Simple Two-way Active Measurement Protocol (STAMP) Extensions

draft-ietf-ippm-stamp-option-tlv

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Update

- Defined STAMP Session Identifier (SSID)
- Added HMAC TLV
- Clarify STAMP test packet processing
- Location TLV - more space for the Destination Port and the Source Port fields
- Follow-up TLV – re-named the field as Follow-up Timestamp

STAMP Session Identifier

```
 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
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                        Sequence Number                        |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                          Timestamp                            |
|                                                               |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|         Error Estimate        |            SSID               |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                                                               |
|                                                               |
|                         MBZ (28 octets)                       |
|                                                               |
|                                                               |
|                                                               |
|                                                               |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|             Type              |           Length              |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
~                            Value                              ~
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

- A STAMP Session is identified using 4-tuple (source and destination IP addresses, source and destination UDP port numbers).
- A STAMP Session-Sender MAY generate locally unique STAMP Session Identifier (SSID).
- SSID is two octets long non-zero unsigned integer. A Session-Sender MAY use SSID to identify a STAMP test session.
- If SSID is used, it MUST be present in each test packet of the given test session.
- An implementation of STAMP Session-Reflector that supports this specification SHOULD identify a STAMP Session using the SSID in combination with elements of the usual 4-tuple.
- A conforming implementation of STAMP Session-Reflector MUST copy the SSID value from the received test packet and put it into the reflected packet.

HMACTLV

- The STAMP authenticated mode protects the integrity of data collected in STAMP base packet.
- STAMP extensions are designed to provide valuable information about the condition of a network, and protecting the integrity of that data is also essential.
- The keyed Hashed Message Authentication Code (HMAC) TLV MUST be included in a STAMP test packet in the authenticated mode, excluding when the only TLV present is Extra Padding 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
 +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
 |            HMAC Type          |        Length = 16            |
 +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
 |                                                               |
 |                             HMAC                              |
 |                                                               |
 |                                                               |
 +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

- The HMAC TLV MUST follow all TLVs included in a STAMP test packet, except for the Extra Padding TLV.
- The HMAC TLV MAY be used to protect the integrity of STAMP extensions in STAMP unauthenticated mode.
- HMAC is calculated, as HMAC-SHA-256, over text as the concatenation of all preceding TLVs. The digest then MUST be truncated to 128 bits and written into the HMAC field.
- If HMAC verification by the Session-Reflector fails, then an ICMP Parameter Problem message MUST be generated (with consideration of limiting the rate of error messages). The Code value MUST be set to 0 and the Pointer identifying HMAC Type.
- Both Session-Sender and Session-Reflector SHOULD log the notification that HMAC verification of STAMP TLVs failed. The packet that failed HMAC verification MUST be dropped.

STAMP TLV Processing

- A system that has received a STAMP test packet with extension TLVs MUST validate each fixed-size TLV by verifying that the value in the Length field equals the value defined for the particular type.
- If the values are not equal, the processing of extension TLVs MUST be stopped and the event logged (logging SHOULD be throttled).
- If the system is the Session-Reflector in that test, it MUST send (transmission of ICMP Error messages SHOULD be throttled) the ICMP Parameter Problem message with Code set to 0 and the Pointer referring to the Length field of the TLV.

Next steps

- Comments are welcome
- Ready for the WGLC