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**Signaling MSD (Maximum SID Depth) using Border Gateway Protocol Link-
State
draft-ietf-idr-bgp-ls-segment-routing-msd-02**

Abstract

This document defines a way for a Border Gateway Protocol Link-State (BGP-LS) speaker to advertise multiple types of supported Maximum SID Depths (MSDs) at node and/or link granularity.

Such advertisements allow logically centralized entities (e.g., centralized controllers) to determine whether a particular SID stack can be supported in a given network.

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Table of Contents

1.	Introduction	2
1.1.	Conventions used in this document	3
1.1.1.	Terminology	3
1.1.2.	Requirements Language	3
2.	Problem Statement	3
3.	MSD supported by a node	3
4.	MSD supported on a link	4
5.	IANA Considerations	5
6.	Security Considerations	5
7.	Acknowledgements	5
8.	References	5
8.1.	Normative References	5
8.2.	Informative References	6
	Authors' Addresses	7

[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.

Other types of MSD are known to be useful. For example, [[I-D.ietf-ospf-mpls-elc](#)] and [[I-D.ietf-isis-mpls-elc](#)] define Readable

Label Depth Capability (RLDC) that is used by a head-end to insert an Entropy Label (EL) at a depth that can be read by transit nodes.

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 [BCP 14](#) [[RFC2119](#)] [[RFC8174](#)] when, and only when, they appear in all capitals, as shown here .

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](#)]

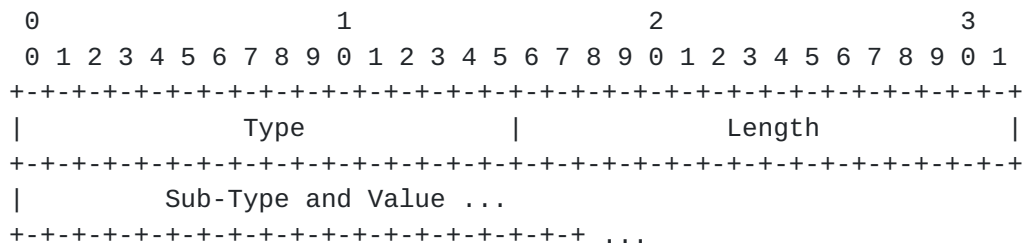


Figure 1: Node attribute format

Type : A 2-octet field specifying code-point of the new TLV type.
Code-point:(TBD1) 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
[\[RFC7752\]](#)

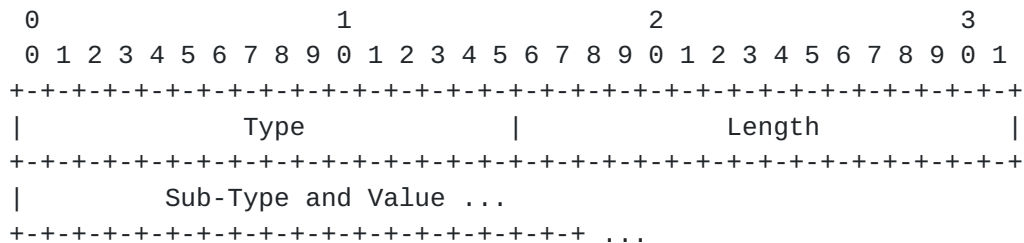


Figure 2: Link attribute format

Type : A 2-octet field specifying code-point of the new TLV type.
Code-point:(TBD2) 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

We request IANA assign code points from the registry BGP-LS Node Descriptor, Link Descriptor, Prefix Descriptor, and Attribute TLVs, as follows: TLV Code Point Description IS-IS TLV/Sub-TLV Reference
TBD1 Node MSD 242/23 (this document) TBD2 Link MSD
(22,23,25,141,222,223)/15 (this document)

6. Security Considerations

Advertisement of the additional information defined in this document that is false, e.g., an MSD that is incorrect, may result in a path computation failing, having a service unavailable, or instantiation of a path that can't be supported by the head-end (the node performing the imposition).

This document does not introduce security issues beyond those discussed in [[RFC7752](#)], [[I-D.ietf-ospf-segment-routing-msd](#)] and [[I-D.ietf-isis-segment-routing-msd](#)]

7. Acknowledgements

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