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T. Graf
Swisscom

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Export of MPLS Segment Routing Label Type Information in IP Flow Information Export (IPFIX) draft-tgraf-ipfix-mpls-sr-label-type-06

Abstract

This document introduces additional code points in the mplsTopLabelType Information Element for IS-IS, OSPFv2, OSPFv3 and BGP MPLS Segment Routing (SR) extensions to enable Segment Routing label protocol type information in IP Flow Information Export (IPFIX).

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1. Introduction

Besides BGP-4 [RFC8277], LDP [RFC5036] and BGP VPN [RFC4364], four new routing-protocols, OSPFv2 Extensions [RFC8665], OSPFv3 Extensions [RFC8666], IS-IS Extensions [RFC8667] and BGP Prefix-SID [RFC8669] have been added to the list of routing-protocols able to propagate Segment Routing labels for the MPLS data plane [RFC8660].

Traffic Accounting in Segment Routing Networks [I-D.ali-spring-sr-traffic-accounting] describes how IPFIX can be leveraged to account traffic to MPLS Segment Routing label dimensions within a Segment Routing domain.

In the Information Model for IP Flow Information Export IPFIX [RFC7012], the information element mplsTopLabelType(46) describes which MPLS control plane protocol allocated the top-of-stack label in the MPLS label stack. RFC 7012 section 7.2 [RFC7012] describes the "IPFIX MPLS label type (Value 46)" sub-registry [IANA-IPFIX-IE46] where new code points should be added.

2. MPLS Segment Routing Top Label Type

By introducing four new code points to information element mplsTopLabelType(46) for IS-IS, OSPFv2, OSPFv3 and BGP Prefix-SID, when Segment Routing with one of these four routing protocols is deployed, we get insight into which traffic is being forwarded based on which MPLS control plane protocol.

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 [RFC8661]

Another use case is the monitoring of a migration to a Seamless MPLS SR [I-D.hegde-spring-mpls-seamless-sr] architecture. Where prefixes are propagated with dynamic BGP labels according to RFC8277

[RFC8277], BGP Prefix-SID according to RFC8669 [RFC8669] and used for the forwarding between IGP domains. Adding an additional layer into the MPLS data plane to above discribed use case.

Both use cases can be verified by looking at mplsTopLabelType(46), mplsTopLabelIPv4Address(47), mplsTopLabelStackSection(70) and forwardingStatus(89) dimensions. Giving insights into the MPLS data plane for which MPLS provider edge loopback address, which label protocol has been used and how many packets are forwarded or dropped and when dropped why they have been dropped.

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 the case for IGP-Adjacency SID's, LDP and dynamic BGP labels as an example.

3. IANA Considerations

This document specifies four additional code points for IS-IS, OSPFv2, OSPFv3 and BGP Prefix-SID Segment Routing extension in the existing sub-registry "IPFIX MPLS label type (Value 46)" of the "IPFIX Information Elements" and one new "IPFIX Information Element" with a new sub-registry in the "IP Flow Information Export (IPFIX) Entities" name space.

Value	Description	Reference	Requester
TBD2	OSPFv2 Segment Routing	RFC8665	TBD1
TBD3	OSPFv3 Segment Routing	RFC8666	TBD1
TBD4	IS-IS Segment Routing	RFC8667	TBD1
TBD5	BGP Segment Routing Prefix-SID	RFC8669	TBD1

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

4. Security Considerations

The same security considerations apply as for the IPFIX Protocol RFC7012 [RFC7012].

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Author's Address

Thomas Graf
Swisscom
Binzring 17
Zurich 8045
Switzerland

Email: thomas.graf@swisscom.com