

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

draft-wang-ippm-stamp-hbh-extensions-02

Online, Nov 2020, IETF 109

Yali Wang, Tianran Zhou @Huawei

Hongwei Yang @China Mobile

Chang Liu @China Unicom

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 traverses 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 extends 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
- HbH Packet Loss TLV ~ NEW
- HbH BW Utilization TLV ~ NEW
- HbH Timestamp Information TLV ~ NEW

Code Point	Description	Reference
TBA1	IOAM Tracing Data TLV	This document
TBA2	Forward HbH Delay TLV	This document
TBA3	Backward HbH Delay TLV	This document
TBA4	HbH Packet Loss TLV	This document
TBA5	HbH BW Utilization TLV	This document
TBA6	HbH Timestamp Information TLV	This document

- These optional TLVs are defined as updates of the STAMP Optional Extensions [I-D.ietf-ippm-stamp-option-tlv].

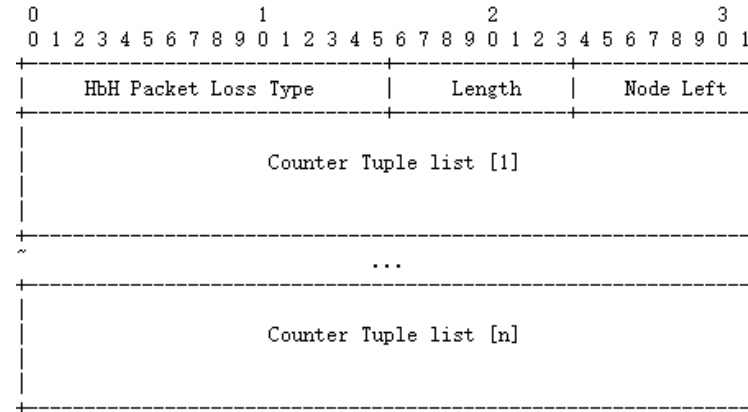
Changes from -01 to -02

Comments and Inputs on the List

- Link bandwidth utilization is also an important indicator. Definition of a new Link Bandwidth Utilization TLV in this draft (comment from Hongwei Yang)
- The specification of the HbH also for packet loss and definition of a new HbH packet loss TLV (comment from Giuseppe Fioccola)
- In addition to IOAM, other telemetry data (e.g. alternate marking) could be transmitted by STAMP optional TLV extensions (comment from Giuseppe Fioccola)
- Specify the source of clock synchronization and the method of timestamp obtained at the intermediate node (comment from Chang Liu)
- Definition of a new HbH Timestamp Information TLV (Chang Liu)

HbH Packet Loss TLV

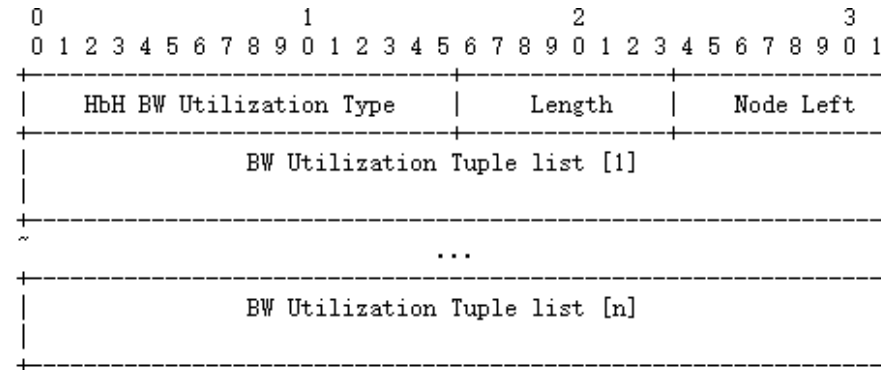
- A new HbH Packet Loss TLV placed in STAMP Session-Sender test packets to record the number of Session-Sender test packets received at and transmitted by every intermediate nodes along the forward path.



- HbH Packet Loss Type: TBA4.
 - Length: value equals to a multiple of 16 octets .
 - Node Left: the number of explicitly listed intermediate nodes still to be visited before reaching the destination node in the forward path.
 - Counter Tuple list [1..n]: a variable-length field, which record the Receive Counter and the Transmit Counter when the test packet is received at and transmitted by the n-th intermediate node.
 - A Counter Tuple is composed of a 64-bit Receive Counter field and a 64-bit Transmit Counter field.
- Procedures:
 - STAMP Session-Sender: generates the STAMP test packet with the HbH Packet Loss TLV, and set Node Left to n.
 - Intermediate node: receives packets and writes punts the packet to control plane and writes the Receive Counter and the Transmit Counter at the Counter Tuple list.
 - STAMP Session-Reflector: MUST copy the HbH Packet Loss TLV into the Session-Reflector test packet before its transmission.

HbH Bandwidth Utilization TLV

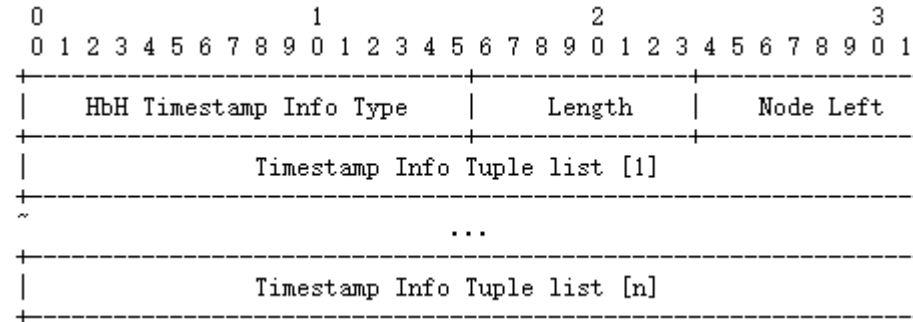
- A new HbH Bandwidth Utilization TLV placed in STAMP Session-Sender test packets to record the ingress and egress bandwidth utilization at every intermediate nodes along the forward path.
- The HbH BW Utilization TLV is usable to detect and troubleshoot the link congestion in the forward path.



- HbH BW Utilization Type: TBA5.
- Length: value equals to a multiple of 8 octets .
- Node Left: the number of explicitly listed intermediate nodes still to be visited before reaching the destination node in the forward path.
- BW Utilization Tuple list [1..n]: a variable-length field, which record the ingress and egress bandwidth utilization when the test packet is received at and transmitted by the n-th intermediate node.
- BW Utilization Tuple is composed of a 32-bit ingress bandwidth utilization field and a 32-bit egress bandwidth utilization field.
- Procedures:
 - STAMP Session-Sender: generates the STAMP test packet with the HbH Bandwidth Utilization TLV, and set Node Left to n.
 - Intermediate node: receives packets and writes punts the packet to control plane and writes the ingress and egress bandwidth utilization at the BW Utilization Tuple list.
 - STAMP Session-Reflector: MUST copy the HbH Bandwidth Utilization TLV into the Session-Reflector test packet before its transmission.

HbH Timestamp Information TLV

- A new HbH Timestamp Information TLV placed in STAMP Session-Sender test packets to record the ingress and egress Timestamp Information (includes the source of clock synchronization and the method of timestamp obtainment).
- The HbH Timestamp Information TLV is usable to query timestamp information from every nodes in the forward path.



- HbH Timestamp Info Type: TBA6.
- Length: value equals to a multiple of 4 octets .
- Node Left: the number of explicitly listed intermediate nodes still to be visited before reaching the destination node in the forward path.
- Timestamp Info Tuple list [1..n]: a variable-length field, which record the clock synchronization and the method of timestamp obtainment at the ingress and egress when the test packet is received at and transmitted by the n-th intermediate node.
- Procedures:
 - STAMP Session-Sender: generates the STAMP test packet with the HbH Timestamp Information TLV, and set Node Left to n.
 - Intermediate node: receives packets and writes punts the packet to control plane and writes the Timestamp Information at the Tuple list.
 - STAMP Session-Reflector: MUST copy the HbH Timestamp Info TLV into the Session-Reflector test packet before its transmission.

Next Steps

- Welcome questions and comments
- Evaluate WG adoption

Thank You!