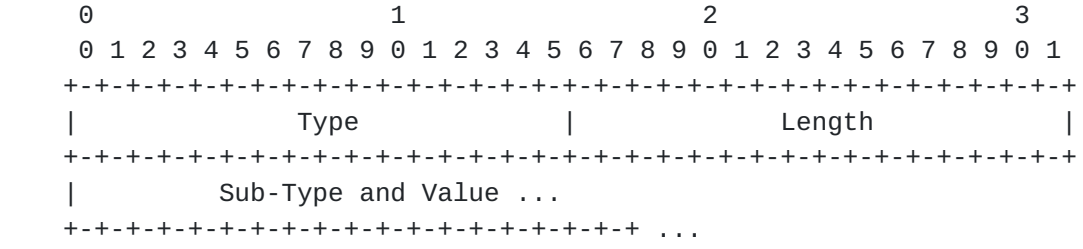

Figure 2: Link attribute format

Type : A 2-octet field specifiying code-point of the new TLV type. Code-point: 1110 (Suggested value - to be assigned by IANA) from BGP-LS Node Descriptor, Link Descriptor, Prefix Descriptor, and Attribute TLVs registry

Length: A 2-octet field that indicates the length of the value portion

Sub-Type and value fields are as defined in corresponding OSPF [I-D.ietf-ospf-segment-routing-msd] and IS-IS [I-D.ietf-isis-segment-routing-msd] extensions.

5. IANA Considerations

This document requests IANA to assign 2 new code-points from the BGP-LS Node Descriptor, Link Descriptor, Prefix Descriptor, and Attribute TLVs registry as specified in sections 3 and 4.

6. Security Considerations

This document does not introduce security issues beyond those discussed in [RFC7752]

7. Acknowledgements

We like to thank Nikos Triantafillis, Stephane Litkowski and Bruno Decraene for their reviews and valuable comments.

8. References

8.1. Normative References

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