Simple Two-Way Direct Loss Measurement Procedure

draft-gandhi-ippm-simple-direct-loss-01

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Agenda

- Requirements and Scope
- Summary
- Next Steps

Requirements and Scope

Requirements:

- Direct Loss Measurement (DLM) for accurate data packet loss
- Support Alternate-Marking Method (AMM) [RFC8321]
- High scale for number of sessions and faster packet loss detection interval
  - Support hardware-based counter update for P2P links/circuits

Goals:

- Avoid maintaining each test session on Session-Reflector
- Avoid control protocol for signaling dynamic parameters

Scope:

- Follow STAMP [RFC8762] approach

Alternate Marking Method for Packet Loss

- RFC 8321 - Alternate-Marking Method for Passive and Hybrid Performance Monitoring
- RFC 8957 - Synonymous Flow Label Framework

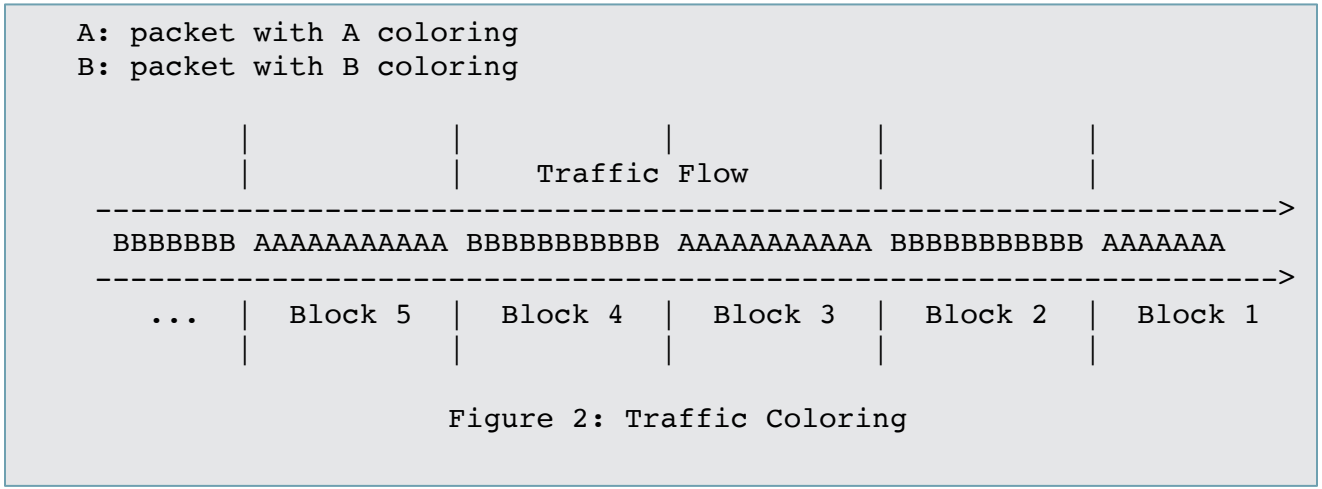


Figure 2: Traffic Coloring

Method 1: STAMP Test Packets with Direct Measurement TLV

Figure: STAMP Session-Sender Test Packet Format

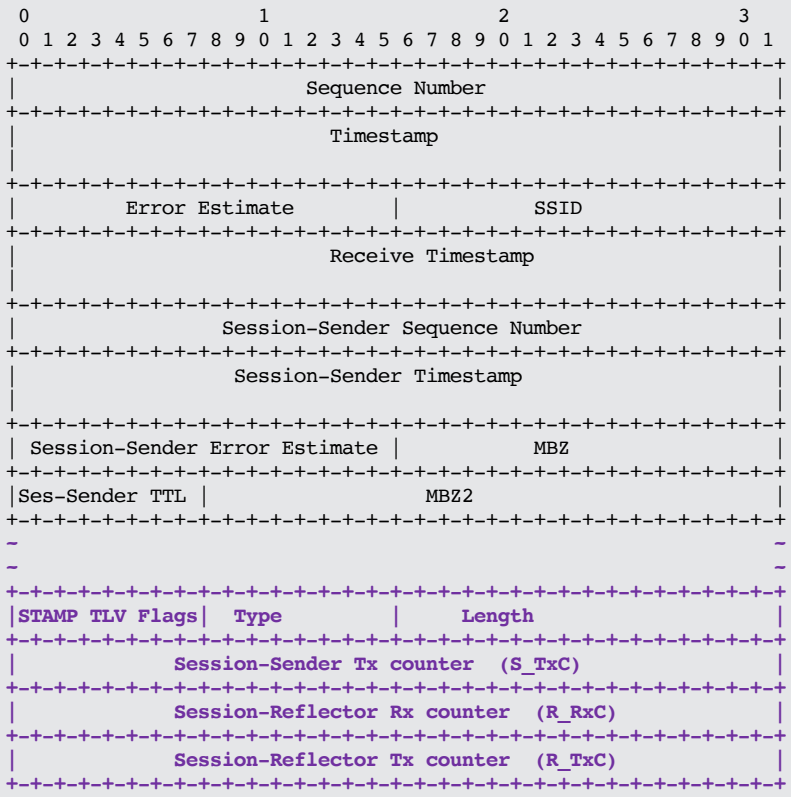


Figure: STAMP Session-Reflector Test Packet Format

Method 2: Direct Loss Measurement Probe Packet for Data Packet Loss Detection

- Base Direct Loss Measurement probe packet format defined
  - Hardware efficient counter updating
    - Well-known locations for traffic counters
  - Block number of the counters for alternate-marking method [RFC8321]
  - Traffic class of the counters for per class packet loss
  - 32-bit and 64-bit Packets and Bytes counters
- DLM probe packet format is also defined for authenticated mode
- User-configured destination UDP Port is used for identifying DLM probe packets (different than port 862 and the port used by STAMP)
- Sequence Number allows to monitor DLM session state, out of order probe packets and probe packet drops
- Flags
  - X set to 1 for 64-Bit Counter, set to 0 for 32-Bit Counter
  - B set to 1 for Byte Counter, set to 0 for Packet Counter
  - T set to 1 for Sender-DSCP scoped Counter

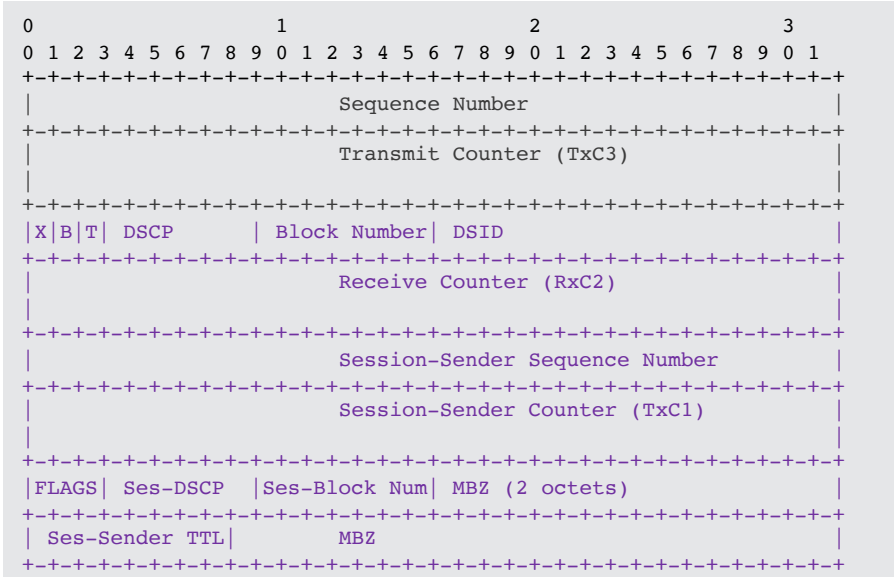
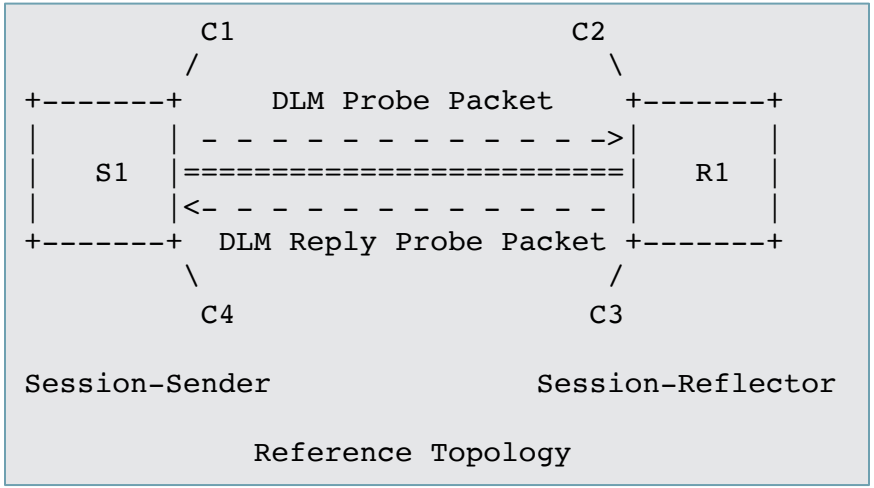


Figure: Session-Reflector Direct Loss Measurement Probe Packet

Direct Measurement TLV vs. Direct Loss Measurement Probe Packet

Attributes	Method 1: STAMP Direct Measurement TLV	Method 1a: Define New STAMP Direct Measurement TLV2?	Method 2: Direct Loss Measurement Probe Packet
Alternate-marking method packet loss - using block number for counters (out-of-order data packet support)	No	Yes	Yes
Counters: ▪ 32-bit and 64-bit Byte counters ▪ 64-bit packet counters ▪ Per Traffic Class Counters	No	Yes	Yes
Need to write timestamp (clock sync needed for one-way delay)	Yes	Yes	No
Counter at fixed location in the probe packet for hardware-based counter update in both directions (applicable to P2P links/circuits)	No (TLV-based)	No (TLV-based)	Yes

Data Packet Loss Calculation



- Using the Counters C1, C2, C3 and C4 as per reference topology, from the n^{th} and $(n-1)^{th}$ Direct Loss Measurement probe packets.
  - Transmit Loss TxL[n-1, n] = (C1[n] - C1[n-1]) - (C2[n] - C2[n-1])
  - Receive Loss RxL[n-1, n] = (C3[n] - C3[n-1]) - (C4[n] - C4[n-1])
- When using Alternate-Marking Method, all Counters used for the loss calculation belongs to the same Block Number, as described in Section 3.1 of [RFC8321].

Next Steps

- Welcome your comments and suggestions
- Requesting IPPM WG adoption
- Define New STAMP Direct Measurement TLV2?

Thank you