Loss and Delay Measurement in Transparent Interconnection of Lots of Links (TRILL)

draft-mizrahi-trill-loss-delay-00

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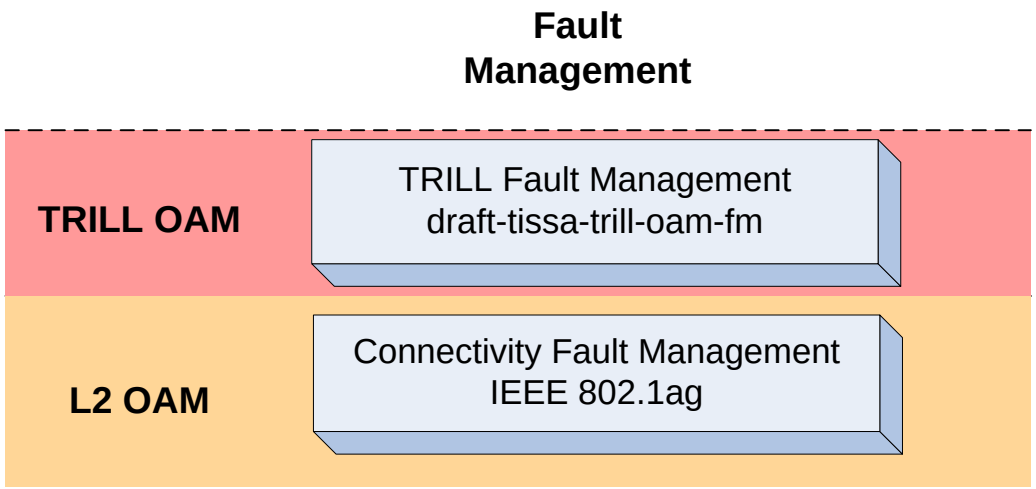
Performance Monitoring (PM)

- **One of the key aspects of OAM.**
- **Verify Service Level Agreement (SLA).**
- **Detect performance degradation and network anomalies.**

TRILL OAM


Fault
Management
TRILL OAM
TRILL Fault Management
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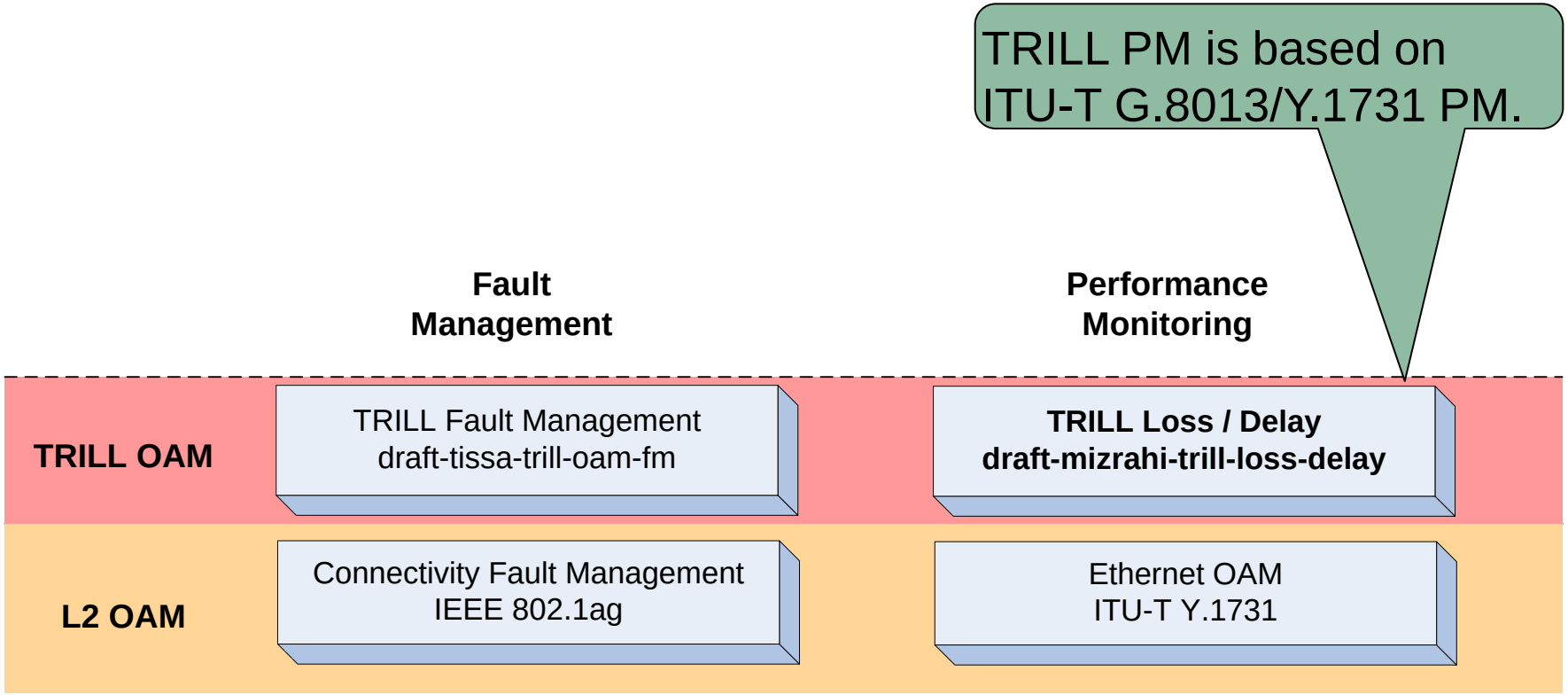
L2 OAM
Connectivity Fault Management
IEEE 802.1ag

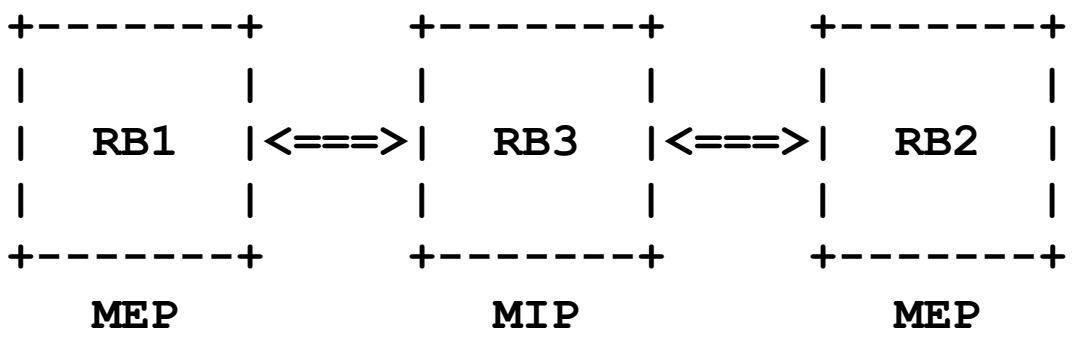
TRILL Loss / Delay



TRILL Loss / Delay - Overview

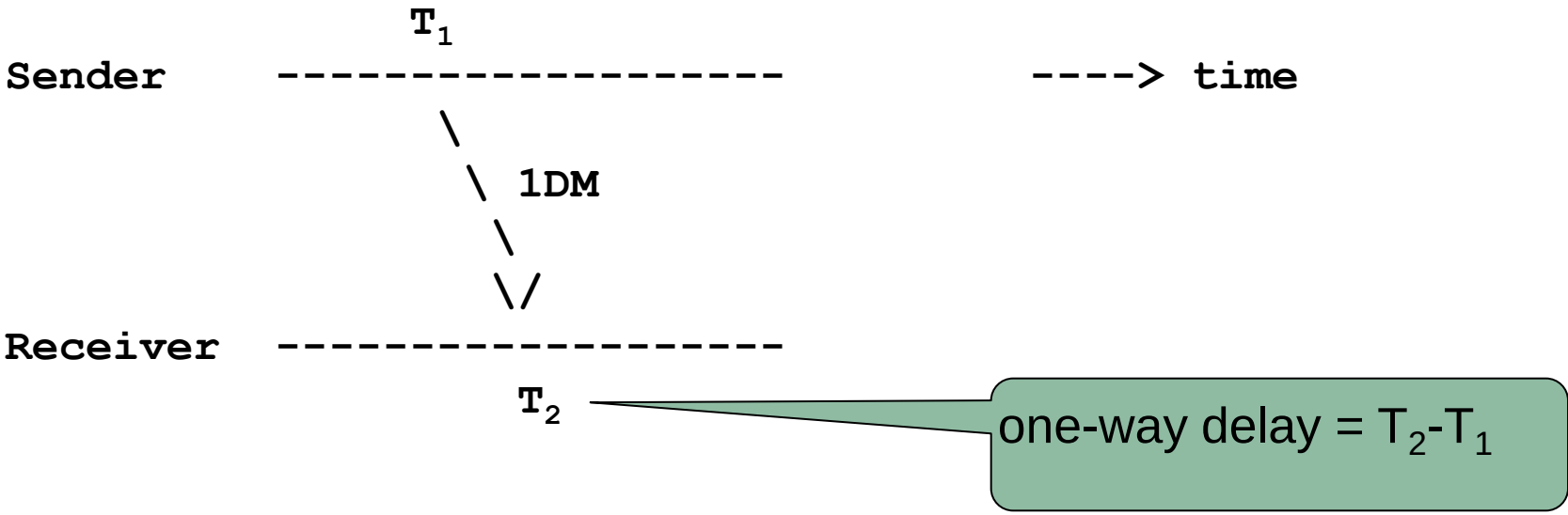
- **Loss Measurement (LM).**
  - Loss rate / Packet Delivery Rate (PDR).
  - Synthetic LM
  - One-Way LM (OWLM)
  - Two-Way LM (TWLM)
- **Delay Measurement (DM).**
  - Delay / delay variation (jitter).
  - One-Way DM (OWDM)
  - Two-Way DM (TWDM)

TRILL Loss / Delay – Overview (2)



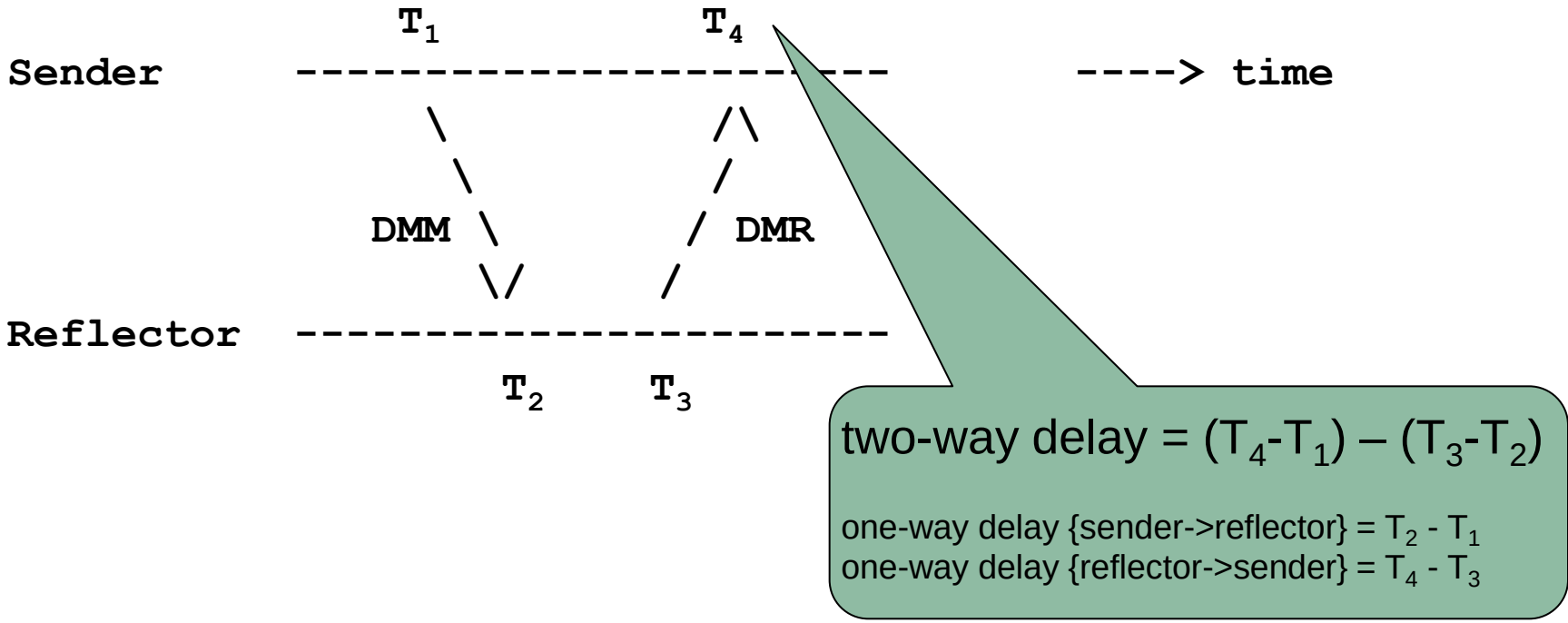
- **One-way / two-way.**
  - One-way: RB1 sends PM messages, RB2 monitors.
  - Two-way: RB1 sends PM messages, RB2 responds, RB1 monitors.
- **Proactive / on-demand.**
- **P2P / P2MP.**
- **Packet formats – identical to ITU-T G.8013/Y.1731.**

One-Way Delay Measurement (OWDM)



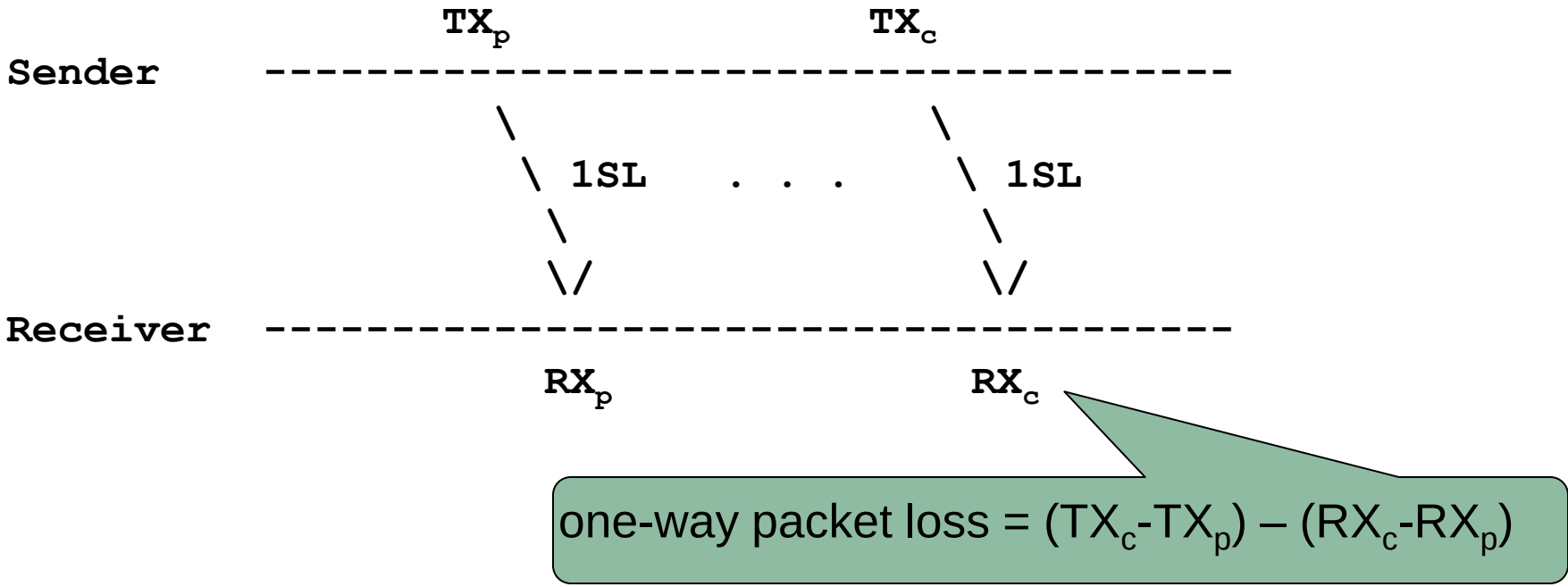
- **Receiver computes delay / delay variation.**
- **Typically proactive.**
- **Measuring delay requires time synchronization.**
  Measuring delay variation does not require synchronization.

Two-Way Delay Measurement (TWDM)



- **Sender computes delay / delay variation.**
- **On-demand**
  or
- **Proactive**

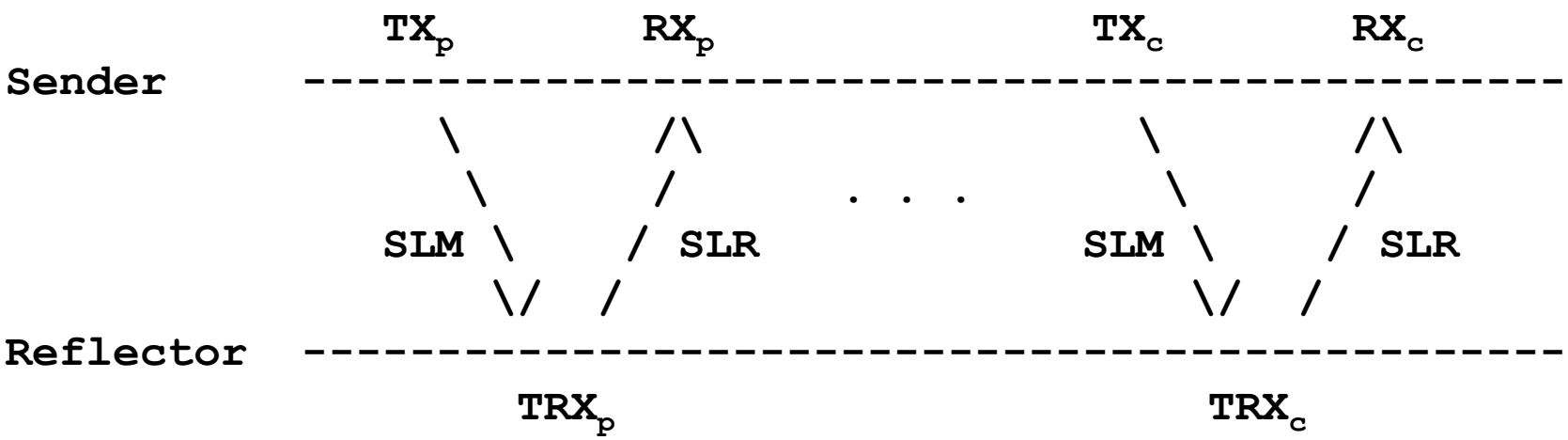
One-Way Loss Measurement (OWLM)



- **Measurement is based on a sequence of 1SL messages sent during a measurement interval.**
- **On-demand – sequence of messages is sent on-demand.**
  or
- **Proactive.**

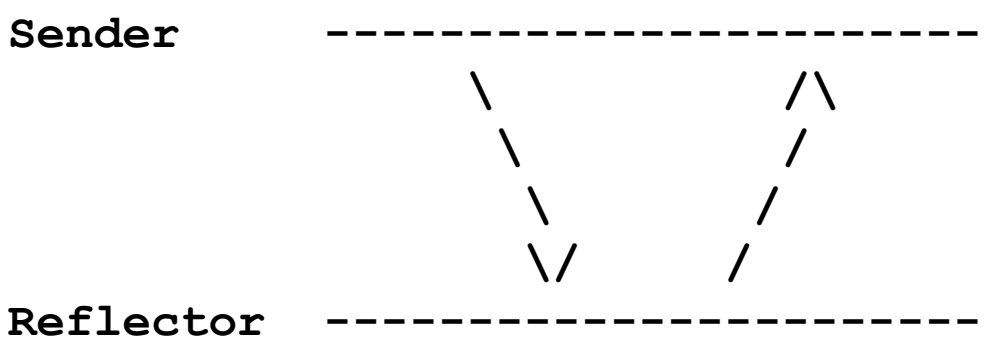
Two-Way Loss Measurement (TWLM)

far-end packet loss = $(TX_c\text{-}TX_p) – (TRX_c\text{-}TRX_p)$
near-end packet loss = $(TRX_c\text{-}TRX_p) – (RX_c\text{-}RX_p)$



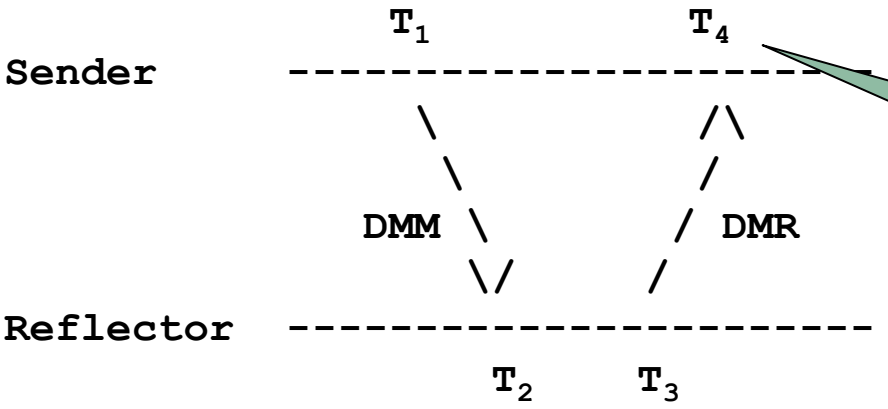
- **Sender computes packet loss ratio for each direction.**

Two-Way PM



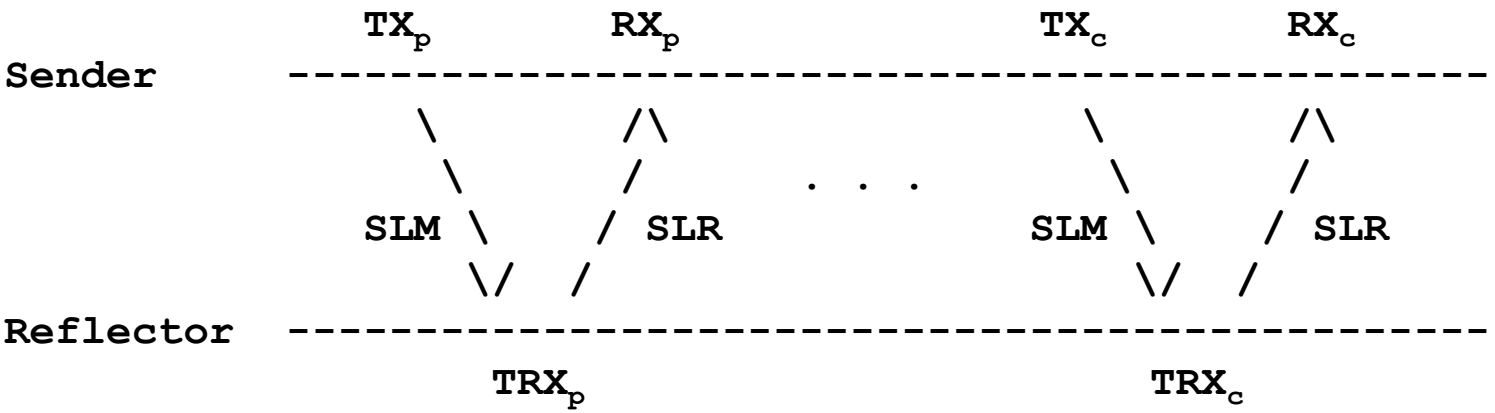
- **<u>Forward</u> and <u>reverse</u> directions may use:**
  - Different physical path.
  - Different <Flow Entropy>.
- **Current draft defines Reflector Entropy TLV:**
  - Allows sender to define the <Flow Entropy> for the response message.
- **Optionally: sender may ignore information about reverse path:**
  - Sender monitors only Sender->Reflector direction.

Using Two-Way PM for Forward Measurement



Sender->Reflector delay = T_2-T_1
(ignore T_3, T_4)

Sender->Reflector loss = (TX_c-TX_p) – (TRX_c-TRX_p)



Status of this Draft

- **February 2013 – draft 00.**

- **Next steps:**
  - **Fix some inconsistencies with Y.1731.**
  - **Deepak Kumar to join as a co-author.**

  - **More comments from WG.**
  - **Request WG adoption.**

Thanks

Why Synthetic Loss Measurement ?

- **TRILL: multipoint-to-multipoint connectivity.**
- **User packets can be delivered to more RBridges or more ports than are necessary (e.g. due to broadcast, un-pruned multicast or unknown unicast flooding).**
- **Loss Measurement using user data traffic requires a 1:1 relationship between the transmitter and receiver which correspond to the measurement endpoints.**
- **➔Current draft performs LM counting based on synthetic frames rather than user data frames.**

Why Synthetic Loss Measurement ?

- **Monitoring granularity:**
  - **Network OAM**
  - **Service OAM**
  - **Flow OAM**
- **➔Current draft performs LM counting based on synthetic frames rather than user data frames.**