Path Computation Element Communication Protocol (PCEP) Extensions to Enable IFIT

draft-ietf-pce-pcep-ifit-01

Hybrid, Nov 2022, IETF 115

Hang Yuan (UnionPay)
Xuerong Wang (China Telecom)
Pingan Yang (Huawei)
Weidong Li (Huawei)
Giuseppe Fioccola (Huawei)
In-situ Flow Information Telemetry (IFIT) refers to dataplane on-path telemetry techniques, including IOAM (RFC9197) and Alternate Marking (RFC8321bis, RFC8889bis).

The PCEP extension defined in this document allows to distribute paths carrying IFIT information. In this way IFIT methods are automatically activated and running when the path is instantiated.

- A PCC can indicate which IFIT features it supports
- A PCE can configure IFIT behavior at a PCC for a specific path in the stateful PCE model.

The IFIT attributes can be generalized and included as TLVs carried inside the LSP Attributes object in order to be applied for all path types, as long as they support the relevant data plane telemetry method.
A new **IFIT-CAPABILITY TLV** as an optional IFIT TLV in the OPEN Object for PCEP capability advertisement

**IFIT-CAPABILITY TLV**

```
+-------------------------------+  +-------------------------------+
|  Type                         |  |  Length=4                     |
|-------------------------------+  +-------------------------------+
|  Flags                       |  | P | I | D | E | M                       |
+-------------------------------+  +-------------------------------+
```

- **P**: IOAM Pre-allocated Trace Option Type-enabled flag (RFC9197)
- **I**: IOAM Incremental Trace Option Type-enabled flag (RFC9197)
- **D**: IOAM DEX Option Type-enabled flag (RFC9197)
- **E**: IOAM E2E Option Type-enabled flag (RFC9197)
- **M**: Alternate Marking enabled flag (RFC8321)

The **IFIT-ATTRIBUTES TLV** provides the configurable knobs of the IFIT feature, and it can be included as an optional TLV in the **LSPA object**

**IFIT-ATTRIBUTES TLV**

```
+-------------------------------+  +-------------------------------+
|  Type                         |  |  Length                         |
|-------------------------------+  +-------------------------------+
|  //                           |  | sub-TLVs                      |
|-------------------------------+  +-------------------------------+
```

IOAM and AltMark Sub-TLVs 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 Sub-TLV
Changes from -00

Main comments addressed after the adoption:

• Clarification on the headend support of IFIT capability. It is supposed that there are at least two nodes (e.g. starting and ending node) which support it

• IFIT methods (IOAM and Alternate Marking) are more mature for SRv6 and compared to SR-MPLS.
  – For SRv6, the references are draft-ietf-6man-ipv6-alt-mark (RFC Ed Queue) and draft-ietf-ippm-ioam-ipv6-options (IESG review)
  – For SR-MPLS, there are different proposals and references are not included in the current draft version

• Relation with draft-ietf-idr-sr-policy-ifit: both PCEP and BGP can be used to instantiate SR Policies, so it is reasonable to have the same IFIT mechanism for PCEP and BGP.

• Clarification about the IFIT terminology and framework (draft-song-opsawg-ifit-framework)

• Editorial comments
Next Steps

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

• Welcome questions, comments

Thank you