BGP Extension for Advertising In-situ Flow Information Telemetry (IFIT) Capabilities

draft-wang-idr-bgp-ifit-capabilities-01

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Background and Motivation

- 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).
  - To avoid IFIT-data leakage, the IFIT decapsulating node (tail node) must remove the data fields.
  - A head node must need to determine whether the tail node can support a specific IFIT-Capability before encapsulating IFIT in traffic packets.

- This document extensions to BGP to advertise the IFIT decapsulating node capabilities.
  - Extensions to IPv4/IPv6 Address Specific Extended Community
  - Extensions to BGP Next-Hop Capability

- Such advertisement would be useful for mitigating the leakage threat and determine whether a particular IFIT option type can be encapsulated in data packets.
IFIT Capabilities

IFIT Capabilities is formed of a 16-bit bitmap as follows:

- P-Flag: IOAM Pre-allocated Trace Option Type flag.
- I-Flag: IOAM Incremental Trace Option Type flag.
- D-Flag: IOAM DEX Option Type flag.
- E-Flag: IOAM E2E Option Type flag.
- M-Flag: Alternate Marking flag.

```
0  1  2  3  4  5  6  7  8  9  0  1  2  3  4  5
+---------------------------------------------+
|P|I|D|E|M| Reserved |
+---------------------------------------------+
```

Figure 1. IFIT Capabilities
Option 1: Extensions to BGP Extended Community

- For IPv4/IPv6 networks, a new type of BGP Extended Community called **IPv4/IPv6-Address-Specific IFIT Extended Community**. It is a transitive optional extended community with type 0x01/0x00 and sub-type TBA.

- This new extended community can be used by the IFIT decapsulation node to notify its IFIT Capabilities to its partner (as the IFIT encapsulation node).

  - **IFIT Capabilities**: as defined in previous section.
  - **Originating IPv4 Address**: a IPv4 address of the IFIT decapsulation node.
  - **Originating IPv6 Address**: a IPv6 address of the IFIT decapsulation node.

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**Figure 2. IPv4-Address-Specific IFIT Extended Community**

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**Figure 3. IPv6-Address-Specific IFIT Extended Community**
Option 2: Extensions to BGP Next-Hop Capability

- A new type of BGP Next-Hop Capability for IFIT is extended as follows. It is a non-transitive BGP attribute with Capability Code (TBA).
- The inclusion of the IFIT Next-Hop Capability with the NLRI advertised in the BGP UPDATE.
- Indicates the BGP Next-Hop can act as the IFIT decapsulating node.

```
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-
| Capability Code (2 octets)     |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-
| Capability Length (2 octets)   |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-
| Capability Value (variable)    |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-

+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| IFIT Capabilities (2 octets)   |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| Originate IP Address           |
| (4 or 16 octets)               |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

Figure 5. BGP Capability Value for IFIT

- Capability Value: a variable-length field, includes 2-octect IFIT Capabilities and Originate IP Address of the IFIT decapsulating node (IPv4 or IPv6 Address)
Next Steps

- Comments are welcome!
- Revise the document accordingly.

Thank you