In-situ OAM (IOAM) in NSH (and POT)

draft-brockners-sfc-ioam-nsh-00

draft-brockners-proof-of-transit-04

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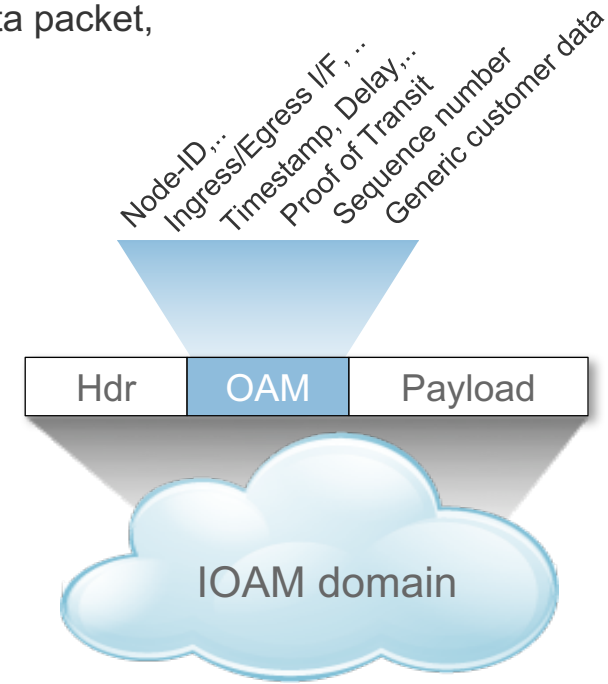
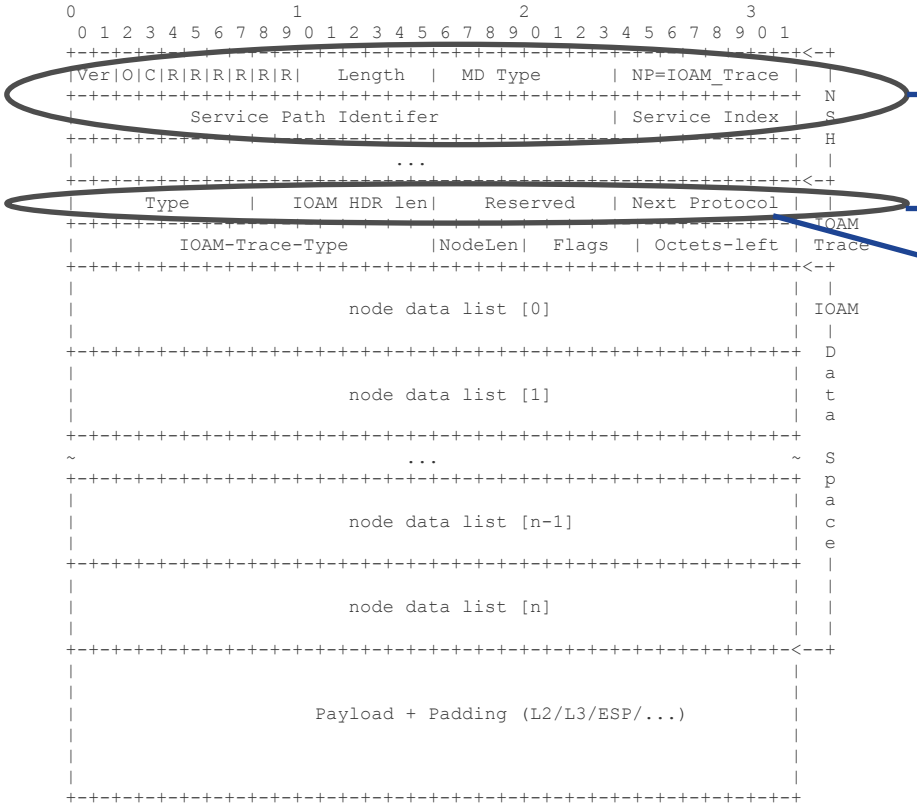
In-situ OAM in a nutshell

- Gather telemetry and OAM information along the path within the data packet, (hence “in-situ OAM”) as part of an existing/additional header
  - No extra probe-traffic (as with ping, trace, ..)
  - “Hybrid, Type-1 OAM” per RFC 7799
- Generic, Transport independent data-fields for IOAM
  - Scope: Per-hop, specific-hops only, end-to-end
  - Data fields include: Node IDs, interface IDs, timestamps, sequence numbers, ...
- Encapsulation
  - IOAM data fields can be embedded into a variety of transports, including: IPv6, SRv6, NSH, GRE, Geneve, VXLAN-GPE ...
- *Base IOAM document adopted by IPPM!*
  - *draft-ietf-ippm-ioam-data-01*



IOAM over NSH

(draft-brockners-sfc-ioam-nsh-00)



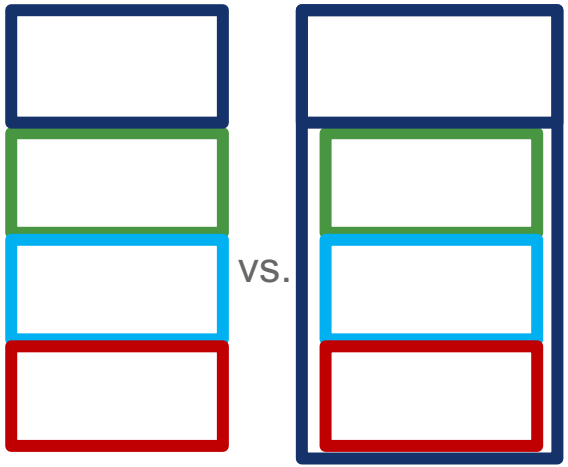
NSH header

IOAM shim header for NSH

Specifies the next protocol
Allows multiple data field

Open Questions

- Section 4: Discussion of the encapsulation approach
  - An encapsulation of IOAM data fields in NSH should be friendly to an implementation in both hardware as well as software forwarders and support a wide range of deployment cases, including large networks that desire to leverage multiple IOAM data fields at the same time.
- “To nest TLVs or not to”?, i.e. use MD Type 2 to encapsulate IOAM data categories (trace, proof-of-transit, and edge-to-edge) or use the next header approach
  - “Next header” approach: Results in serial list of IOAM data categories. Avoids iterative lookups. Finding the L4 header requires parsing each header of the list. Current approach in -00 version of the draft.
  - “TLV” approach using MD Type 2: Results in nested TLVs. Requires iterative lookups. Single length field for all options allows nodes not interested in the IOAM information to skip the information easily.
    Approach taken by the VPP open source implementation
- Total length of IOAM data?
  MD Type 2 offers 6 bits for length = 256 of encap data
- Setting the ‘O’ bit
  Should the ‘O’ bit be set in packets that include IOAM metadata?

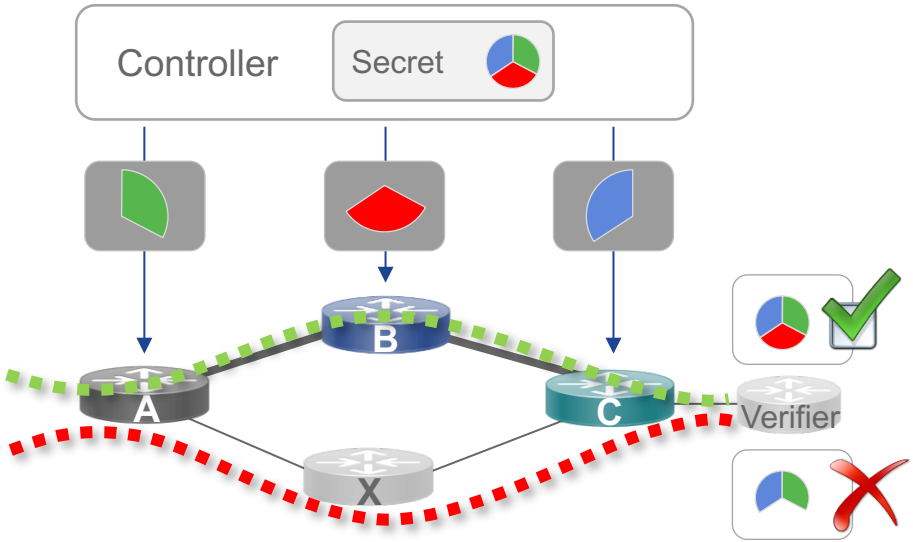


What about compliance?

How do we ensure the integrity of a path or service chain?

- draft-brockners-proof-of-transit-04
- Meta-data added to all user traffic
  - Based on “Share of a secret”
  - Updated at every hop where proof of transit is required
- Verifier checks whether collected meta-data allows retrieval of secret

  ➡ “Proof of Transit”: Path verified
- *Referenced from NSH!*



Status

- Data Fields for In-situ OAM
  - Adopted by IPPM
  - draft-ietf-ippm-ioam-data-01
- IOAM encapsulations into protocols
  - draft-brockners-nvo3-ioam-geneve-00
  - draft-brockners-ioam-vxlan-gpe-00
  - draft-brockners-sfc-ioam-nsh-00 (this discussion)
  - … more to come…

Next steps

- IOAM in NSH in SFC WG
  - Feedback from SFC WG appreciated, especially on open questions
  - WG adoption?

- IOAM Proof of Transit
  - Consider WG adoption