BGP SR Policy Extensions to Enable IFIT

draft-ietf-idr-sr-policy-ifit-03

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Background and Motivation

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

  A headend can 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 IFIT information. So data plane on-path telemetry methods can be enabled automatically when the SR policy is applied.
IFIT Attributes in SR Policy

The **SR Policy Candidate Path** is encoded in the Tunnel Encapsulation Attribute as defined in [draft-ietf-idr-segment-routing-te-policy](https://tools.ietf.org/html/draft-ietf-idr-segment-routing-te-policy)

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

```plaintext
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](image)

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
When Enhanced Alternate Marking is enabled, Alt-Mark is applied to each packet of the traffic that is steered into the SR paths:

- **Enhanced Alternate Marking (EAM) sub-TLV**

  Type=5 | Length=4

  FlowMonID | Period | H|E| R

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

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**

  Type=1 | Length=6 | Namespace ID

  IOAM Trace Type | Flags | Rsvd

- **IOAM Incremental Trace Option Sub-TLV**

  Type=2 | Length=6 | Namespace ID

  IOAM Trace Type | Flags | Rsvd

- **IOAM Directly Export Option Sub-TLV**

  Type=3 | Length=12

  Namespace ID | Flags

  IOAM Trace Type | Rsvd

  Flow ID

- **IOAM Edge-to-Edge Option Sub-TLV**

  Type=4 | Length=4

  Namespace ID | IOAM E2E Type
SR Policy Architecture with IFIT

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

Considering the SR Policy Architecture:

- A headend can be informed about the multiple candidate paths for an SR Policy via various mechanisms (e.g. BGP or PCEP).
- Additional information (e.g. IFIT support) can be included at the candidate path level.
- The selection of the best candidate path for an SR Policy can be done accordingly.
- The selected candidate path and its BSID is then installed in the forwarding plane.

It may be possible to choose the candidate path for the SR Policy also considering the supported IFIT Attributes.

- IFIT methods can then be enabled automatically with the SR policy.
Discussion & Next Steps

- Relevant document to enable IFIT (IOAM and AltMark) control mechanisms
- IFIT Attributes added as a simple extension of draft-ietf-idr-segment-routing-te-policy

- Welcome questions, comments

Thank you