BGP SR Policy Extensions to Enable IFIT

draft-ietf-idr-sr-policy-ifit-02

Online, Nov 2021, IETF 112

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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.
Latest Changes

- Specified the usage scenario of IFIT
  IFIT is a solution focusing on specific network domains according to RFC8799.
  - For a number of reasons, such as policies, options supported, style of network management and security requirements, it is suggested to limit applications including the emerging IFIT techniques to a controlled domain.

- Improved Security Considerations section
  IFIT data MUST be propagated in a limited domain to avoid malicious attacks. Solutions to ensure this requirement are respectively discussed in `draft-ietf-ippm-ioam-data` and `draft-ietf-6man-ipv6-alt-mark`.
  - A limited administrative domain provides the network administrator with the means to select, monitor and control the access to the network, making it a trusted domain also for the BGP extensions defined in this document.
IFIT Attributes in SR 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

```
+--------------------------------+
<table>
<thead>
<tr>
<th>Type</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
+--------------------------------+
```

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**
  
<table>
<thead>
<tr>
<th>Type=1</th>
<th>Length=6</th>
<th>Namespace ID</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IOAM Trace Type</td>
<td>Flags</td>
<td>Rsvd</td>
</tr>
</tbody>
</table>

- **IOAM Incremental Trace Option Sub-TLV**
  
<table>
<thead>
<tr>
<th>Type=2</th>
<th>Length=6</th>
<th>Namespace ID</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IOAM Trace Type</td>
<td>Flags</td>
<td>Rsvd</td>
</tr>
</tbody>
</table>

- **IOAM Directly Export Option Sub-TLV**
  
<table>
<thead>
<tr>
<th>Type=3</th>
<th>Length=12</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Namespace ID</td>
<td>Flags</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>IOAM Trace Type</td>
<td>Rsvd</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Flow ID</td>
<td></td>
</tr>
</tbody>
</table>

- **IOAM Edge-to-Edge Option Sub-TLV**
  
<table>
<thead>
<tr>
<th>Type=4</th>
<th>Length=4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Namespace ID</td>
<td>IOAM E2E Type</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Alternate Marking Sub-TLVs

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.
Discussion & Next Steps

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

• draft-ietf-idr-segment-routing-te-policy got WG Consensus and is waiting for Write-Up. So, we can progress with this document as well

• Welcome questions, comments

Thank you