Simple Two-way Active Measurement Protocol Extensions for Hop-by-Hop OAM Data Collection

draft-wang-ippm-stamp-hbh-extensions-00

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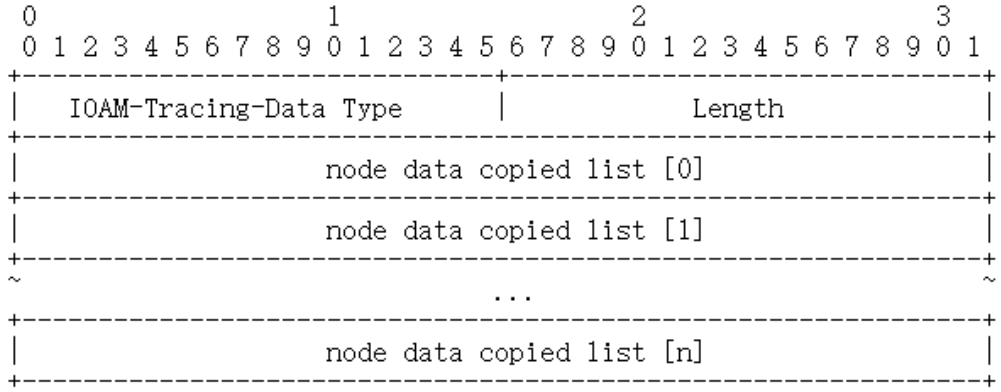
Background & Purpose

- Background:
  - STAMP enables the measurement of both one-way and round-trip performance metrics [RFC8762].
  - The performance of intermediate nodes that STAMP test packets travers are invisible.
  - The STAMP instance must be configured at every intermediate node to measure the performance per node that test packets traverse, which increases the complexity of OAM in large-scale networks.

- Purpose:
  - This document extents optional TLVs to STAMP which enable OAM data collection per node that STAMP test packets traverse:
    - IOAM Tracing Data TLV
    - Forward HbH Delay TLV
    - Backward HbH Delay TLV
  - These optional TLVs are defined as updates of the STAMP Optional Extensions [I-D.ietf-ippm-stamp-option-tlv].

IOAM Tracing Data TLV

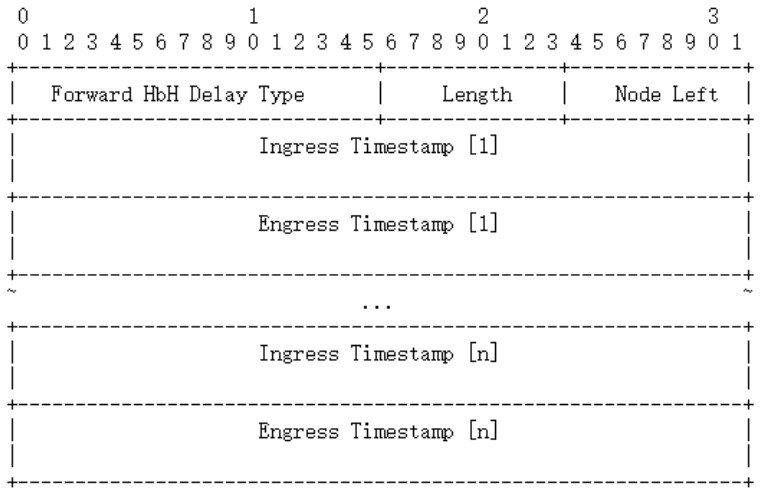
- A new IOAM Tracing Data TLV in STAMP Session-Sender test packets to record the IOAM tracing data of every IOAM capable node that the test packet traverses in the forward path.



  - IOAM-Tracing-Data Type: TBA1.
  - Length: value equals to a multiple of 4 octets according to the number of nodes and IOAM-Trace-Type bits (i.e. a 24-bit identifier which specifies which data types are collected in the node data list [I-D.ietf-ippm-ioam-data]).
  - Node data copied list [0..n]: a variable-length field, which record the copied content of each node data element determined by the IOAM-Trace-Type. It MUST be set to zero upon Session-Sender test packets transmission and ignored upon receipt.
- Procedures:
  - STAMP Session-Sender: must inserts the "trace option header" and allocate a node-data-list array into test packets, and sets the corresponding bits in the IOAM-Trace-Type field.
  - STAMP Session-Reflector: MUST copy the node-data-list array into the node-data-copied-list carried in the reflected test packet before transmission and must remove the trace option header in the Se.
- IOAM tracing data collection also can be enabled for the backward path that the reflected packets traverse.

Forward HbH Delay TLV

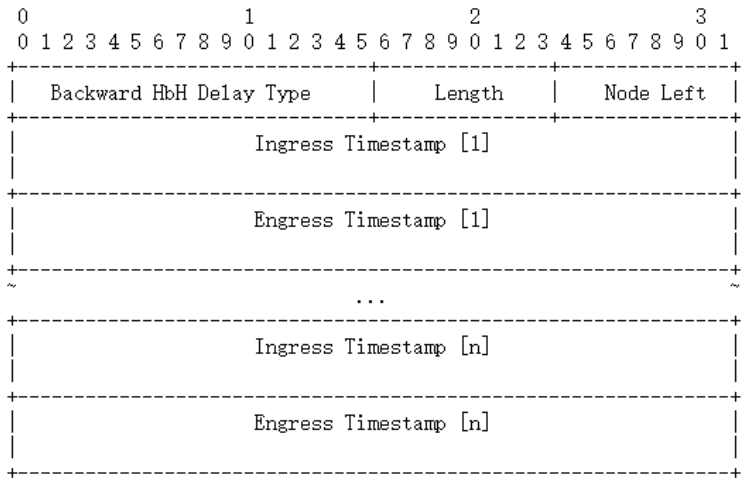
- A new Forward HbH Delay TLV: record the ingress timestamp and egress timestamp at every intermediate nodes in the forward path that STAMP test packets traverse.
  - Forward HbH Delay Type: TBA2.
  - Length: the value MUST be set according to the number of explicitly listed intermediate nodes in the forward path and the timestamp formats, e.g. NTP [RFC5905].
  - Node Left: the number of explicitly listed intermediate nodes still to be visited before reaching the destination node in the forward path.
  - Timestamp Tuple list (Ingress Timestamp [1..n], Engress Timestamp [1..n]): record the timestamp when the test packet received and forwarded at the ingress and egress of the n-th intermediate node in the forward path.



- Procedures:
  - STAMP Session-Sender: generates the STAMP test packet with the Forward HbH Delay TLV, and set Node Left to n.
  - Intermediate node: receives packets and fills the Ingress Timestamp field and Egress Timestamp field.
  - STAMP Session-Reflector: copy the Forward HbH Delay TLV into the reflected test packet before its transmission.

Backward HbH Delay TLV

- A new Backward HbH Delay TLV: record the ingress timestamp and egress timestamp at every intermediate nodes in the backward path that STAMP test packets traverse.
  - Backward HbH Delay Type: TBA3.
  - Length: the value MUST be set according to the number of explicitly listed intermediate nodes in the backward path and the timestamp formats, e.g. NTP [RFC5905].
  - Node Left: the number of explicitly listed intermediate nodes still to be visited before reaching the destination node in the backward path.
  - Timestamp Tuple list (Ingress Timestamp [1..n], Engress Timestamp [1..n]): record the timestamp when the test packet received and forwarded at the ingress and egress of the n-th intermediate node in the backward path.



- Procedures:
  - STAMP Session-Sender: generates the STAMP test packet with the Backward HbH Delay TLV, and set Node Left to n.
  - STAMP Session-Reflector: copy the Backward HbH Delay TLV into the reflected test packet before its transmission.
  - Intermediate node: receives packets and fills the Ingress Timestamp field and Egress Timestamp field .

Next Steps

- Comments and inputs are welcome
- Refine the document accordingly

Thank You!