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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-07

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 described use case.

Both use cases can be verified by using `mplsTopLabelType(46)`, `mplsTopLabelIPv4Address(47)`, `mplsTopLabelStackSection(70)` and `forwardingStatus(89)` dimensions to get insights into

- 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 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
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.

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

Note to RFC-editor:

- o Please remove above two IANA notes.

[4.](#) Security Considerations

There exists no extra security considerations regarding the allocation of these new IPFIX information elements compared to [RFC7012](#) [[RFC7012](#)].

[5.](#) Acknowledgements

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[6.](#) References

[6.1.](#) Normative References

- [RFC7012] Claise, B., Ed. and B. Trammell, Ed., "Information Model for IP Flow Information Export (IPFIX)", [RFC 7012](#), DOI 10.17487/RFC7012, September 2013, <<https://www.rfc-editor.org/info/rfc7012>>.

6.2. Informative References

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

Filsfils, C., Talaulikar, K., Sivabalan, S., Horneffer, M., Raszuk, R., Litkowski, S., Voyer, D., and R. Morton, "Traffic Accounting in Segment Routing Networks", [draft-ali-spring-sr-traffic-accounting-04](#) (work in progress), February 2020.

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

Hegde, S., Bowers, C., Xu, X., Gulko, A., Bogdanov, A., Uttaro, J., Jalil, L., Khaddam, M., and A. Alston, "Seamless Segment Routing", [draft-hegde-spring-mpls-seamless-sr-04](#) (work in progress), January 2021.

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[IANA-IPFIX-IE46]

"IANA IP Flow Information Export (IPFIX) Information Element #46 SubRegistry",
<<https://www.iana.org/assignments/ipfix/ipfix.xhtml#ipfix-mpls-label-type>>.

[RFC4364] Rosen, E. and Y. Rekhter, "BGP/MPLS IP Virtual Private Networks (VPNs)", [RFC 4364](#), DOI 10.17487/RFC4364, February 2006, <<https://www.rfc-editor.org/info/rfc4364>>.

[RFC5036] Andersson, L., Ed., Minei, I., Ed., and B. Thomas, Ed., "LDP Specification", [RFC 5036](#), DOI 10.17487/RFC5036, October 2007, <<https://www.rfc-editor.org/info/rfc5036>>.

[RFC8277] Rosen, E., "Using BGP to Bind MPLS Labels to Address Prefixes", [RFC 8277](#), DOI 10.17487/RFC8277, October 2017, <<https://www.rfc-editor.org/info/rfc8277>>.

[RFC8660] Bashandy, A., Ed., Filsfils, C., Ed., Previdi, S., Decraene, B., Litkowski, S., and R. Shakir, "Segment Routing with the MPLS Data Plane", [RFC 8660](#), DOI 10.17487/RFC8660, December 2019,

<<https://www.rfc-editor.org/info/rfc8660>>.

- [RFC8661] Bashandy, A., Ed., Filsfils, C., Ed., Previdi, S., Decraene, B., and S. Litkowski, "Segment Routing MPLS Interworking with LDP", [RFC 8661](#), DOI 10.17487/RFC8661, December 2019, <<https://www.rfc-editor.org/info/rfc8661>>.
- [RFC8665] Psenak, P., Ed., Previdi, S., Ed., Filsfils, C., Gredler, H., Shakir, R., Henderickx, W., and J. Tantsura, "OSPF Extensions for Segment Routing", [RFC 8665](#), DOI 10.17487/RFC8665, December 2019, <<https://www.rfc-editor.org/info/rfc8665>>.
- [RFC8666] Psenak, P., Ed. and S. Previdi, Ed., "OSPFv3 Extensions for Segment Routing", [RFC 8666](#), DOI 10.17487/RFC8666, December 2019, <<https://www.rfc-editor.org/info/rfc8666>>.
- [RFC8667] Previdi, S., Ed., Ginsberg, L., Ed., Filsfils, C., Bashandy, A., Gredler, H., and B. Decraene, "IS-IS Extensions for Segment Routing", [RFC 8667](#), DOI 10.17487/RFC8667, December 2019, <<https://www.rfc-editor.org/info/rfc8667>>.

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- [RFC8669] Previdi, S., Filsfils, C., Lindem, A., Ed., Sreekantiah, A., and H. Gredler, "Segment Routing Prefix Segment Identifier Extensions for BGP", [RFC 8669](#), DOI 10.17487/RFC8669, December 2019, <<https://www.rfc-editor.org/info/rfc8669>>.

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