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

draft-ietf-idr-bgp-ifit-capabilities-00

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Giuseppe Fioccola (Huawei)
Ran Pang (China Unicom)
Subin Wang (China Telecom)
Shunwan Zhuang (Huawei)
Hiabo Wang (Huawei)

Background and Motivation

❏ In-situ Flow Information Telemetry (**IFIT**) refers to dataplane on-path telemetry techniques, including **IOAM** (RFC9197) and **Alternate Marking** (RFC8321, RFC8889)

• Since these are solutions required in limited domains, the ingress node must learn the IFIT capabilities supported in order to avoid IFIT data leaking from the IFIT domain

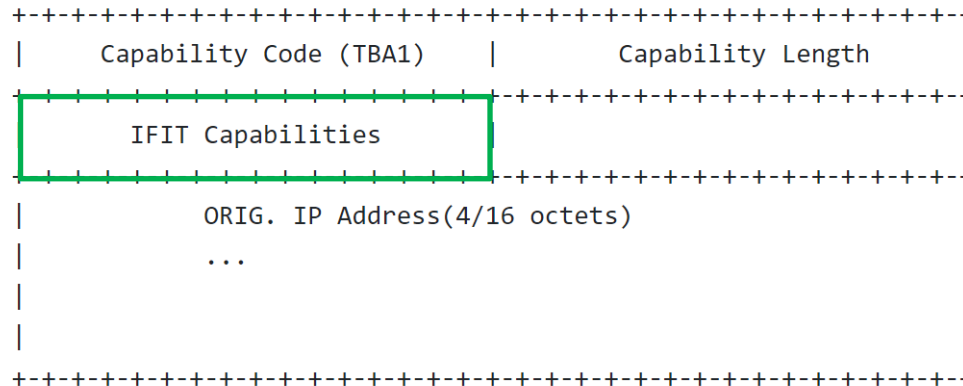This document defines **extensions to BGP to advertise IFIT** capability.
- IFIT-capability advertisement from the tail node to the head node assists the head node to determine whether a particular IFIT Option type can be encapsulated.
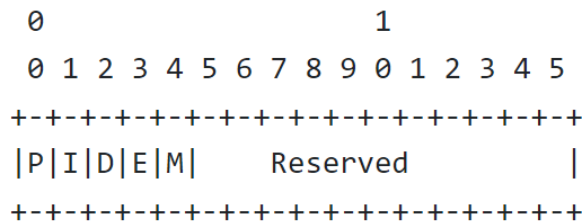- It is mainly used in distributed scenarios.

IFIT Capabilities

The BGP Next-Hop Capability Attribute (draft-ietf-idr-next-hop-capability) is a non-transitive BGP attribute and consists of a set of Next-Hop Capabilities.

- It is updated or deleted when the next-hop is changed, to reflect the new next-hop.

The IFIT Capabilities can be encoded as a BGP Next-Hop IFIT Capability Attribute.

```
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|      Capability Code (TBA1)    |       Capability Length     |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|      IFIT Capabilities                                       |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|             ORIG. IP Address(4/16 octets)                   |
|             ...                                             |
|                                                             |
|                                                             |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

It is defined as a 16-bit bitmap:

```
 0                   1
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|P|I|D|E|M|    Reserved         |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```
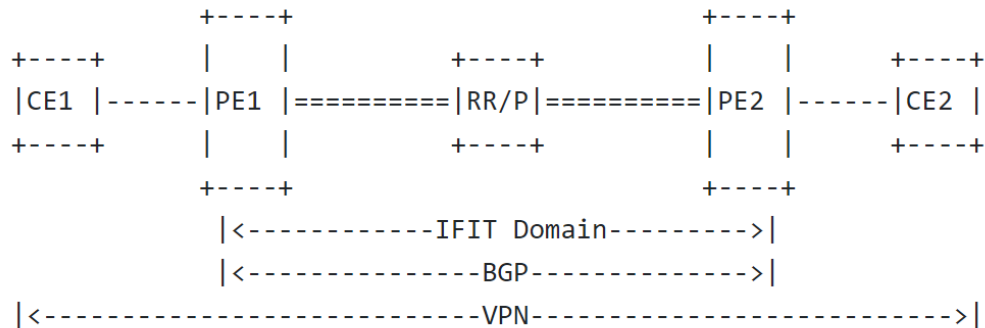
- P-Flag: IOAM Pre-allocated Trace Option Type flag.
- I-Flag: IOAM Incremental Trace Option Type flag.
- D-Flag: IOAM DEX Option Type flag.
- E-Flag: IOAM E2E Option Type flag.
- M-Flag: Alternate Marking flag.

When a specific flag is set, this indicates that the router can process that method

IFIT Domain Application

A BGP speaker that sends an UPDATE with the BGP Next-Hop Capability Attribute MAY include the IFIT Next-Hop Capability.

- It allows to advertise the supported IFIT capabilities of the egress node to the ingress node in an IFIT domain.
- It indicates that the BGP Next-Hop can act as the IFIT decapsulating node and it can process the specific IFIT encapsulation format indicated per the capability value.

```
                       +----+                           +----+
     +----+            |    |           +----+          |    |          +----+
     |CE1 |------|PE1 |==========|RR/P|==========|PE2 |------|CE2 |
     +----+            |    |           +----+          |    |          +----+
                       +----+                           +----+
                     |<------------IFIT Domain--------->|
                     |<---------------BGP-------------->|
              |<---------------------------VPN---------------------------->|
```

In case of multiple domains, BGP RR may also pass this information between IGP clusters to keep the IFIT methods consistent.

- RR and BGP-LS may allow to bring the information back to a centralized controller as well.

IDR Adoption discussion and IPPM feedback

IDR comments already addressed:

✓ According to the IDR consensus, it has been clarified that the non-transitive Next-Hop Capability attribute is the only solution in scope.

✓ Additional extended community solution is no longer considered.

IPPM feedback to address in the next version:

• Clarification about the use of the term IFIT. It was explained that IFIT is just a term which denotes IOAM and Alt-Mark together. No new technology is added to IOAM and Alt-Mark

• The relation with draft-ietf-ippm-ioam-conf-state will be mentioned in the next revision. In some cases BGP is the best option while in other cases ICMPv6 can be used as well

Discussion & Next Steps

- Relevant document to enable IFIT (IOAM and AltMark) control mechanisms

- Welcome questions, comments

Thank you