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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-04

Abstract

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

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1. Introduction

Besides BGP-4 [RFC8277], LDP [RFC5036] and BGP VPN [RFC4364], three new routing-protocols, OSPFv2 Extensions [RFC8665], OSPFv3 Extensions [RFC8666] and IS-IS Extensions [RFC8667] have been added to the list of routing-protocols able to propagate Segment Routing labels for the MPLS dataplane [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 #46 mplsTopLabelType 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 IANA Information Element #46 SubRegistry [IANA-IPFIX-IE46] where new code points should be added.

2. MPLS Segment Routing Top Label Type

By introducing three new code points to information element #46 mplsTopLabelType for IS-IS, OSPFv2 and OSPFv3, when Segment Routing with one of these three 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. 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 and LDP as an example.

3. Segment Routing Segment Identifier Type

The introduction of a new Information Element called SrSidType, which contains the Segment Routing Segment Identifier type according to Segment Routing Architecture [RFC8402], allows the Segment Routing forwarding behaviour to be exported in IPFIX.

A typical use case scenario is to monitor the forwarding behaviour when Topology Independent Fast Reroute [I-D.ietf-rtgwg-segment-routing-ti-lfa] or micro loop avoidance [I-D.bashandy-rtgwg-segment-routing-uloop] tunnel traffic with IGP-Adjacency Segment SID's or when ECMP load balancing should occur with Anycast-SID's.

4. IANA Considerations

This document specifies three additional code points for IS-IS, OSPv2 and OSPFv3 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
TBD1	OSPFv2 Segment Routing	RFC8665
TBD2	OSPFv3 Segment Routing	RFC8666
TBD3	IS-IS Segment Routing	RFC8667

Figure 1: Updates to "IPFIX Information Element #46" SubRegistry

ElementID	Name	Abstract Data Type	Data Type Semantics	Description	Reference
TBD4	SrSidType	unsigned8	identifier	This field identifies the Segment Routing Identifier Type of the MPLS top-of-stack label. SID types for this field are listed in the SR SID type registry.	RFC8402

Figure 2: New "IPFIX Information Element #TBD4"

Value	Description	Reference
TBD5	Unknown SID Type	RFC8402
TBD6	Prefix-SID	RFC8402
TBD7	Node-SID	RFC8402
TBD8	Anycast-SID	RFC8402
TBD9	Adjacency-SID	RFC8402
TBD10	LAN-Adjacency-SID	RFC8402
TBD11	PeerNode-SID	RFC8402
TBD12	PeerAdj-SID	RFC8402
TBD13	PeerSet-SID	RFC8402
TBD14	Binding-SID	RFC8402

Figure 3: New "IPFIX Information Element #TBD4" SubRegistry

5. Security Considerations

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

6. Acknowledgements

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