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IS-IS Extensions for Advertising IFIT Node Capability
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Abstract

This document defines a way for an Intermediate System to Intermediate System (IS-IS) routers to advertise IFIT(in-situ Flow Information Telemetry) capabilities. This document extends a new optional sub-TLV in the IS-IS Router CAPABILITY TLV [[RFC7981](#)], which allows a router to announce its IFIT node capabilities within an IS-IS level or the entire routing domain. Such advertisements enable IFIT applications in the network domain.

Requirements Language

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC 2119](#) [[RFC2119](#)].

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[1.](#) Introduction

IFIT provides a complete framework architecture and a reflection-loop working solution for on-path flow telemetry [[I-D.song-opsawg-ifit-framework](#)]. At present, there are a family of emerging on-path flow telemetry techniques, including In-situ OAM (IOAM) [[I-D.ietf-ippm-ioam-data](#)], PBT [[I-D.song-ippm-postcard-based-telemetry](#)], IOAM Direct Export (DEX) [[I-D.ioamteam-ippm-ioam-direct-export](#)], Enhanced Alternate Marking (EAM) [[I-D.zhou-ippm-enhanced-alternate-marking](#)], etc. IFIT is a solution focusing on network domains. The "network domain" consists of a set of network devices or entities within a single administration. For example, a network domain can be one or more IGP routing domains. The family of emerging on-path flow telemetry techniques may be selectively or partially implemented in different vendors' devices as an emerging feature for various use cases of application-aware network operations. Hence, in order to enable IFIT

applications in an operational network domain, IFIT node capabilities SHOULD be advertised by every Intermediate System to Intermediate System (IS-IS) router in the network domain.

1.1. IFIT Domain

IFIT is expected to be deployed in a specific domain referred as the IFIT domain. An IFIT domain may cross multiple network domains. One network domain may consist of multiple IFIT domain. Within the IFIT domain, the IFIT data fields of flow information head MAY be updated by network nodes that the packet traverses.

1.2. IFIT Node Capability Information

Each IFIT node is configured with a node-id which uniquely identifies a node within the associated IFIT domain. To accommodate the different use cases or requirements of in-situ flow information telemetry, IFIT data fields updated by network nodes fall into different categories which are referred as different IFIT option types, including IOAM Trace Option-Types [[I-D.ietf-ippm-ioam-data](#)], IOAM Edge-to-Edge (E2E) Option-Type [[I-D.ietf-ippm-ioam-data](#)], IOAM DEX Option-Type [[I-D.ioamteam-ippm-ioam-direct-export](#)] and Enhanced Alternate Marking (EAM) Option-Type [[I-D.zhou-ippm-enhanced-alternate-marking](#)]. So IFIT Option Types SHOULD be carried in IFIT node capability advertisement.

2. Advertisement of the IFIT Node Capabilities in ISIS

The IS-IS Extensions for Advertising Router Information TLV named IS-IS Router CAPABILITY TLV [[RFC7981](#)], which allows a router to announce its capabilities within an IS-IS level or the entire routing domain, has been chosen for IFIT node capabilities advertisement. IS-IS Router CAPABILITY TLV is formed of multiple sub-TLVs [[RFC5305](#)].

2.1. IFIT Node Capability Sub-TLV

According to the format of IS-IS Router CAPABILITY TLV [[RFC7981](#)], the IFIT Node Capability sub-TLV is composed of three fields, a one-octet Type field, a one-octet Length field, and zero or more octets of Value. The Type field indicates the type of items in the Value field. The Length field indicates the length of the Value field in octets. The Value field indicates the IFIT Node Capability, which is a 2-octet IFIT Option Type-enabled Flag.

The IFIT Node-capability Sub-TLV has the following format:

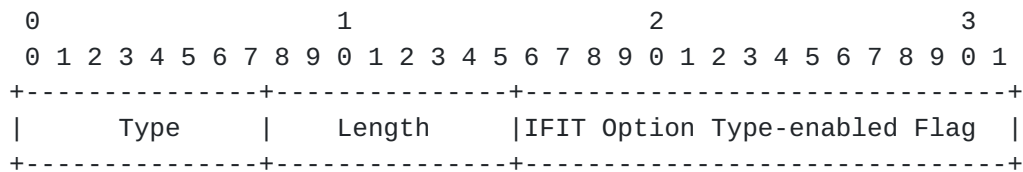


Fig. 1 IFIT Node Capability Sub-TLV Format

Type: To be assigned by IANA

Length: A 8-bit field that indicates the length of the value portion in octets.

IFIT Option Type-enabled Flag: A 2-octet field that is defined as following:



Where:

p-Flag: iOAM Pre-allocated Trace Option Type-enabled flag. If p bit is set (1), the router is capable of iOAM Pre-allocated Trace [[I-D.ietf-ippm-ioam-data](#)].

i-Flag: iOAM Incremental Trace Option Type-enabled flag. If i bit is set (1), the router is capable of iOAM Incremental Tracing [[I-D.ietf-ippm-ioam-data](#)].

d-Flag: iOAM DEX Option Type-enabled flag. If d bit is set (1), the router is capable of iOAM DEX [[I-D.ioamteam-ippm-ioam-direct-export](#)].

e-Flag: iOAM E2E Option Type-enabled flag. If e bit is set (1), the router is capable of iOAM E2E processing [[I-D.ietf-ippm-ioam-data](#)].

m-Flag: Enhanced Alternative Marking enabled flag. If m bit is set (1), then the router is capable of processing Enhanced Alternative Marking packets [[I-D.zhou-ippm-enhanced-alternate-marking](#)].

Reserved: Must be set to zero upon transmission and ignored upon receipt.

An IFIT node SHALL be capable of more than one IFIT option types. So for this case, IFIT Option Type-enabled Flag bitmap SHOULD has more than one bit being set.

3. IANA Considerations

Note to RFC Editor: this section may be removed on publication as an RFC.

3.1. Sub-TLVs for the IS-IS Router CAPABILITY TLV (242)

This document makes the following registrations for a Sub-TLV type of the new Sub-TLV proposed in [Section 3](#) of this document from the "Sub-TLVs for TLV 242 (IS-IS Router CAPABILITY TLV)" registry.

+-----+	-----+
Type	Description
+-----+	-----+
TBD	IFIT Node Capability
+-----+	-----+

4. Security Considerations

This document introduces new sub-TLVs for the existing IS-IS Router capability TLV. It does not introduce any new security risks to ISIS.

5. Acknowledgements

6. References

6.1. Normative References

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- [RFC5305] "IS-IS Extensions for Traffic Engineering", <<https://www.rfc-editor.org/info/rfc5305>>.
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