

# Simple Two-Way Direct Loss Measurement Procedure

*draft-gandhi-ippm-simple-direct-loss-00*

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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) [RFC 8321]
- High scale for number of sessions and faster packet loss detection interval
  - Support hardware implementation

## Goals:

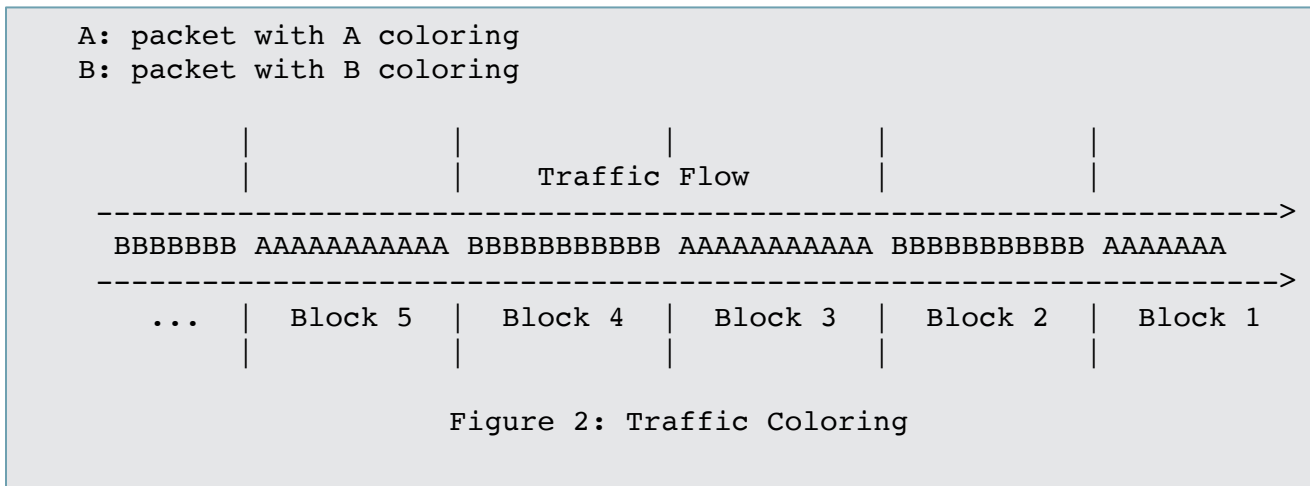
- Avoid provisioning and maintaining sessions on Session-Reflector
- Avoid control protocol for signaling dynamic parameters

## Scope:

- Follow STAMP [RFC 8762] approach

# Alternate Marking Method for Packet Loss

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



# Case 1. STAMP Test Packets with Direct Measurement TLV

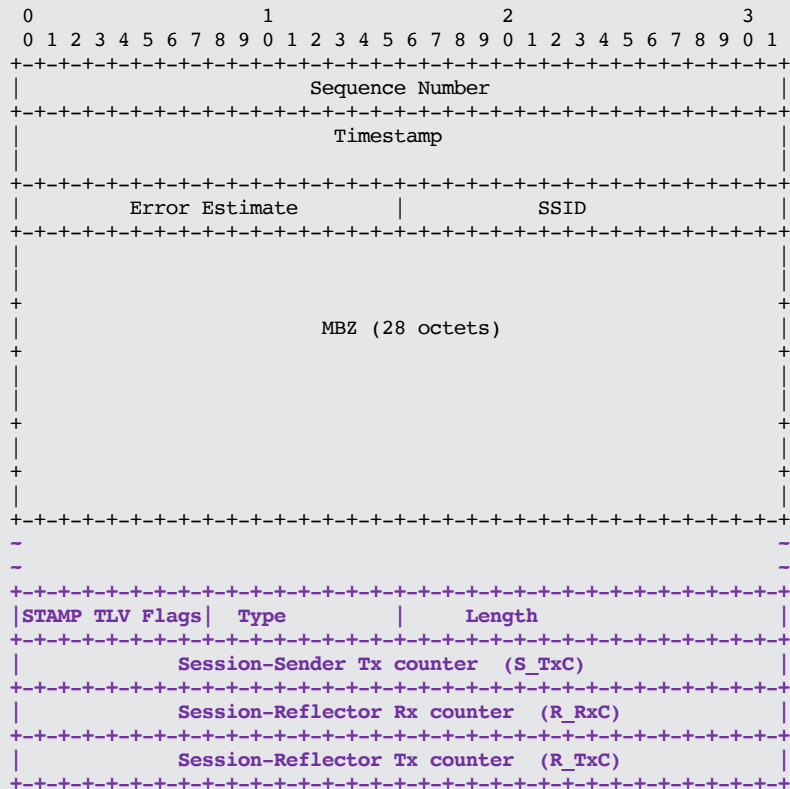


Figure: STAMP Session-Sender Test Packet Format



Figure: STAMP Session-Reflector Test Packet Format

## Case 2. Direct Loss Measurement Probe Packet for Data Packet Loss Detection

- Base Direct Loss Measurement probe packet defined
  - Hardware efficient counter updating
    - Well-known locations for traffic counters
  - Block number of the counters for alternate-marking method [RFC 8321]
  - Traffic class of the counters for per class packet loss
  - DLM probe packet is also defined for authenticated mode
- User-configured destination UDP Port is used for identifying DLM probe packets (different than port 862 and the one used by STAMP)
- Sequence Number allows to monitor DLM session status, 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

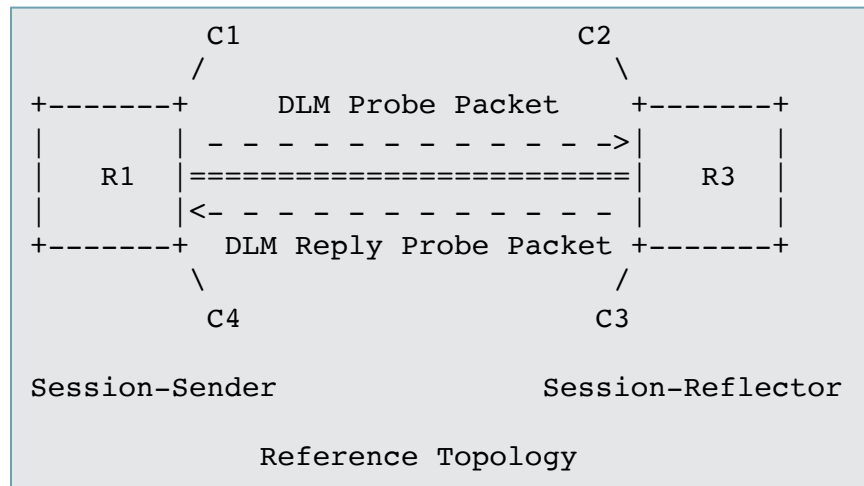


Figure: Session-Reflector Direct Loss Measurement Probe Packet

# Direct Measurement TLV vs. Direct Loss Measurement Probe Packet

Attributes	Case 1. STAMP Direct Measurement TLV	Case 1a. Define New STAMP Direct Measurement TLV?	Case 2. Direct Loss Measurement Probe Packet
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	No (TLV-based)	No (TLV-based)	Yes
Reply probe packets with counter at fixed location for hardware-based counter update	No	No	Yes
Need to scan for DM TLV in each received probe packet on Session-Reflector in hardware (there can be multiple TLVs)	Yes	Yes	No
32-bit and 64-bit Byte counters	No	Yes	Yes
64-bit packet counters	No	Yes	Yes
Alternate-marking method packet loss - using block number for counters (out-of-order data packet support)	No	Yes	Yes
Per Traffic Class Counters	No	Yes	Yes

# Data Packet Loss Calculation



- Using the Counters C1, C2, C3 and C4 as per reference topology, from the  $n^{\text{th}}$  and  $(n-1)^{\text{th}}$  Direct Loss Measurement probe packets.
  - Transmit Loss  $\text{TxL}[n-1, n] = (C1[n] - C1[n-1]) - (C2[n] - C2[n-1])$
  - Receive Loss  $\text{RxL}[n-1, n] = (C3[n] - C3[n-1]) - (C4[n] - C4[n-1])$
- 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 WG adoption

# Thank you