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Enhanced Alternate Marking Method
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Abstract

This document extends the IPv6 Alternate Marking Option, defined in IPv6 AltMark Option [[I-D.ietf-6man-ipv6-alt-mark](#)], to provide the enhanced capabilities and allow advanced functionalities.

Requirements Language

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC 2119](#) [[RFC2119](#)].

Status of This Memo

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[1.](#) Introduction

The Alternate Marking [[RFC8321](#)] and Multipoint Alternate Marking [[RFC8889](#)] define the Alternate Marking technique that is an hybrid performance measurement method, per [[RFC7799](#)] classification of measurement methods. This method is based on marking consecutive batches of packets and it can be used to measure packet loss, latency, and jitter on live traffic.

IPv6 AltMark Option [[I-D.ietf-6man-ipv6-alt-mark](#)] applies the Alternate Marking Method to the IPv6 protocol, and defines Extension Header Option to encode Alternate Marking Method for both Hop-by-Hop Options Header and Destination Options Header. Similarly, SRv6 AltMark [[I-D.fz-spring-srv6-alt-mark](#)] defines how Alternate Marking data is carried as SRH TLV.

While the AltMark Option implements the basic alternate marking method, this document defines the extended data fields for the AltMark Option and provides the enhanced capabilities.

It is worth mentioning that the enhanced capabilities are intended for further use and are optional.

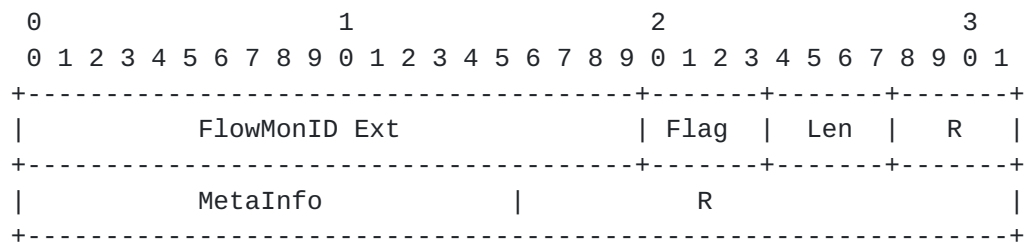
2. Data Fields Format

The Data Fields format is represented in the next figure. An 8 bits NextHeader field is allocated from the Reserved field of IPv6 AltMark Option [[I-D.ietf-6man-ipv6-alt-mark](#)].



The NextHeader field is used to indicate the extended data fields which are used for enhanced capabilities. When the NextHeader is 0, there is no extended data field attached. Value 1-8 are reserved for private use.

The following figure shows the extended data fields format when the NextHeader value is 9.



where:

- o FlowMonID Ext - 20 bits unsigned integer. This is used to extend the FlowMonID to reduce the conflict when random allocation is applied. The disambiguation of the FlowMonID field is discussed in IPv6 AltMark Option [[I-D.ietf-6man-ipv6-alt-mark](#)].
- o Flag - A 4 bits flag to indicate the special purpose usage.
- o Len - Length. It indicates the length of extension headers.
- o MetaInfo - A 16 bits Bitmap to indicate more meta data attached for the enhanced function.
- o R - Reserved for further use. These bits MUST be set to zero.

The Flag is defined as follows:

- o bit 1 - Flow direction identification, F bit. F=1, indicates that the flow direction is forward. F=0, indicates the flow direction is backward.
- o bit 3 - Measurement mode, M bit. M=1, indicates that it is for hop-by-hop monitoring. M=0, indicates that it is for end-to-end monitoring.
- o others - Reserved.

3. Enhanced Alternate Marking capabilities

The extended data fields presented in the previous section can be used for several uses. Some possible applications can be:

1. shortest marking periods of single marking method for thicker packet loss measurements.
2. more dense delay measurements than double marking method (down to each packet).
3. increase the entropy of flow monitoring identifier by extending the size of FlowMonID.
4. automatically set up the backward direction flow monitoring.
5. and so on.

4. Security Considerations

IPv6 AltMark Option [[I-D.ietf-6man-ipv6-alt-mark](#)] analyzes different security concerns and related solutions. These aspects are valid and applicable also to this document. In particular the fundamental security requirement is that Alternate Marking MUST be applied in a specific limited domain, as also mentioned in [[RFC8799](#)].

5. IANA Considerations

This document has no request to IANA.

6. References

6.1. Normative References

- [I-D.fz-spring-srv6-alt-mark]
Fioccola, G., Zhou, T., and M. Cociglio, "Segment Routing Header encapsulation for Alternate Marking Method", [draft-fz-spring-srv6-alt-mark-00](#) (work in progress), January 2021.
- [I-D.ietf-6man-ipv6-alt-mark]
Fioccola, G., Zhou, T., Cociglio, M., Qin, F., and R. Pang, "IPv6 Application of the Alternate Marking Method", [draft-ietf-6man-ipv6-alt-mark-04](#) (work in progress), March 2021.
- [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>>.
- [RFC7799] Morton, A., "Active and Passive Metrics and Methods (with Hybrid Types In-Between)", [RFC 7799](#), DOI 10.17487/RFC7799, May 2016, <<https://www.rfc-editor.org/info/rfc7799>>.

6.2. Informative References

- [RFC8321] Fioccola, G., Ed., Capello, A., Cociglio, M., Castaldelli, L., Chen, M., Zheng, L., Mirsky, G., and T. Mizrahi, "Alternate-Marking Method for Passive and Hybrid Performance Monitoring", [RFC 8321](#), DOI 10.17487/RFC8321, January 2018, <<https://www.rfc-editor.org/info/rfc8321>>.
- [RFC8799] Carpenter, B. and B. Liu, "Limited Domains and Internet Protocols", [RFC 8799](#), DOI 10.17487/RFC8799, July 2020, <<https://www.rfc-editor.org/info/rfc8799>>.
- [RFC8889] Fioccola, G., Ed., Cociglio, M., Sapio, A., and R. Sisto, "Multipoint Alternate-Marking Method for Passive and Hybrid Performance Monitoring", [RFC 8889](#), DOI 10.17487/RFC8889, August 2020, <<https://www.rfc-editor.org/info/rfc8889>>.

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