~~IPPM~~ OPSAWG

Commenté [BMI1]: :-)

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IP Flow Information Export (IPFIX) Alternate-Marking Information Elements

draft-ietf-opsawg-ipfix-alt-mark-00

Abstract

This document ~~introduces~~ specifies new IP Flow Information Export (IPFIX)
Information Elements (IEs) to export Alternate Marking measurement data.

Status of This Memo

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

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This Internet-Draft will expire on 9 January 2025.

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1. Introduction

Alternate-Marking (AltMark) Method [RFC9341] [RFC9342] is a technique used to measure packet loss, delay, and jitter on in-flight packets.

[I-D.ietf-ippm-alt-mark-deployment] provides a framework for Alternate Marking deployments and includes considerations and guidance for application and methodology. The IP Flow Information Export (IPFIX) protocol [RFC7011] [RFC7012]is considered for data export in Section 6.1 of [I-D.ietf-ippm-alt-mark-deployment].

~~[RFC7012] defines the data types and management policy for the information model of the IPFIX protocol [RFC7011].~~ This document defines ~~the~~ new IPFIX Information Elements (IEs) for the Alternate Marking Method.

1.1. Requirements Language

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. AltMark IPFIX Information Elements

This section describes existing IEs ~~of~~ [IANA-IPFIX] that are relevant for the Alternate Marking application. It ~~and~~ also introduces new IEs.

Commenté [BMI2]: Which ones?

2.1. Flow Decomposition

~~For IPFIX [RFC7011] the d~~Data decomposition can be achieved on ~~the~~an Alternate-Marking-aware node where IPFIX data is exported or on the IPFIX data collection.

Commenté [BMI3]: As there are many

Commenté [BMI4]: Add a terminology section with the appropriate terms. This one should be introduced first.

The ipPayloadPacketSection(IE314) ~~Information Element~~IE carries a series of n octets from the IP payload, starting sectionOffset(IE409)

octets into the IP payload.

When decomposed at the data collection, the packet header sections, as example the IPv6 options type header described in Section 3.1 of [RFC9343] or the Segment Routing header TLV as described in Section 3.1 of [I-D.fz-spring-srv6-alt-mark] containing the FlowMonID, Loss, and Delay flags ~~are~~ can be ~~being~~ exposed as part of ipPayloadPacketSection(IE314), defined in Section 4.2 of [RFC7133].

a mis en forme : Surlignage

The IPv4 payload is that part of the packet that follows the IPv4 header and ~~any~~ options (if any). The IPv6 payload is the rest of the packet following the 40-octet IPv6 header. Note that any extension headers present are considered part of the payload. The sectionExportedOctets(IE410) expresses how much data was observed, while the remainder is padding.

2.2. Flow Aggregation

An Aggregated Flow is simply an IPFIX Flow generated from Original Flows by an Intermediate Aggregation Process.

When being decomposed on ~~the~~ an Alternate-Marking-aware node, new IPFIX entities for FlowMonID, Loss, and Delay flags are needed so that the data can now be aggregated according to S~~s~~ection 5 of [RFC7015].

According to S~~s~~ection 4 of [RFC7015] new Flow Keys may be derived from existing Flow Keys or "promoted" from specific non-key fields.

Therefore FlowMonID, Loss, and Delay flags are considered Flow Key fields.

2.3. Flow Correlation

The following IPFIX entities are of interest to describe the relationship to the forwarding topology and the control-plane.

* Hostname, ingressInterface(IE10) and egressInterface(IE14) describes on which node which logical ingress and egress interfaces have been used to forward the packet.

* Hostname and egressPhysicalInterface(IE253) describes on which node which physical egress interfaces have been used to forward the packet.

* Hostname and ipNextHopIPv4Address(IE15) or ipNextHopIPv6Address(IE62), describes the forwarding path to which next-hop IP address the packets are forwarded to.

* Hostname and mplsTopLabelIPv4Address(IE47) or srhActiveSegmentIPv6(IE495) ~~from [I-D.ietf-opsawg-ipfix-srv6-srh]~~ describes the forwarding path to which MPLS top label IPv4 address or SRv6 active segment the packets are forwarded to.

* BGP communities [RFC1997] are ~~often~~ used for setting a path priority or

service selection. bgpDestinationExtendedCommunityList(IE488) or bgpDestinationCommunityList(IE485) or bgpDestinationLargeCommunityList(IE491) describes which group of prefixes have been used to forward the packet.

* Hostname and destinationIPv4Address(IE13), destinationTransportPort(IE11), protocolIdentifier(IE4) and sourceIPv4Address(IE8) describes the forwarding path on each node from each IPv4 source address to a specific application in the network.

Note that, in case of Link Aggregation Group (LAG) interface, the ingressInterface ~~IE~~ and egressInterface IEs can be used to refer the logical LAG port, while ingressPhysicalInterface ~~IE~~ and egressPhysicalInterface IEs can be used to indicate the physical interfaces which are members of the LAG port.

2.4. Flow Measurements

To calculate loss, the packet count can be ~~done~~ based upon ~~with~~ octetDeltaCount(IE1) or packetDeltaCount(IE2).

While, to calculate delay, either flowStartSeconds(IE150), flowStartMilliseconds(IE152), flowStartMicroseconds(IE154) or flowStartNanoseconds(IE156), can be used depending on timestamp granularity requirements. It is also possible to use flowEndSeconds(IE151), flowEndMilliseconds(IE153), flowEndMicroseconds(IE155) or flowEndNanoseconds(IE157).

It is also defined the PeriodID, which is needed for Alternate-Marking measurement correlation ~~as~~ per [I-D.ietf-ippm-alt-mark-deployment].

3. IANA Considerations

This document requests IANA to create a new ~~sub~~registry called "IPFIX Alternate-Marking" under the "IPFIX Information Elements" registry group ~~[RFC7012]~~ available at [IANA-IPFIX].

The allocation policy of this new ~~sub~~registry is Expert Review (Section 4.5 of [RFC8126]).

The designated experts for this registry should be familiar with Alternate-Marking. The guidelines that are being followed by the designated experts for the IPFIX registry should be followed for this ~~sub~~registry. In particular, criteria that should be applied by the designated experts include determining whether the proposed registration duplicates existing entries and whether the registration description is clear and fits the purpose of this registry. Within the review period, the designated experts will either approve or deny the registration request, communicating this decision to IANA. Denials should include an explanation and, if applicable, suggestions as to how to make the request successful.

Initial values in the registry are defined in Table 1.

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Commenté [BMI5]: Why not IPv6?

Commenté [BMI6]: Consider adding a reference

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Value	Description	Reference
TBD1	FlowMonID	[RFC-to-be], RFC9341, RFC9342, RFC9343
TBD2	L flag	[RFC-to-be], RFC9341, RFC9342, RFC9343
TBD3	D flag	[RFC-to-be], RFC9341, RFC9342, RFC9343
TBD4	PeriodID	[RFC-to-be], [I-D.ietf-ippm-alt-mark-deployment]

Table 1: "IPFIX Alternate-Marking" Rsubregistry

4. Security Considerations

Alternate Marking [RFC9341] and Multipoint Alternate Marking [RFC9342] analyze 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 only be applied in a specific limited domain, as also mentioned in [RFC8799].

Commenté [BMI7]: Add also IPFIX-specific considerations

5. Acknowledgements

TBD

6. References

6.1. Normative References

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6.2. Informative References

[I-D.fz-spring-srv6-alt-mark] Fioccola, G., Zhou, T., Cociglio, M., Mishra, G. S., wang, X., and G. Zhang, "Application of the Alternate Marking Method to the Segment Routing Header", Work in Progress, Internet-Draft, draft-fz-spring-srv6-alt-mark-08, 8 February 2024, <https://datatracker.ietf.org/doc/html/draft-fz-spring-srv6-alt-mark-08>.

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