OPSAWG
Internet-Draft
Intended status: Standards Track
Expires: 26 June 2026

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23 December 2025

# Export of MPLS Network Action (MNA) Information in IPFIX
draft-liu-opsawg-ipfix-mpls-mna-00

## Abstract

This document introduces new IPFIX IEs for exporting MPLS Network Action (MNA) information in IPFIX, covering both in-stack and post-stack MNAs.

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## 1. Introduction

MPLS Network Actions (MNAs), as introduced in [RFC9789], are used to indicate actions that impact the forwarding or other processing (such as monitoring) of the packet along the Label Switched Path (LSP) of the packet and to transfer any additional data needed for these actions.

Two types of MNAs solutions are defined:

* MNA Sub-Stack Solution/In-stack Solution: as in [I-D.ietf-mpls-mna-hdr], it is used to carry Network Actions and Ancillary Data in the MPLS label stack. In-stack actions and ancillary data are contained in a Network Action Sub-Stack (NAS), which is recognized by a new base Special Purpose Label (bSPL).

* Post-Stack MNA Solution: as in [I-D.ietf-mpls-mna-ps-hdr], it is for carrying Network Actions and Ancillary Data after the MPLS label stack. The Post-Stack MPLS Header (PSMH) consists of two main parts: Post-Stack MPLS Header (PSMH) Type and Post-Stack Network Action Encoding.

When monitoring a traffic flow with MPLS MNA encoding, the following information may be required by the network operator.

* What's the content of the MNAs carried in the MPLS label stack ?

* What's the content of the MNAs carried after the MPLS label stack ?

In the existing IPFIX mechanism, mplsLabelStackSection(IE 316) can be used to carry a series of n octets from the MPLS label stack of a sampled packet, starting sectionOffset(IE 409) octets into the MPLS label stack, and mplsPayloadPacketSection(IE 317) carries a series of n octets from the MPLS payload of a sampled packet, starting sectionOffset(IE 409) octets into the MPLS payload.

If mplsLabelStackSection(IE 316) and mplsPayloadPacketSection(IE 317) are used to carry the MNA information, additional procedures are required at the network analyzer to parse the mplsLabelStackSection or the mplsPayloadPacketSection information to see if there’s any MNA information carried in it and what’s the detailed MNA information. And this would bring extra complexity in the network analyzer.

This document introduces new IPFIX IEs for exporting MNA information in IPFIX, covering both in-stack and post-stack MNAs.

## 2. Terminology

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in BCP 14 [RFC2119] [RFC8174] when, and only when, they appear in all capitals, as shown here.

This document makes use of the terms defined in [RFC7011] and [RFC9789].

The following terms are used as defined in [RFC7011]:

* IPFIX
* IPFIX Information Elements
* Metering Process
* Template
* Collector
* IPFIX Device

The following terms are used as defined in [RFC9789]:

* MPLS Network Action (MNA)
* Label Stack Entry (LSE)

* Ancillary Data (AD)

* Network Action Sub-Stack (NAS)

* Post-Stack Data

# 3. IPFIX IEs for MNA

This section defines several Encapsulation Layer IEs for MPLS MNAs. Section 3.1 defines IEs for MNAs carried in the MPLS label stack (in-Stack MNA) and section 3.2 defines IEs for MNAs carried after the bottom of the MPLS label stack (post-Stack MNA).

## 3.1. IPFIX IEs for In-Stack MNAs

### 3.1.1. mplsMnaSubStack

Name: mplsMnaSubStack

ElementID: TBD1

Description: The MNA Sub-Stack in the MPLS label stack with the MNA Sub-Stack Indicator excluded. This Information Element has a variable length. Multiple mplsMnaSubStack IEs can be specified within a single Template since multiple MPLS Network Action Sub-Stacks (NASes) may appear in a label stack as described in section 3 of [I-D.ietf-mpls-mna-hdr].

Abstract Data Type: octetArray

Data Type Semantics: default

Additional Information: See [I-D.ietf-mpls-mna-hdr].

Reference: [I-D.ietf-mpls-mna-hdr]

### 3.1.2. mplsMnaLseFormatB

Name: mplsMnaLseFormatB

ElementID: TBD2

Description: The LSE Format B carried in the MPLS Network Action Sub-Stack(NAS). As defined in section 5 of [I-D.ietf-mpls-mna-hdr], the second LSE in a NAS MUST be a Format B LSE. This LSE contains an initial opcode plus additional fields that describe the NAS. The size of this Information Element is 3 octets.

If multiple mplsMnaLseFormatB Information Elements are specified within a single Template, then they apply to the mplsMnaSubStack Information Elements in order: the first mplsMnaLseFormatB applies to the first mplsMnaSubStack, the second to the second, and so on. Note that the "closest" mplsMnaLseFormatB and mplsMnaSubStack Information Elements within a given Template are not necessarily related. If there are fewer mplsMnaLseFormatB Information Elements than mplsMnaSubStack Information Elements, then subsequent mplsMnaSubStack Information Elements have no LSE Format B information in this template. If there are more mplsMnaLseFormatB Information Elements than the number of mplsMnaSubStack Information Elements, then the additional mplsMnaLseFormatB Information Elements are meaningless.

Abstract Data Type: octetArray

Data Type Semantics: default

Additional Information: See section 4.2 in [I-D.ietf-mpls-mna-hdr] for the definition of LSE Format B.

Reference: This document.

## 3.2. IPFIX IEs for Post-Stack MNAs

### 3.2.1. mnaPostStackMplsHeaderSection

Name: mnaPostStackMplsHeaderSection

ElementID: TBD3

Description: The Post-Stack MPLS Header encoded after the Bottom of the MPLS label stack. This Information Element has a variable length.

Abstract Data Type: octetArray

Data Type Semantics: default

Additional Information: See section 3 of [I-D.ietf-mpls-mna-ps-hdr].

Reference: This document.

### 3.2.2. mnaPostStackMplsHeaderType

Name: mnaPostStackMplsHeaderType

ElementID: TBD4

Description: This IE carries the Post-Stack MPLS Header Type defined in section 3.2.1 of [I-D.ietf-mpls-mna-ps-hdr]. The Post-Stack MPLS Header type is the top-header for all the Post-Stack Network Actions that are encoded in the PSMH for each scope. The size of this Information Element is 4 octets.

Abstract Data Type: octetArray

Data Type Semantics: default

Additional Information: See section 3.2.1 of [I-D.ietf-mpls-mna-ps-hdr].

Reference: This document.

## 4. Operational Considerations

For the in-stack MNAs, as specified in [I-D.ietf-mpls-mna-hdr], the presence of the MNA Sub-Stack Indicator is indicated by the MNA Sub-Stack Indicator which is a Base Special-Purpose MPLS Label with value TBA. To generate Flow Records with the in-Stack MNA IEs included, the metering process MUST understand the MNA Sub-Stack Indicator. If the Base Special-Purpose MPLS Label with value TBA is absent in the label stack, when the in-Stack MNA IEs appear in the template record, the corresponding field in the data record is RECOMMENDED to set to all zeros.

For the post-stack MNAs, since the presence of the Post-Stack MPLS Header is indicated by the P-bit in the LSE Format B [I-D.ietf-mpls-mna-ps-hdr] which is carried in the label stack following the MNA Sub-Stack Indicator, the metering process MUST understand the MNA Sub-Stack Indicator and the P-bit in the LSE Format B. Only when the P-bit is set SHOULD the metering process capture the post-stack MNA information after the bottom of the stack.

## 5. Security Considerations

There are no additional security considerations regarding allocation of these new IPFIX IEs compared to [RFC7012].

## 6. IANA Considerations

This document requests IANA to create new IEs under the "IPFIX Information Elements" registry [RFC7012] available at [IANA-IPFIX].

| Element ID | Name | Reference |
|---|---|---|
| TBD1 | mplsMnaSubStack | This document |
| TBD2 | mplsMnaLseFormatB | This document |
| TBD3 | mnaPostStackMplsHeaderSection | This document |
| TBD4 | mnaPostStackMplsHeaderType | This document |

Table 1: IPFIX Information Elements Registry

## 7. References

### 7.1. Normative References

[I-D.ietf-mpls-mna-hdr]
Rajamanickam, J., Gandhi, R., Zigler, R., Song, H., and K. Kompella, "MPLS Network Action (MNA) Sub-Stack Solution", Work in Progress, Internet-Draft, draft-ietf-mpls-mna-hdr-17, 1 December 2025, <https://datatracker.ietf.org/doc/html/draft-ietf-mpls-mna-hdr-17>.

[I-D.ietf-mpls-mna-ps-hdr]
Rajamanickam, J., Gandhi, R., Zigler, R., Li, T., and J. Dong, "Post-Stack MPLS Network Action (MNA) Solution", Work in Progress, Internet-Draft, draft-ietf-mpls-mna-ps-hdr-04, 20 November 2025, <https://datatracker.ietf.org/doc/html/draft-ietf-mpls-mna-ps-hdr-04>.

[IANA-IPFIX]
IANA, "IP Flow Information Export (IPFIX) Entities", <https://www.iana.org/assignments/ipfix>.

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, DOI 10.17487/RFC2119, March 1997, <https://www.rfc-editor.org/info/rfc2119>.

[RFC7011] Claise, B., Ed., Trammell, B., Ed., and P. Aitken, "Specification of the IP Flow Information Export (IPFIX) Protocol for the Exchange of Flow Information", STD 77, RFC 7011, DOI 10.17487/RFC7011, September 2013, <https://www.rfc-editor.org/info/rfc7011>.

[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>.

[RFC8174] Leiba, B., "Ambiguity of Uppercase vs Lowercase in RFC 2119 Key Words", BCP 14, RFC 8174, DOI 10.17487/RFC8174, May 2017, <https://www.rfc-editor.org/info/rfc8174>.

### 7.2. Informative References

[RFC9789] Andersson, L., Bryant, S., Bocci, M., and T. Li, "MPLS Network Actions (MNAs) Framework", RFC 9789, DOI 10.17487/RFC9789, July 2025, <https://www.rfc-editor.org/info/rfc9789>.

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