

In-situ OAM (IOAM) in IPv6

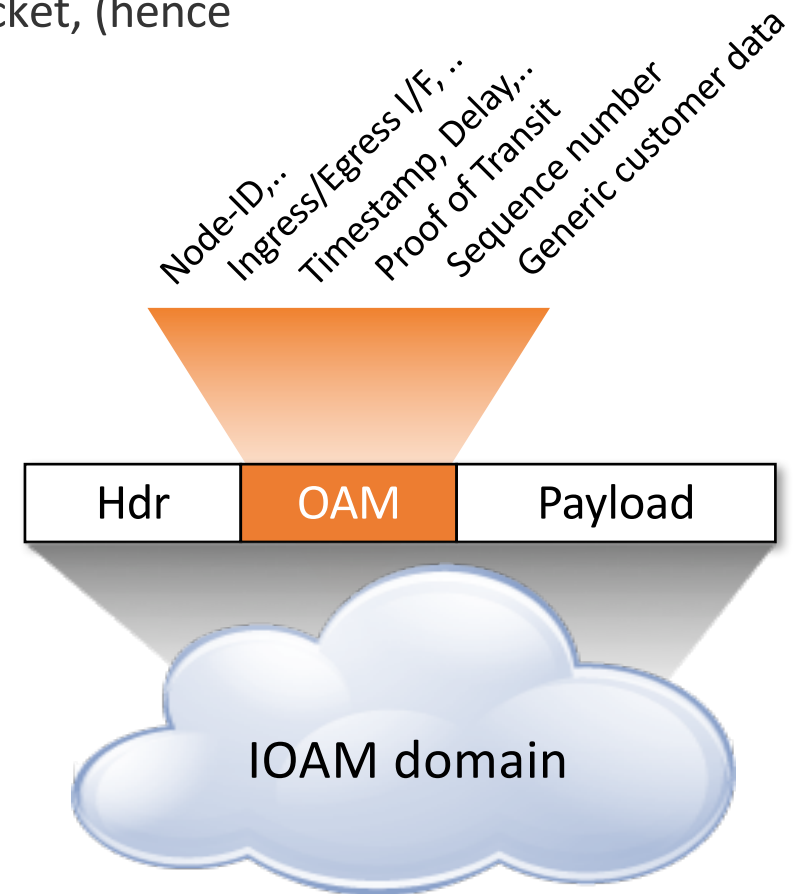
[draft-ioametal-ippm-6man-ioam-ipv6-options-01](#)

6man

November 6th, 2018

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, SR, NSH, GRE, Geneve, VXLAN-GPE ...
- Main work on IOAM progressed in IPPM WG



Issues

1. HbH ext header and IOAM option insertion and removal by transit nodes in a restricted administrative domain.
 - a) Dealing with PMTU– Packet size changes can exceed PMTU.
 - b) Misleading ICMP errors confusing the source.
 - c) Possible leaks that affect the forwarding behavior and state of network elements outside the domain.
2. To support hardware friendly tracing option - Incremental Trace IOAM HbH Option: Changes Option Data Len en-route.
 - a) Dealing with PMTU– Packet size changes can exceed PMTU.
3. Applicability statement and scope draft in the works, incomplete at the moment.

1. Supporting HbH ext header and option insertion/removal in transit

- No easy solutions

1. Fix PMTU and offset for packet size change in PMTU discovery - <https://tools.ietf.org/html/draft-troan-6man-pmtu-solution-space-00>
2. New IPv6 packet is created with encapsulating node as source(E) and the original destination (D) as the destination

1. Payload of this packet is the original IPv6 packet along with an extension header inserted inside.



2. *The original packet is restored by removing the outer IPv6 header and the inner extension header by a node at the domain boundary.*
 3. *Modified packet may still leak – but will only confuse the destination node.*
 4. *ECMP computation needs to be reworked.*
 5. *Complex/costly implementation in HW & SW.*
3. No support of IOAM in transit network. Only source initiated IOAM tracing, proof of transit.. *Limits usage of IOAM significantly*

Next steps

- IOAM data fields definition
 - [draft-ietf-ippm-ioam-data](#) - Progressed in IPPM WG.
- IOAM data fields encapsulation for different protocols:
 - SFC : draft-ietf-sfc-ioam-nsh
 - VXLAN GPE: draft-brockners-ippm-ioam-vxlan-gpe
 - GENEVE: draft-brockners-ippm-ioam-geneve
 - Generic encap for protocols with Ethertype (GRE, etc): draft-weis-ippm-ioam-eth
 - **IPv6: draft-ioametal-ippm-6man-ioam-ipv6-options**
 - SRv6: draft-ali-spring-ioam-srv6
 - SR-MPLS: draft-gandhi-spring-ioam-sr-mpls

Joint review of drafts between IPPM and working groups which “own” the parent protocol.

[Please review draft-ioametal-ippm-6man-ioam-ipv6-options](#)