Simple TWAMP (STAMP) Extensions for Segment Routing Networks

draft-gandhi-ippm-stamp-srpm-02

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Agenda

- Requirements and Scope

- Summary of Extensions

- Next Steps

Requirements and Scope

Requirements:

- Support in-band Performance Measurement for links and SR paths

Goals:

- Avoid per session provisioning on Session-Reflector
- Avoid control-channel signaling for sessions
- Very high scale for number of sessions and faster detection interval
  - Support hardware implementation

Scope:

- STAMP [RFC 8762]
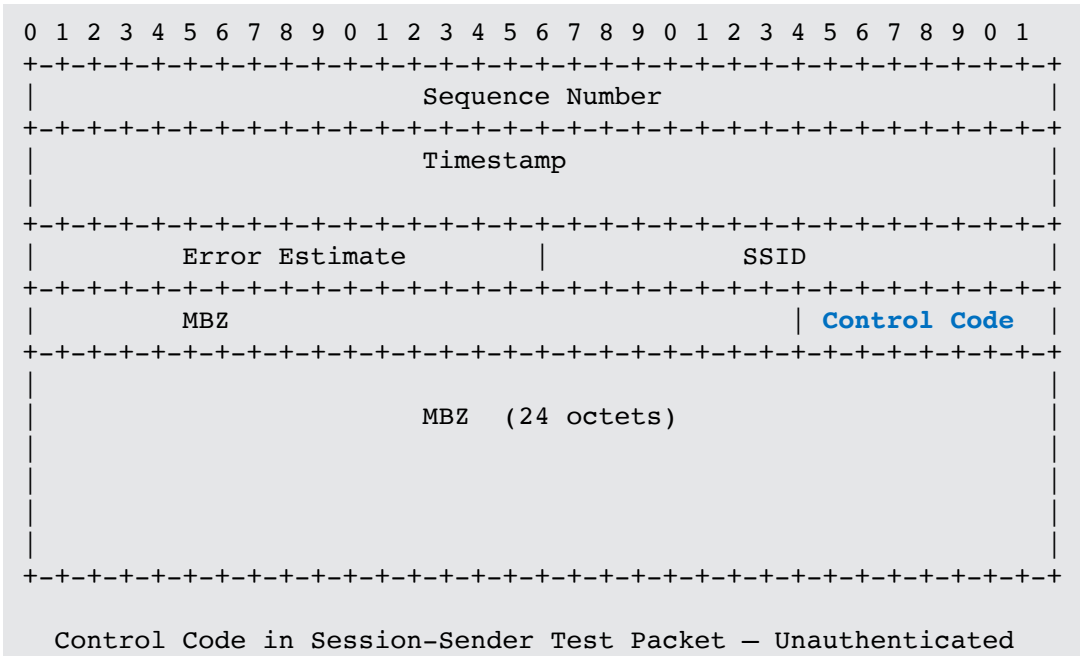- STAMP Extensions [RFC8972]

STAMP - Session-Sender Control Code Field

Session-Sender Control Code (8-bit) Flags:

0x0: Existing default behavior as defined in RFC 8762.

0x1: In-band Reply Requested.
Indicates that this test packet has been sent over a bidirectional path and the reply is required in-band over the same interface in the reverse direction.

0x2: No Reply Requested.

```
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                        Sequence Number                        |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                          Timestamp                            |
|                                                               |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|         Error Estimate        |             SSID              |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|           MBZ                                  | Control Code  |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                                                               |
|                     MBZ   (24 octets)                         |
|                                                               |
|                                                               |
|                                                               |
|                                                               |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+

   Control Code in Session-Sender Test Packet — Unauthenticated
```

STAMP - Session-Sender Control Code Field - Usage

- Two-way delay measurement mode for links
  - Reflector needs to send reply on the same interface (symmetric delay on forward and reverse link)
  - Link can be LAG (bundle) member
- Avoid configuring each (session id, source-address) on session-reflector (can have an order of 1K links)
  - Cannot always send reply on the same incoming interface as the STAMP test packet reply may need to be IP routed

STAMP - Return Path TLV

Return Path TLV (value TBA2) to carry one Sub-TLV for return path:

Sub-TLVs Types:

- Type (value 1): Return Address. Destination node address for the reply; different than the Source Address in the test packet

- Type (value 2): SR-MPLS Label Stack of the Return SR Path

- Type (value 3): SR-MPLS Binding SID [draft-ietf-pce-binding-label-sid] of the Reverse SR Policy

- Type (value 4): SRv6 Segment List of the Return SR Path

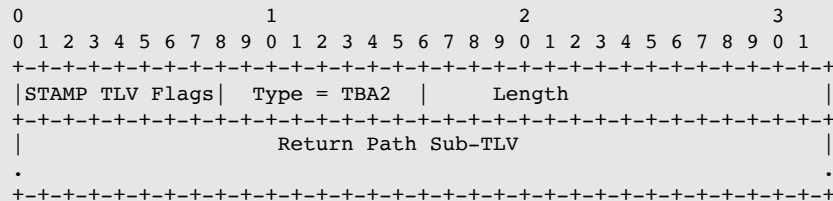- Type (value 5): SRv6 Binding SID [draft-ietf-pce-binding-label-sid] of the Reverse SR Policy

```
 0                   1                   2                   3
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|STAMP TLV Flags|  Type = TBA2  |           Length              |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                     Return Path Sub-TLV                        |
.                                                               .
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+

             Figure: Return Path TLV
```

```
 0                   1                   2                   3
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|STAMP TLV Flags|    Type       |           Length              |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                       Segment(1)                              |
.                                                               .
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
.                                                               .
.                                                               .
.                                                               .
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                       Segment(n)                              |
.                                                               .
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+

       Figure: Segment List Sub-TLV in Return Path TLV
```
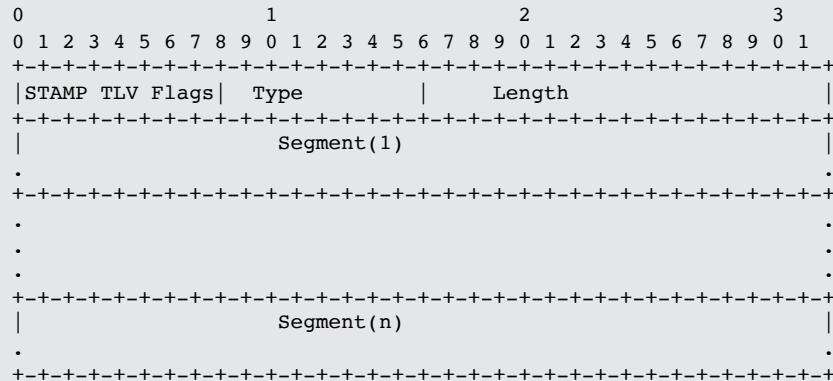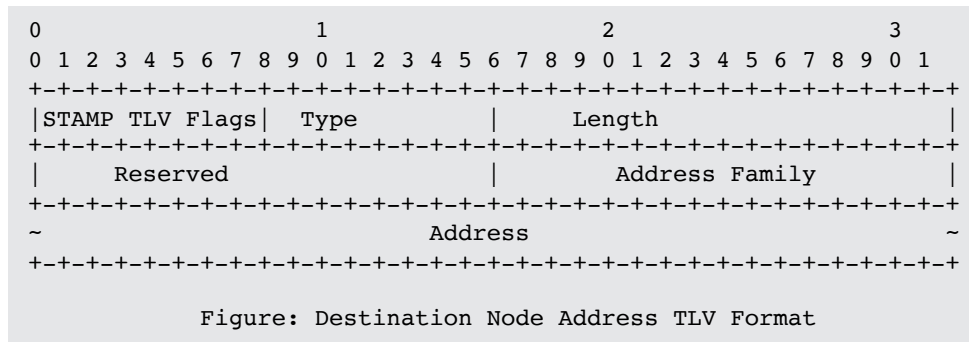
STAMP - Return Path TLV - Usage

- For Bidir SR Policy, reply test packet needs to be sent on the reverse SR Policy

- Bidir SR Path (forward and reverse) dynamically computed using CSPF by the head-end node

  – Path can change often based on topology change, link/node failure in the network, etc.

- No signaling in SR, possible to use PCE

- Avoid per session state on session-reflector node to store reverse paths (each session-id, source-address)

  – order of 10Ks SR Policy (that can have active and standby candidate-paths and each can have multiple segment-lists)

STAMP - Destination Node Address TLV

Destination Node Address TLV (value TBA1):

- Indicates the address of the intended destination node of the session-sender test packet.
- The Session-Reflector node **MUST NOT** send reply if it is not the intended destination node of the test packet.
- Useful when test packet is sent with 127/8 destination address (e.g. sweeping ECMP paths).

```
 0                   1                   2                   3
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|STAMP TLV Flags|   Type        |             Length            |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|     Reserved                  |          Address Family       |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
~                          Address                              ~
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+

          Figure: Destination Node Address TLV Format
```

Next Steps

- Welcome your comments and suggestions

- Requesting WG adoption

Thank you