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Export of MPLS Segment Routing Label Type Information in

IP Flow Information Export (IPFIX)

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Abstract

This document introduces new IP Flow Information Export (IPFIX) code

points to identify which traffic is being forwarded based on which

MPLS control plane protocol within a Segment Routing

domain. In particular, this document defines four code points for

the IPFIX mplsTopLabelType Information Element for IS-IS, OSPFv2,

OSPFv3, and BGP MPLS Segment Routing extensions.

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1. Introduction

Four new routing protocol extensions, OSPFv2 Extensions [RFC8665],

OSPFv3 Extensions [RFC8666], IS-IS Extensions [RFC8667] and BGP

Prefix Segment Identifiers (Prefix-SIDs) [RFC8669] have been defined as routing protocols that are

able to propagate Segment Routing (SR) labels for the MPLS data plane

[RFC8660].

Also [I-D.ali-spring-sr-traffic-accounting] describes how IP Flow

Information Export [RFC7012] can be leveraged to account traffic to

MPLS Segment Routing label dimensions within a Segment Routing

domain.

In [RFC7012], the Information Element (IE) mplsTopLabelType(46) identifies

which MPLS control plane protocol allocated the top-of-stack label in

the MPLS label stack. Section 7.2 of [RFC7012] creates the "IPFIX

MPLS label type (Value 46)" subregistry [IANA-IPFIX-IE46] where new

MPLS label types should be added. This document defines new code points

to address typical use cases that are discussed in Section 2.

2. MPLS Segment Routing Top Label Type

By introducing four new code points to the IPFIX IE

mplsTopLabelType(46) for IS-IS, OSPFv2, OSPFv3, and BGP Prefix-SID,

, it is possible to identify which traffic is being

forwarded based upon which MPLS control plane protocol.

A typical use case is to monitor MPLS control plane

migrations from LDP to IS-IS (or OSPF) Segment Routing. Such a

migration can be done node by node as described in Appendix A of [RFC8661]

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Another use case is to monitor MPLS control plane migrations

from dynamic BGP labels [RFC8277] to BGP Prefix-SIDs in

the context of Seamless MPLS SR described in Section 4.6 of

[I-D.hegde-spring-mpls-seamless-sr].

Both use cases can be verified by using mplsTopLabelType(46),

mplsTopLabelIPv4Address(47), mplsTopLabelIPv6Address(140),

mplsTopLabelStackSection(70), and forwardingStatus(89) IEs to infer:

o how many packets are forwarded or dropped,

o if dropped, for which reasons, and

o the MPLS provider edge loopback address and label protocol.

By looking at the MPLS label value itself, it is not always clear as

to which label protocol it belongs. This because they may

share the same label allocation range. This is, for example, the

case for IGP-Adjacency SIDs, LDP, and dynamic BGP labels.

3. IANA Considerations

This document requests IANA to allocate the following code points in the existing sub

registry "IPFIX MPLS label type (Value 46)" under the "IPFIX Information

Elements" registry available at [IANA-IPFIX].

-

+------+--------------------------------+-----------+-------------+

| Value| Description | Reference | Requester |

+------+--------------------------------+-----------+-------------+

| TBD1 | OSPFv2 Segment Routing | RFC8665 | [RFC-to-be] |

+------+--------------------------------+-----------+-------------+

| TBD2 | OSPFv3 Segment Routing | RFC8666 | [RFC-to-be] |

+------+--------------------------------+-----------+-------------+

| TBD3 | IS-IS Segment Routing | RFC8667 | [RFC-to-be] |

+------+--------------------------------+-----------+-------------+

| TBD4 | BGP Segment Routing Prefix-SID | RFC8669 | [RFC-to-be] |

+------+--------------------------------+-----------+-------------+

Table 1: Updates to "IPFIX MPLS label type (Value 46)" SubRegistry

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Note to the RFC Editor:

o Please replace TBD1 - TBD4 with the values allocated by IANA.

o Please replace the [RFC-to-be] with the RFC number assigned to

this document.

4. Operational Considerations

In the IE mplsTopLabelType(46), the BGP code point 4

refers to the label value in MP\_REACH\_NLRI path attribute described

in Section 2 of [RFC8277], while the BGP Segment Routing Prefix-SID

code point TBD4 corresponds to the label index value in the Label-Index TLV

described in Section 3.1 of [RFC8669]. These values are thus used for distinct purposes.

5. Security Considerations

There exists no extra security considerations regarding the

allocation of these new IPFIX IEs compared to

[RFC7012].

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