MPLS Working Group
Internet-Draft
Intended status: Standards Track
Expires: 31 August 2026

W. Cheng
China Mobile
X. Min
ZTE Corp.
R. Gandhi
Cisco Systems, Inc.
G. Mirsky
Ericsson
G. Fioccola
Huawei

27 February 2026

MNA for Performance Measurement with Alternate Marking Method
draft-cx-mpls-mna-inband-pm-08

Abstract

MPLS Network Action (MNA) is used to indicate action for Label Switched Paths (LSPs) and/or MPLS packets, and to transfer data needed for the action.

This document defines MNA encodings for MPLS performance measurement with alternate marking method, which performs flow-based packet loss, delay, and jitter measurements on MPLS live traffic.

Status of This Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF). Note that other groups may also distribute working documents as Internet-Drafts. The list of current Internet-Drafts is at https://datatracker.ietf.org/drafts/current/.

Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use Internet-Drafts as reference material or to cite them other than as "work in progress."

This Internet-Draft will expire on 31 August 2026.

Copyright Notice

Table of Contents

1. Introduction

MPLS Network Action (MNA) [RFC9789] is used to indicate action for Label Switched Paths (LSPs) and/or MPLS packets, and to transfer data needed for the action. [I-D.ietf-mpls-mna-hdr] defines the MNA sub-stack solution for carrying Network Actions and Ancillary Data in the MPLS label stack. [I-D.ietf-mpls-mna-ps-hdr] defines the Post-Stack MNA solution for carrying Network Actions and Ancillary Data after the MPLS label stack.

As specified in [RFC9714], Flow-ID Label, L bit and D bit are used for MPLS flow identification and flow-based performance measurement with alternate marking method [RFC9341], which can be an applicable MNA usecase [RFC9791].

This document defines MNA encodings for MPLS performance measurement with alternate marking method, which performs flow-based packet loss, delay, and jitter measurements on MPLS live traffic. The proposed MNA encodings are compliant with the MNA solutions specified in [I-D.ietf-mpls-mna-hdr] and [I-D.ietf-mpls-mna-ps-hdr], and reuse the data fields specified in [RFC9714].

1.1. Terminology

This document makes use of the terms defined in [RFC9714], [I-D.ietf-mpls-mna-hdr] and [I-D.ietf-mpls-mna-ps-hdr].

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.

2. MPLS Network Actions for Flow-based PM

2.1. In-Stack MNA for Flow-based PM

The In-Stack MNA format for performance measurement with alternate marking method is illustrated as below:

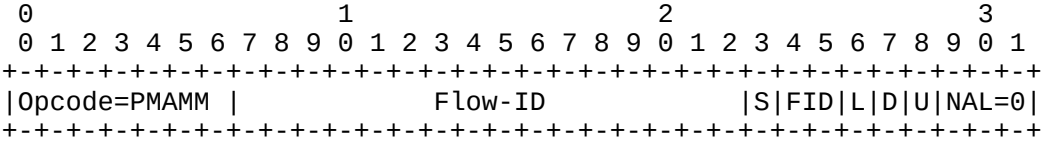

Figure 1: In-Stack MNA for Alternate Marking

The description of In-Stack MNA for Alternate Marking is as follows:

* Opcode: Performance Measurement with Alternate Marking Method (PMAMM) Action with value TBA1.

* Scope: The PMAMM Action is valid in all scopes.

* In-Stack Data: The PMAMM Action carries 20 bits of ancillary data. The most significant 18 bits of ancillary data is the Flow-ID Value, immediately followed by L bit and D bit. Note that the 2-bit FID field is part of the Flow-ID Value. The three fields Flow-ID Value, L bit, and D bit have semantics consistent with the Flow-ID Label, L bit and D bit defined in [RFC9714], except that the Flow-ID Value is an 18-bit value while the Flow-ID Label is a 20-bit value. While the Flow-ID Label has some restrictions to avoid collisions with the reserved label space (0-15) [RFC3032], those restrictions are not necessary for the Flow-ID Value and do not apply. The forwarding node in the scope of PMAMM Action SHOULD execute the flow-based performance measurement by using the Flow-ID Value, L bit and D bit.

* Label Stack Entry (LSE) Format: Format C as defined in [I-D.ietf-mpls-mna-hdr]. The S bit is the Bottom of Stack (BoS) field [RFC3032]. There is no additional data. The Network Action Length (NAL) field MUST be set to 0. The U bit has the same semantics as used in [I-D.ietf-mpls-mna-hdr].

* Post-Stack Data: None.

2.2. Post-Stack MNA for Flow-based PM

The Post-Stack MNA format for performance measurement with alternate marking method contains two parts, one part is an In-Stack MNA which indicates the presence of MNA Post-Stack Header (PSH), another part is a Post-Stack Network Action carrying the data for performance measurement with alternate marking method. Note that a Post-Stack Network Action is part of an MNA PSH.

The format of the In-Stack MNA indicating the presence of MNA PSH is illustrated as below:

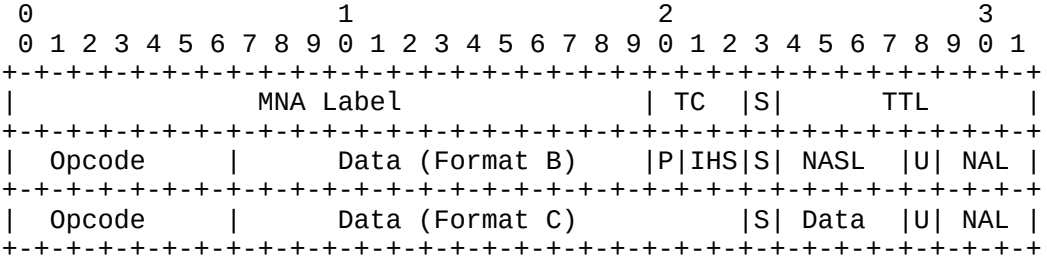

Figure 2: In-Stack MNA with Post-Stack Network Action Carrying Alternate Marking Data

The description of the In-Stack MNA is as follows:

* Opcode: PMAMM In-Stack Network Action for Alternate Marking Data in MNA PSH with value TBA2. This Opcode is optional and can be carried in Format B LSE or Format C LSE.

* Scope: The PMAMM Action is valid in all scopes.

* In-Stack Data: The 10 bits next to the Opcode field contains the offset for MNA PSH for this In-Stack Network Action in 4-octet units after bottom of stack LSE to the start of the corresponding Post-Stack Network Action Opcode. Due to the Post-Stack Header type top-header, minimum value for the offset is 1 (i.e., 4-octets).

* LSE Format: Format B as defined in [I-D.ietf-mpls-mna-ps-hdr] or Format C as defined in [I-D.ietf-mpls-mna-hdr]. The P bit MUST be set to 1. The S bit is the BoS field [RFC3032]. The NAL field MUST be set to 0. The IHS field, NASL field and U bit have the same semantics as used in [I-D.ietf-mpls-mna-hdr].

* Post-Stack Data: As defined in Figure 3.

The format of the Post-Stack MNA carrying Alternate Marking Data is illustrated as below:

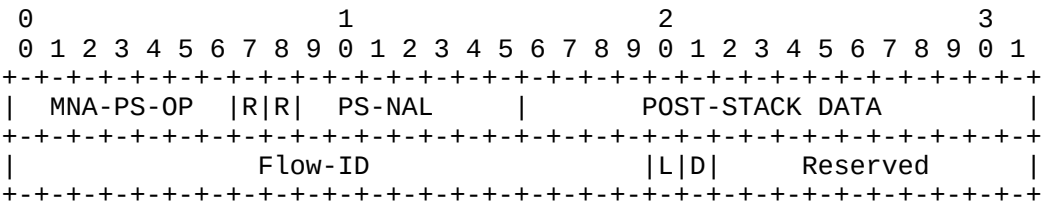

Figure 3: Post-Stack MNA carrying Alternate Marking Data

The description of the Post-Stack MNA is as follows:

* Opcode: PMAMM Post-Stack Network Action carrying Alternate Marking Data with value TBA3.

* Post-Stack Data: The PMAMM Post-Stack Network Action carries 22 bits of ancillary data. The most significant 20 bits of ancillary data is the Flow-ID Value, immediately followed by L bit and D bit. The three fields Flow-ID Value, L bit, and D bit have semantics consistent with the Flow-ID Label, L bit and D bit defined in [RFC9714]. While the Flow-ID Label has some restrictions to avoid collisions with the reserved label space (0-15) [RFC3032], those restrictions are not necessary for the Flow-ID Value and do not apply. The forwarding node in the scope of PMAMM In-Stack Action SHOULD execute the flow-based performance measurement by using the Flow-ID Value, L bit and D bit.

* Post-Stack MNA Format: Post-Stack Network Action Encoding as defined in [I-D.ietf-mpls-mna-ps-hdr]. The PS-NAL field MUST be set to 1. The R bit and POST-STACK DATA field have the same semantics as used in [I-D.ietf-mpls-mna-ps-hdr].

3. Security Considerations

Security issues discussed in [RFC9341], [RFC9714], [I-D.ietf-mpls-mna-hdr], and [I-D.ietf-mpls-mna-ps-hdr] apply to this document.

4. IANA Considerations

This document requests that IANA allocates two codepoints (TBA1 and TBA2) from the "Network Action Opcodes" registry within the "MPLS Network Actions Parameters" registry group. This document also requests that IANA allocates a codepoint (TBA3) from the "Post-Stack Network Action Opcodes" registry within the "MPLS Network Actions Parameters" registry group. The IETF Review range (1-110) should be used. Note that both the "MPLS Network Actions Parameters" registry group and the "Network Action Opcodes" registry will be created based on the request from [I-D.ietf-mpls-mna-hdr], and the "Post-Stack Network Action Opcodes" registry will be created based on the request from [I-D.ietf-mpls-mna-ps-hdr]. Specifically, this document requests the following allocation from IANA.

Opcode	Description	Reference
TBA1	In-Stack Network Action for Performance Measurement with Alternate Marking Data in ISD	This document
TBA2	In-Stack Network Action for Performance Measurement with Alternate Marking Data in PSD	This document

Table 1: In-Stack Network Action Opcodes Registry

Opcode	Description	Reference
TBA3	Post-Stack Network Action for Performance Measurement with Alternate Marking Method	This document

Table 2: Post-Stack Network Action Opcodes Registry

5. Acknowledgements

The authors would like to acknowledge Loa Andersson for his careful review and helpful comments.

6. References

6.1. 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 Specification including In-Stack Network Actions and Data", Work in Progress, Internet-Draft, draft-ietf-mpls-mna-hdr-21, 24 February 2026, <https://datatracker.ietf.org/doc/html/draft-ietf-mpls-mna-hdr-21>.

[I-D.ietf-mpls-mna-ps-hdr]
Rajamanickam, J., Gandhi, R., Zigler, R., and J. Dong, "Post-Stack MPLS Network Action (MNA) Solution", Work in Progress, Internet-Draft, draft-ietf-mpls-mna-ps-hdr-06, 20 January 2026, <https://datatracker.ietf.org/doc/html/draft-ietf-mpls-mna-ps-hdr-06>.

[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>.

[RFC3032] Rosen, E., Tappan, D., Fedorkow, G., Rekhter, Y., Farinacci, D., Li, T., and A. Conta, "MPLS Label Stack Encoding", RFC 3032, DOI 10.17487/RFC3032, January 2001, <https://www.rfc-editor.org/info/rfc3032>.

[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>.

[RFC9341] Fioccola, G., Ed., Cociglio, M., Mirsky, G., Mizrahi, T., and T. Zhou, "Alternate-Marking Method", RFC 9341, DOI 10.17487/RFC9341, December 2022, <https://www.rfc-editor.org/info/rfc9341>.

[RFC9714] Cheng, W., Ed., Min, X., Ed., Zhou, T., Dai, J., and Y. Peleg, "Encapsulation for MPLS Performance Measurement with the Alternate-Marking Method", RFC 9714, DOI 10.17487/RFC9714, February 2025, <https://www.rfc-editor.org/info/rfc9714>.

6.2. 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>.

[RFC9791] Saad, T., Makhijani, K., Song, H., and G. Mirsky, "Use Cases for MPLS Network Action Indicators and Ancillary Data", RFC 9791, DOI 10.17487/RFC9791, July 2025, <https://www.rfc-editor.org/info/rfc9791>.

Authors' Addresses

Weiqiang Cheng
China Mobile
Beijing
China
Email: chengweiqiang@chinamobile.com

Xiao Min
ZTE Corp.
Nanjing
China
Email: xiao.min2@zte.com.cn

Rakesh Gandhi
Cisco Systems, Inc.
Canada
Email: rgandhi@cisco.com

Greg Mirsky
Ericsson
United States of America
Email: gregimirsky@gmail.com

Giuseppe Fioccola
Huawei
Italy
Email: giuseppe.fioccola@huawei.com