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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 is in use 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 protocols extensions, OSPFv2 Extensions [RFC8665], OSPFv3 Extensions

[RFC8666], IS-IS Extensions [RFC8667], and BGP Prefix-SID [RFC8669]

have been defined as routing protocols that are able to propagate

Segment Routing labels for the MPLS data plane [RFC8660].

Also,

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

IP Flow Information Export (IPFIX)

[RFC7012] can be

leveraged to account traffic to MPLS Segment Routing label dimensions

within a Segment Routing domain.

In

[RFC7012], the information element mplsTopLabelType(46) describes

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

the MPLS label stack. Section 7.2 of [RFC7012] describes the

"IPFIX MPLS label type (Value 46)" sub-registry [IANA-IPFIX-IE46]

where new code points 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

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

when Segment Routing with one of these four routing protocols is

deployed, it is possible to identify which traffic is being forwarded based

on which MPLS control plane protocol is in use.

A typical use case scenario 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 [RFC8661].

Another use case scenario is to monitor MPLS control plane migrations

from dynamic BGP labels according to [RFC8277] to BGP Prefix-

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SID according to [RFC8669] in context of Seamless MPLS SR

[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.

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, since they could potentially

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

Adjacency SID's, LDP, and dynamic BGP labels.

3. IANA Considerations

IANA is requested to allocate four code points in the existing sub-

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

Elements" registry for IS-IS, OSPFv2, OSPFv3, and BGP Prefix-SID

Segment Routing extensions.

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

| 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] |

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

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

Note to IANA:

o Please assign TBD1 to 4 to the next available numbers according to

the "IPFIX MPLS label type (Value 46)" sub-registry

[IANA-IPFIX-IE46] procedure.

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

this document.

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Note to RFC-editor:

o Please remove above two IANA notes.

4. Operational Considerations

In the information element mplsTopLabelType(46), the BGP code point 4

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

in section 2 of [RFC8277], and the BGP Segment Routing

Prefix-SID code point TBD4 to the label index value in the Label-

Index TLV described in Section 3.1 of [RFC8669].

5. Security Considerations

There exists no extra security considerations regarding the

allocation of these new IPFIX information elements compared to

[RFC7012].

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