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Signaling Flow-ID Label Capability and Flow-ID Readable Label Depth

Abstract

Flow-ID Label (FL) is used for MPLS flow identification and flow-based performance measurement with alternate marking method. The ability to process Flow-ID labels is called Flow-ID Label Capability (FLC), and the capability of reading the maximum label stack depth and performing FL-based performance measurement is called Flow-ID Readable Label Depth (FRLD). This document defines a mechanism to signal the FLC and the FRLD using IGP and BGP-LS.

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 19 August 2022.

Table of Contents

1. Introduction

As specified in [I-D.ietf-mpls-inband-pm-encapsulation], Flow-ID Label (FL) is used for MPLS flow identification and flow-based performance measurement with alternate marking method.

Flow-ID Label may appear multiple times in a label stack with variable depth, so both the Flow-ID Label Capability (FLC) and the Flow-ID Readable Label Depth (FRLD) are defined in [I-D.ietf-mpls-inband-pm-encapsulation].

Analogous to [RFC9088] and [RFC9089], this document defines a mechanism to signal the FLC and the FRLD using IGP and BGP-LS, specifically, IGP includes IS-IS, OSPFv2 and OSPFv3.

1.1. Terminology

This memo makes use of the terms defined in [I-D.ietf-mpls-inband-pm-encapsulation] and [RFC8491].

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. Advertising FLC Using IGP

FLC is a property of the node, so FLC is advertised with a node in this document.

If a router has multiple interfaces, the router MUST NOT announce FLC unless all of its interfaces are capable of processing FLs.

2.1. Advertising FLC Using IS-IS

[RFC8667] defines SR-Capabilities sub-TLV of the IS-IS Router Capability TLV (defined in [RFC7981]). Bit 2 in the Flags field of SR-Capabilities sub-TLV is used as the FLC Flag (F-Flag), as shown in Figure 1.

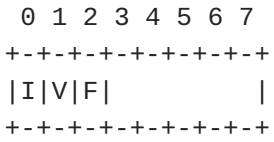

Figure 1: Flags field of SR-Capabilities sub-TLV

F-Flag:

FLC Flag (Bit 2) - Set for the originating node if it supports FLC on all interfaces.

2.2. Advertising FLC Using OSPF

[RFC8665] defines some SR Capabilities TLVs as top-level TLVs of the Router Information Opaque LSA (defined in [RFC7770]). The SR Capabilities TLVs are applicable to both OSPFv2 and OSPFv3 (see also [RFC8666]). Within the SR Capabilities TLVs, the SID/Label Range TLV has a 1-octet Reserved field. Bit 0 in the Reserved field of SID/ Label Range TLV is used as the FLC Flag (F-Flag), as shown in Figure 2.

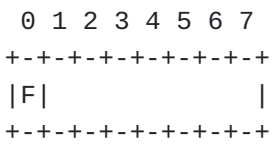

Figure 2: Reserved field of SID/Label Range TLV

F-Flag:

FLC Flag (Bit 0) - Set for the originating node if it supports FLC on all interfaces.

3. Advertising FRLD Using IGP

As requested by [RFC8491], IANA has created an IANA-managed registry titled "IGP MSD-Types" to identify MSD-Types. A new MSD-Type, called

FRLD-MSD, is defined to advertise the FRLD of a given router. The MSD-Type code 3 is requested to be assigned by IANA for FRLD-MSD. The MSD-Value field is set to the FRLD in the range between 0 to 255.

If a router has multiple interfaces with different capabilities of reading the maximum label stack depth, the router MUST advertise the smallest value found across all of its interfaces.

For IS-IS, the FRLD is advertised in a Node MSD Sub-TLV [RFC8491] using the FRLD-MSD type.

For OSPF including both OSPFv2 and OSPFv3, the FRLD is advertised in a Node MSD TLV [RFC8476] using the FRLD-MSD type.

The absence of FRLD-MSD advertisements indicates only that the advertising node does not support advertisement of this capability.

4. Signaling FLC and FRLD in BGP-LS

The IGP extensions defined in this document can be advertised via BGP-LS (Distribution of Link-State and Traffic Engineering Information Using BGP) [I-D.ietf-idr-rfc7752bis] using existing BGP-LS TLVs.

The FLC is advertised using the SR Capabilities TLV as defined in [RFC9085].

The FRLD-MSD is advertised using the Node MSD TLV as defined in [RFC8814].

5. Security Considerations

This document specifies the ability to advertise additional node capabilities using IS-IS, OSPF and BGP-LS. As such, the security considerations as described in the referenced specifications are applicable to this document.

Incorrectly setting the F-Flag during origination, propagation, or redistribution may lead to poor or no performance measurement of the MPLS traffic or to the MPLS traffic being discarded on the egress node.

Incorrectly setting the FRLD value may lead to poor or no performance measurement of the MPLS traffic.

6. IANA Considerations

This document requests the following allocation from IANA:

* Type 3 in the IGP MSD-Types registry is requested to be assigned to the FRLD-MSD.

7. Acknowledgements

The authors would like to acknowledge Acee Lindem and Les Ginsberg for their very helpful comments.

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8.1. Normative References

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8.2. Informative References

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