IOAM Update

IPPM Interim Meeting,
April 1, 15:00-16:30 UTC

IOAM related WG documents

- draft-ietf-ippm-ioam-data-09
- draft-ietf-ippm-ioam-ipv6-options-01
- draft-ietf-ippm-ioam-flags-01
- draft-ietf-ippm-ioam-direct-export-00

IOAM Data Fields: draft-ietf-ippm-ioam-data

WGLC on draft-ietf-ippm-ioam-data-08

Many comments received. Thanks to all reviewers!

- Issue #149: draft-ietf-ippm-ioam-data-08 WGLC#1 comments: Editorial
- Issue #150: draft-ietf-ippm-ioam-data-08 WGLC#1 comments: Nomenclature
- Issue #151: draft-ietf-ippm-ioam-data-08 WGLC#1 comments: Clarifications to SHOULD statements
- Issue #152: draft-ietf-ippm-ioam-data-08 WGLC#1 comments: Add further detail/clarifications to existing definitions
- Issue #153: draft-ietf-ippm-ioam-data-08 WGLC#1 comments: Changes to existing definitions
- Issue #154: draft-ietf-ippm-ioam-data-08 WGLC#1 comments: Suggestions for additional data fields
- Issue #155: draft-ietf-ippm-ioam-data-08 WGLC#1 comments: Security related
- Issue #156: draft-ietf-ippm-ioam-data-08 WGLC#1 comments: Needs clarification on timestamp insertion in E2E option
- Issue #157: draft-ietf-ippm-ioam-data-08 WGLC#1 comments: Editorial on Pre-allocated and Incremental Trace Options
- Issue #158: draft-ietf-ippm-ioam-data-08 WGLC#1 comments: Trace-Flags Registry clarification
- Issue #159: draft-ietf-ippm-ioam-data-08 WGLC#1 comments: Editorial DEX leftovers

Draft-ietf-ippm-ioam-data: Updates from -08 to -09

Editorial changes (Issue #149, Issue #157) - Haoyu Song, Greg Mirsky, Mickey Spiegel

- Clarified use of RemainingLen in opaque snapshot
- Removed sloppy language
- Removed reference to expired draft
- Explicit statements that IOAM-Trace-Type bits determine which data fields are included in each node data element, IOAM transit nodes must not modify fields in the fixed header, reserved “must be zero” fields need to be set and also ignored

Nomenclature (Issue #150) - Greg Mirsky

- Clarified that, despite the name “in-situ” not all IOAM functions require piggybacking meta-data onto live customer traffic.

Draft-ietf-ippm-ioam-data: Updates from -08 to -09

Use of SHOULD statements (Issue #151) - Greg Mirsky

- Reworded sentences which used uppercase SHOULD, despite RFC2119 style “SHOULD” was not intended.
  (e.g. “It SHOULD be possible to enable IOAM on a selected set of traffic” -> “Using IOAM on a selected set of traffic could be useful in deployments where …”)

Draft-ietf-ippm-ioam-data: Updates from -08 to -09

Expand/clarify existing definitions (Issue #152) - Greg Mirsky

- Hop_lim = 0xFF if the encap protocol does not carry TTL/Hop-Limit
- Field length for Trace-Type 0 = 4 Bytes
- Reference to “nodes supporting functionality defined in draft-ietf-ippm-ioam-data” instead of introducing terms like “IOAM capable node”.

Draft-ietf-ippm-ioam-data: Updates from -08 to -09

Clarify existing definitions (Issue #153) - Greg Mirsky, Barak Gnafi

- Unit type for “buffer occupancy”: Field may be implementation specific. Unit may be interpreted within the context of a namespace.
  The authors acknowledge that in some operational cases there is a need for the units to be consistent across a packet path through the network, hence recommend the implementations to use standard unit such as Bytes.

Draft-ietf-ippm-ioam-data: Updates from -08 to -09

Suggestions for additional data fields (Issue #154) - Greg Mirsky, Barak Gnafi

(Higher resolution timestamps, interface sent/receive rate, byte count on port)

- No updates on the document to allow the base document to be finished up. New data fields are expected to be covered by new drafts.

Security related (Issue #155) - Greg Mirsky, Tal Mizrahi

- Section 8 was extended to cover additional security aspects, incl. malicious change to IOAM data, mitigation to leaking IOAM data from network domain that employs IOAM, security considerations related to specific IOAM encapsulations

Draft-ietf-ippm-ioam-data: Updates from -08 to -09

Timestamp insertion in E2E option type (Issue #156) - Mickey Spiegel

- Within the IOAM encapsulating node, the time that the timestamp is retrieved can depend on the implementation. Some possibilities are: 1) the time at which the packet was received by the node, 2) the time at which the packet was transmitted by the node, 3) when a tunnel encapsulation is used, the point at which the packet is encapsulated into the tunnel. Each implementation should document when the E2E timestamp that is going to be put in the packet is retrieved.

Draft-ietf-ippm-ioam-data: Updates from -08 to -09

Trace-Flags Registry clarification (Issue #158) - Mickey Spiegel

- Section 7.4 now states: “Bit 1 - 3 are available for assignment via RFC Required process as per [RFC8126]” - which was missing prior.

Direct export references leftovers (Issue #159) - Mickey Spiegel

- All references to direct export are removed. Direct export is covered in draft-ietf-ippm-ioam-direct-export-00

draft-ietf-ippm-ioam-data-09 - Next Steps

- draft-ietf-ippm-ioam-data-09 should include all WGLC;
  Since the WGLC finished, no further comments have been received.

- Issue another WGLC once everyone had a chance to review
  draft-ietf-ippm-ioam-data-09, e.g. by mid May?

IOAM IPv6 Options
draft-ietf-ippm-ioam-ipv6-options-00

draft-ietf-ippm-ioam-ipv6-options: Updates from -00 to -01

Updates from -00 to -01

- Minor editorial updates only (author email address change)

Early allocation 2 IPv6 Option Types

- IPPM WG chairs initiated the process for early allocation

draft-ietf-ippm-ioam-ipv6-options-01: Next steps

- WGLC?

IOAM Flags
draft-ietf-ippm-ioam-flags-01

Changes Since Version -00

Clarifications about the loopback flag.

Text has been added about the purpose of the active flag.

Security considerations updated:

- Amplification attacks.
- Measures to limit the impact of amplification attacks:
  - Rate limiting.
  - Data minimization: up to one data field per exported packet.

- Seeking feedback from the WG.

Open Issue

- Loopback on the reverse path:
  - Pushing IOAM data on the reverse path is not necessary.
  - Problem: how do transit nodes know that a looped back packet is in transit on the reverse path?
    - New flag?
    - New IOAM type?
    - Clearing the RemainingLen field when the packet is looped back?

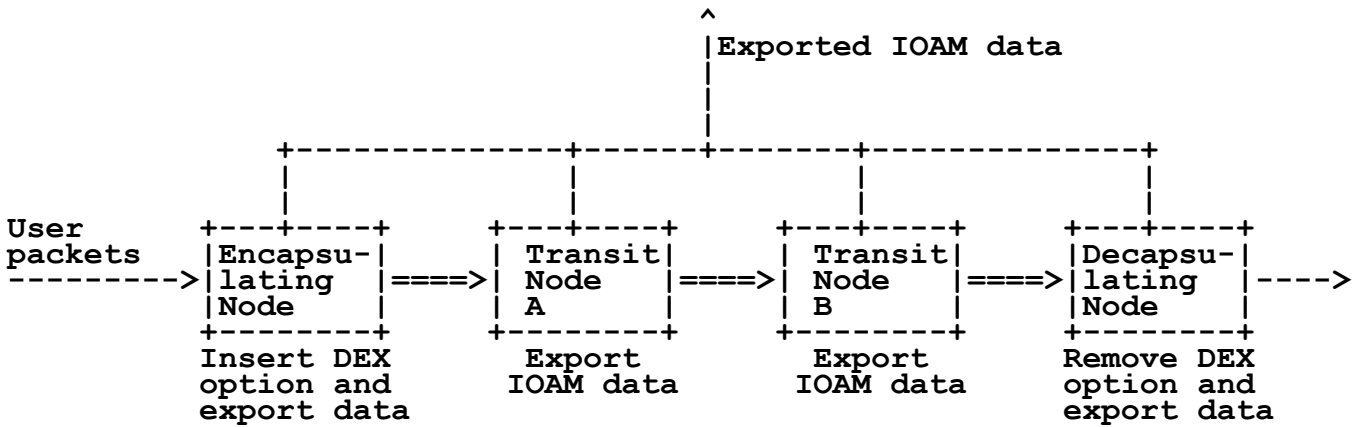
IOAM Direct Export
draft-ietf-ippm-ioam-direct-export-00

Direct Exporting (DEX) – Overview

IOAM data is exported without modifying data packets.

Simplifies transit node processing.

Reduces the data plane on-the-wire overhead of IOAM.



The History / State of this Draft

This draft combines two somewhat similar approaches:

- The PBT-I concept from draft-song-ippm-postcard-based-telemetry
- The Immediate Export flag from draft-mizrahi-ippm-ioam-flags

This draft is the product of a design team that worked on combining the two concepts.

December 2019 – adopted by the IPPM WG.

February 2019 – draft-ietf-00.

Open Issue – Hop Count

Question: Should the DEX option include an explicit Hop Count field, or is the Hop_Lim/Node_ID data field sufficient?

No Hop Count:

- Using existing functionality: Hop_Lim/Node_ID data field can be used, copied from the TTL/Hop Limit from the encap protocol, and included in the exported packet.
- The DEX option does not need to be modified by transit switches.

Explicit Hop Count:

- The lower layer TTL may not be accurate, e.g., L2 or hierarchical VPN.
- Allows to detect IOAM-capable node that fails to export packets.