BGP SR Policy Extensions to Enable IFIT

draft-ietf-idr-sr-policy-ifit-01

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Background and Motivation

- In-situ Flow Information Telemetry (**IFIT**) refers to dataplane on-path telemetry techniques, including In-situ OAM (**IOAM**) (draft-ietf-ippm-ioam-data) and **Alternate Marking** (RFC8321, RFC8889)

- A headend may be informed about a candidate path for an SR Policy by using BGP (**draft-ietf-idr-segment-routing-te-policy**).

This document defines **extensions to BGP to distribute SR policies** carrying **In-situ Flow Information Telemetry** (IFIT) information.

So data plane on-path telemetry methods can be enabled automatically when the SR policy is applied

Changes after WG Adoption

Comments during IETF 109 and Adoption Call

- Inputs from Dhruv Dhody during WG adoption
  - More text about error handling actions, IFIT start/stop/update and backward compatibility
- Comment from Ketan Talaulikar: what types of Steering would be possible to be used for such SR Policies and how it is handled by the SRPM.
- Comment from Gyan Mishra: Alignment with “SR Policy and Tunnel Encapsulation Attribute” of draft-ietf-idr-segment-routing-te-policy
- Mike Koldychev: consider the case of different IFIT methods for each Segment Lists (draft-koldychev-pce-multipath).
- It has been added the AltMark Mode (HbH, DOH).

Summary of the changes in -01

Steering into an SR Policy

Once the IFIT attributes are signalled, if a packet arrives at the headend, based on the types of steering described in draft-ietf-spring-segment-routing-policy, it may get steered into an SR Policy where IFIT methods (IOAM or Alternate Marking) are applied.

IFIT possible cases: conservative strategy

- ✓ In case of empty IFIT Attributes Sub-TLV or more than one instance of the same sub-TLV, IFIT methods will not be activated.
- ✓ If two conflicting IOAM sub-TLVs are present it means that they are not usable and none of the two methods will be activated.

IFIT Attributes Validation

- ✓ The validation of the individual fields of the IFIT Attributes sub-TLVs are handled by the SRPM.

Backward compatibility

- ✓ An implementation that does not understand IFIT Attributes Sub-TLV can simply ignore it.

Error handling actions

As described in draft-ietf-idr-segment-routing-te-policy, a BGP Speaker MUST perform the syntactic validation of the SR Policy NLRI to determine if it is malformed, including the TLVs/sub-TLVs.

- In case of any error detected, the "treat-as-withdraw" strategy MUST be applied.

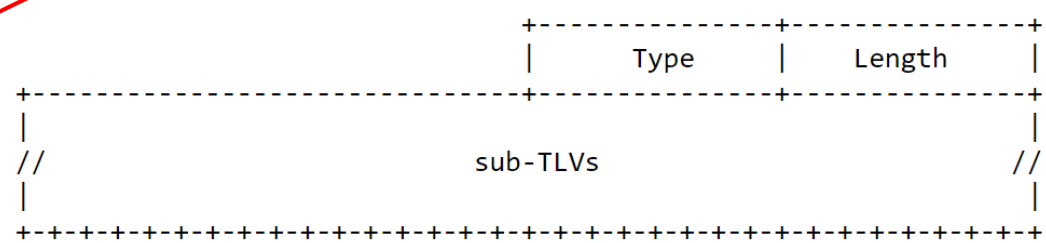
IFIT Attributes in SR Policy

The **SR Policy encoding structure** has been updated according to draft-ietf-idr-segment-routing-te-policy.

- **IFIT attributes** can be attached at the candidate path level as **sub-TLVs**

```
SR Policy SAFI NLRI: <Distinguisher, Policy-Color, Endpoint>
Attributes:
   Tunnel Encaps Attribute (23)
      Tunnel Type: SR Policy
          Binding SID
          SRv6 Binding SID
          Preference
          Priority
          Policy Name
          Policy Candidate Path Name
          Explicit NULL Label Policy (ENLP)
          IFIT Attributes
          Segment List
              Weight
              Segment
              Segment
              ...
          ...
```

The format of the general IFIT Attributes Sub-TLV



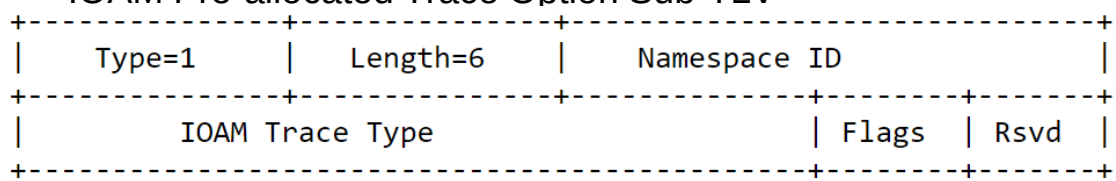
sub-TLVs currently defined:

* IOAM Pre-allocated Trace Option Sub-TLV
* IOAM Incremental Trace Option Sub-TLV
* IOAM Directly Export Option Sub-TLV
* IOAM Edge-to-Edge Option Sub-TLV
* Enhanced Alternate Marking (EAM) sub-TLV

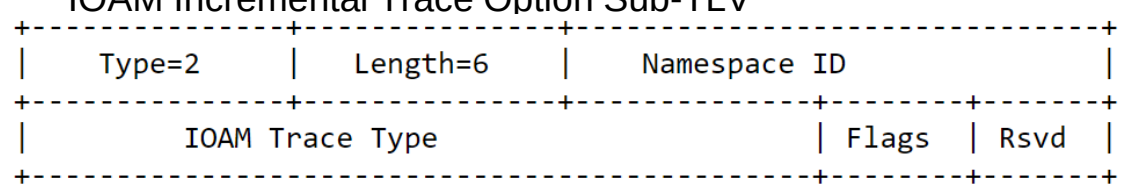
IOAM Sub-TLVs

When IOAM is enabled, the IOAM header will be inserted into every packet of the traffic that is steered into the SR paths:

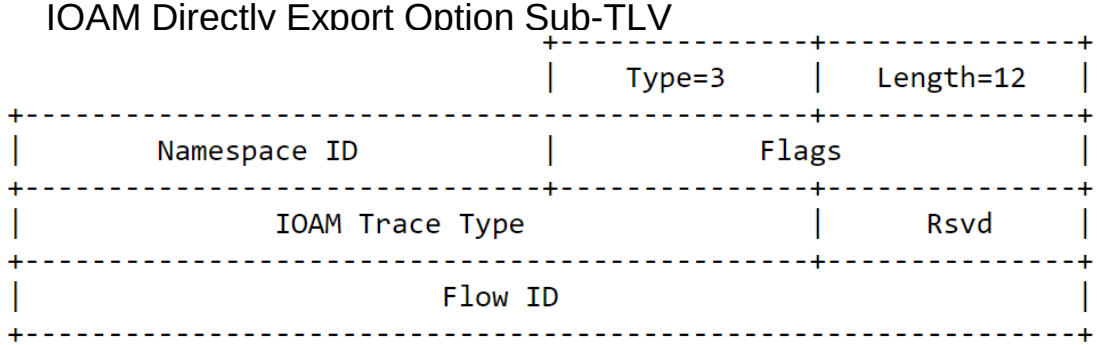
- IOAM Pre-allocated Trace Option Sub-TLV



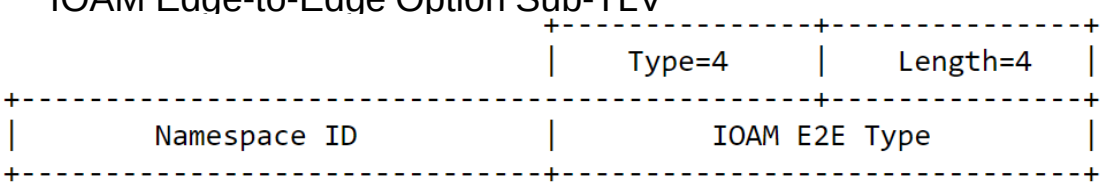
- IOAM Incremental Trace Option Sub-TLV



- IOAM Directly Export Option Sub-TLV



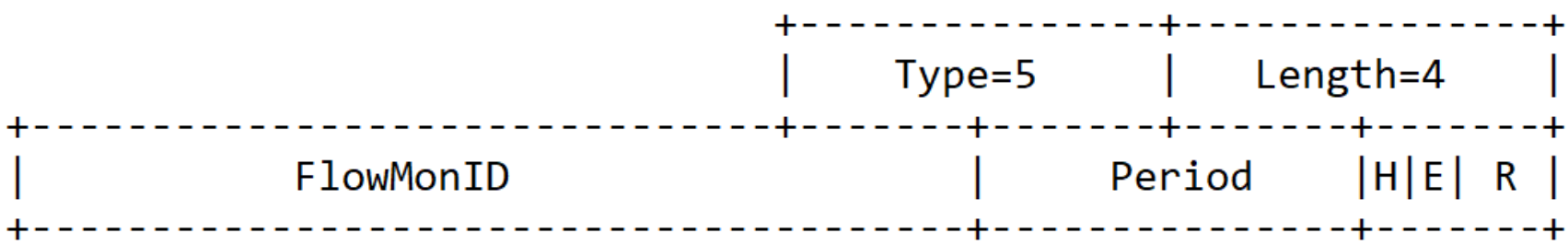
- IOAM Edge-to-Edge Option Sub-TLV



Alternate Marking Sub-TLVs

When Enhanced Alternate Marking is enabled Alt-Mark is applied to the traffic that is steered into the SR paths

- Enhanced Alternate Marking (EAM) sub-TLV



New fields added:

H: A flag indicating that the measurement is Hop-By-Hop.

E: A flag indicating that the measurement is end to end.

SR Policy Operations with IFIT Attributes

This document complements SR Policy Operations described in **draft-ietf-idr-segment-routing-te-policy** by adding the IFIT Attributes.

- The addition of IFIT Attributes Sub-TLVs for the SR Policy NLRI is considered by a BGP speaker, but the implementation MAY ignore the unrecognized or unsupported IFIT sub-TLVs.
- SR Policy NLRIs that have been determined acceptable, usable and valid can be evaluated for propagation, including the IFIT information.
- The error handling actions are also described in draft-ietf-idr-segment-routing-te-policy.
- The validation of the IFIT Attributes sub-TLVs introduced in this document MUST be performed to determine if they are malformed or invalid. This is done by the SRPM.

Discussion & Next Steps

- Work in progress to make the draft stable
- Welcome questions, comments

Thank you