Performance Measurement Using TWAMP Light for Segment Routing Networks

draft-gandhi-spring-twamp-srpm-09

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Agenda

- Requirements and Scope
- History of the Draft
- Updates Since IETF-106
- Summary
- Next Steps

Requirements and Scope

Requirements:

- Delay and Loss Performance Measurement (PM)
  - ✓ Links and End-to-end P2P/P2MP SR Paths
  - ✓ Applicable to SR-MPLS/SRv6 data planes
- No need to negotiate UDP port to bootstrap PM session - spirit of SR
  - ✓ Stateless on egress node - spirit of SR
- Handle ECMP for SR Paths
- Support stand-alone direct-mode loss measurement

Scope:

- RFC 5357 (TWAMP Light) defined probe messages
- User-configured IP/UDP path for probe messages

History of the Draft

- Feb 2019
  - Draft was published - *draft-gandhi-spring-twamp-srpm-00*
- Mar 2019
  - Presented *draft-gandhi-spring-twamp-srpm-00* at IETF 104 Prague in SPRING WG
- May 2019
  - Added STAMP TLV for Return Path
- July 2019
  - Presented *draft-gandhi-spring-twamp-srpm-01* at IETF 105 Montreal in IPPM WG
    - Slide 9 Titled - Applicability of STAMP – STAMP is supported
- Aug 2019
  - *draft-gandhi-spring-twamp-srpm-02* included stand-alone LM messages
- Nov 2019
  - SPRING Chairs announced in the meeting the agreement with IPPM chairs to progress the draft in SPRING WG
  - Presented *draft-gandhi-spring-twamp-srpm-04* at IETF 106 Singapore in SPRING WG
- Mar 2020
  - Moved STAMP support to *draft-gandhi--spring-**stamp**-srpm-00*
  - Keep TWAMP Light support as informational in *draft-gandhi-spring-**twamp**-srpm-08*

Updates Since IETF-106 (Version-04)

Updates:

1. Defined Control Code for “In-band Response Requested” for TWAMP Light
   - ✓ Updated Two-way mode procedure using the Control Code
2. Moved STAMP support to a new draft - *draft-gandhi-spring-stamp-srpm-00*
3. Informational draft - as TWAMP Light is informational, see Appendix I in RFC 5357 and Appendix A RFC 8545
4. Moved Loopback mode to a new draft - *draft-gandhi-spring-sr-enhanced-plm-00*
5. Various editorial changes

Open Items:

- None

TWAMP Light Control Code Field

For a Query: Sender Control Code

0x0: Out-of-band Response Requested.
This is also the default behavior.

0x1: In-band Response Requested.
Indicates that this query has been sent over a bidirectional path and the probe response is required over the same path in the reverse direction.
Also applicable to non-SR path.

For a Response: Reflector Control Code

0x1: Error - Invalid Message.
Indicates that the operation failed because the received query message could not be processed.
0xN: Additional Error will be defined in future

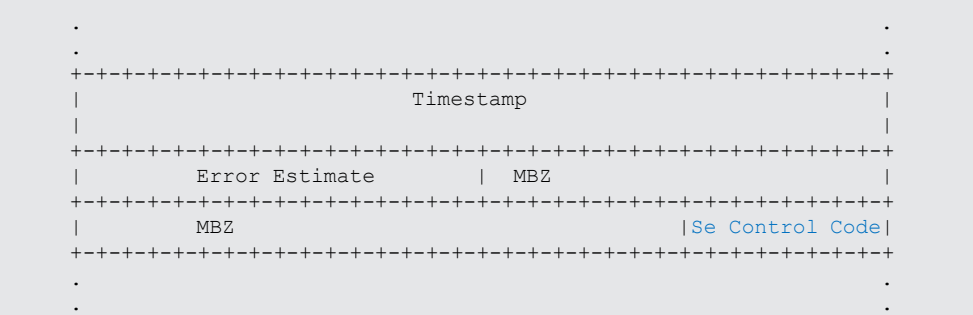


Figure: Control Code in TWAMP Light Query Message

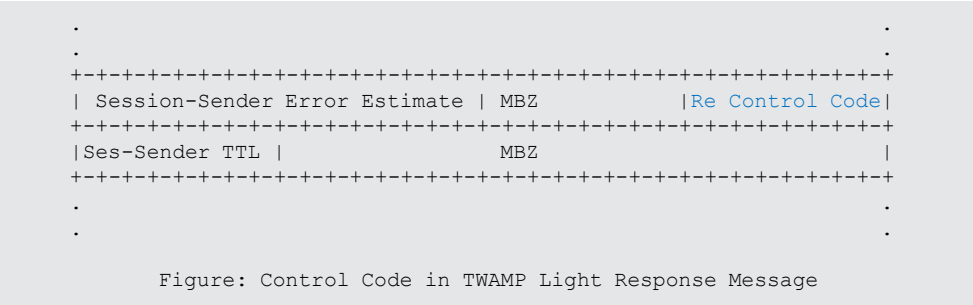


Figure: Control Code in TWAMP Light Response Message

Performance Measurement Modes

- One-way Measurement Mode
  - Reply sent “out of band” on IP/UDP path - default
- Two-way Measurement Mode
  - Reply sent “in-band” on reverse SR path
    - Based on Control Code from the probe query message

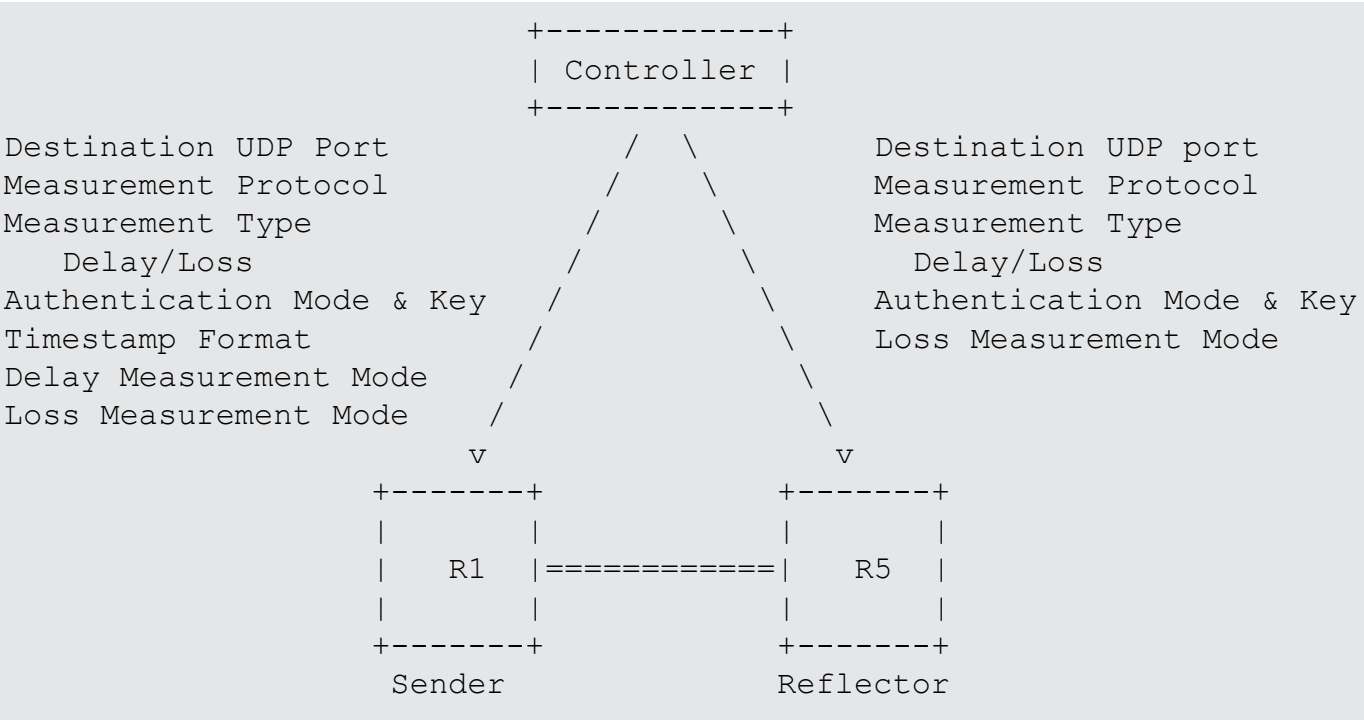
Next Steps

- Welcome your comments and suggestions
- Implementation exists
- In WG adoption (SPRING WG) queue
- Keep IPPM WG in the loop about the milestones

Thank you

Backup

Example Provisioning Model



Probe Query for Links

- User-configured destination UDP **port1** is used for DM probe messages and **port2** is used for LM probe messages, both in unauthenticated mode.

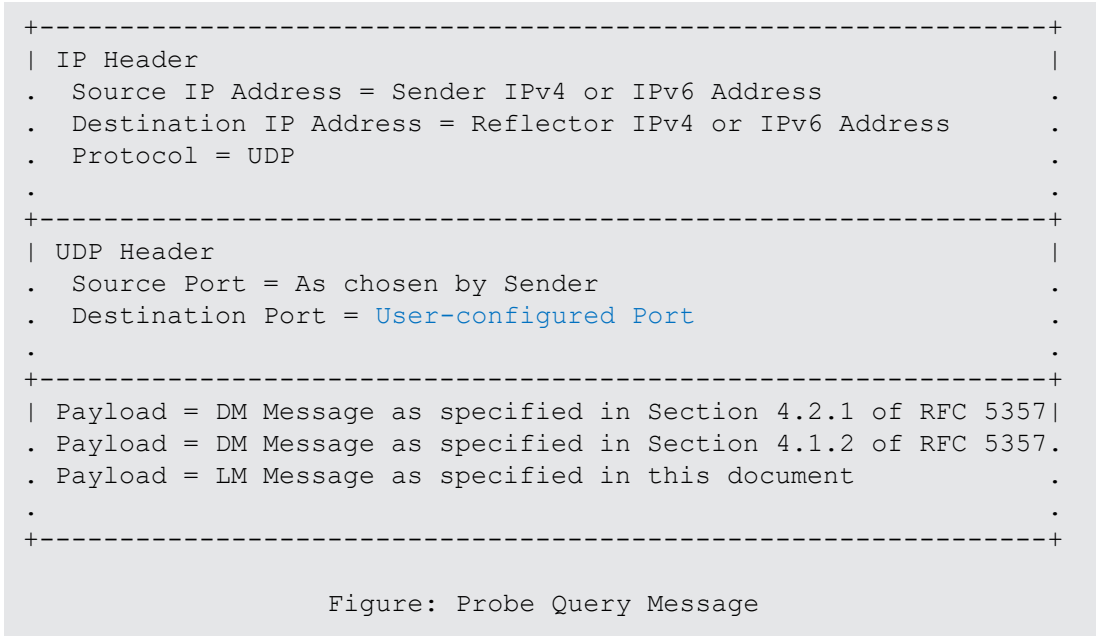


Figure: Probe Query Message

Probe Query for SR-MPLS and SRv6 Policy

For **end-to-end** performance delay/loss measurement of SR Policy, the probe query message is sent on the SR Policy with:

1. MPLS label stack for SR-MPLS Policy
2. SRv6 SRH [RFC 8754] with Segment List for SRv6 Policy

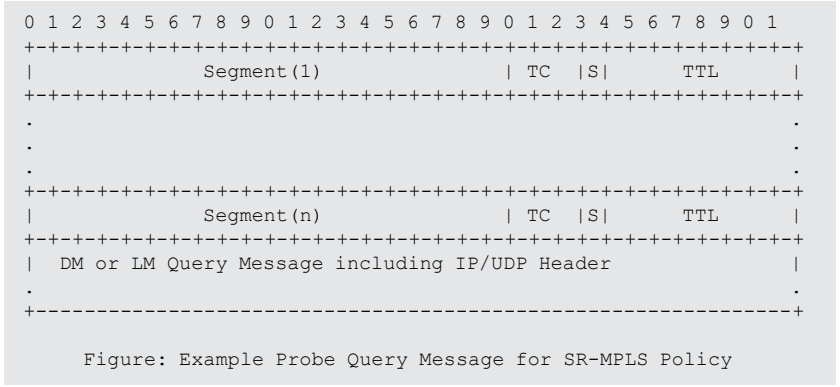


Figure: Example Probe Query Message for SR-MPLS Policy

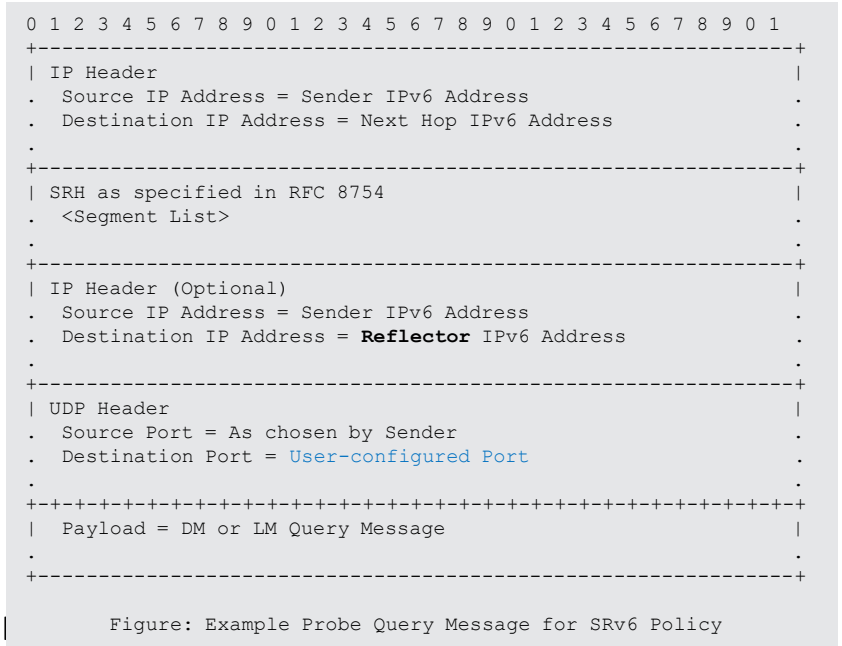


Figure: Example Probe Query Message for SRv6 Policy

Probe Response Message

- The probe response message is sent using the IP/UDP information from the probe query message.

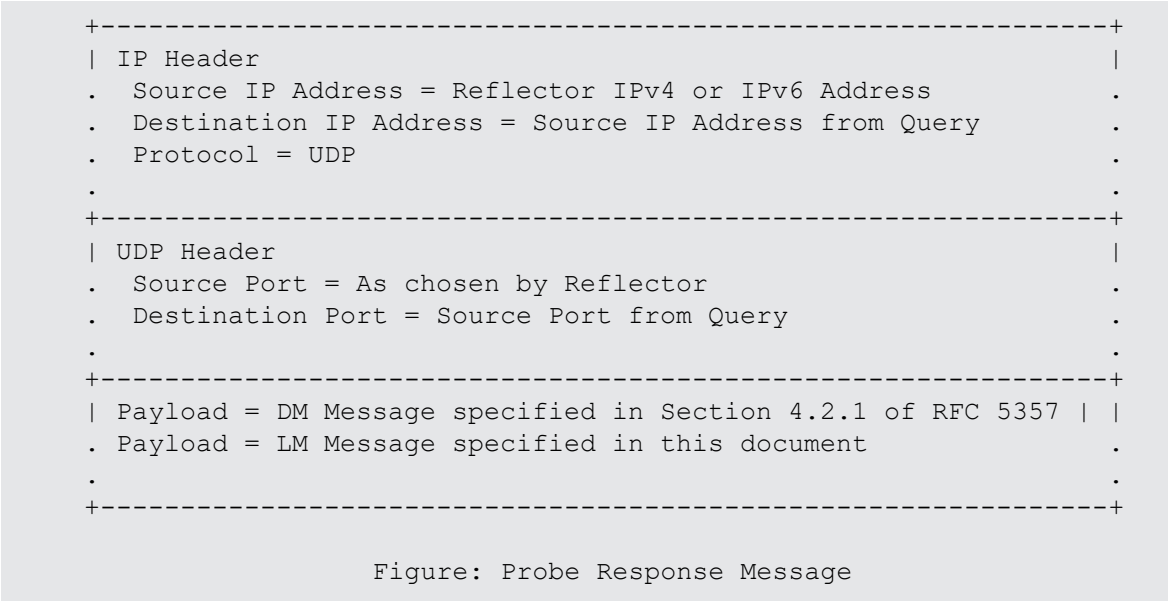
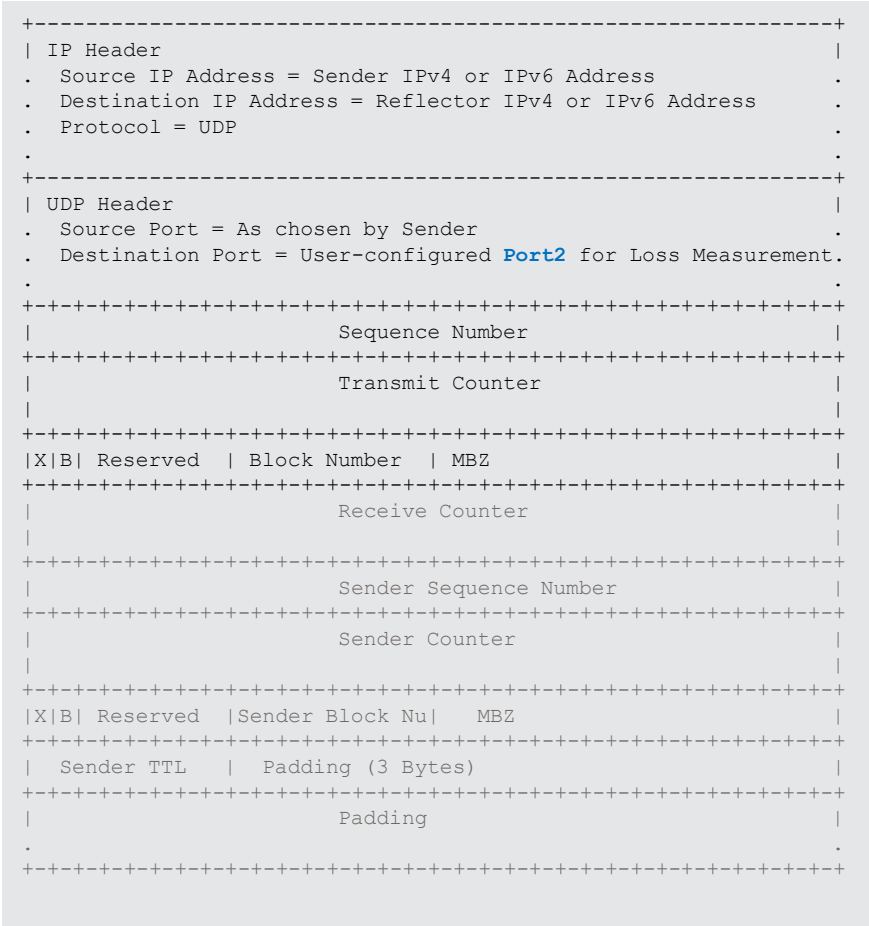


Figure: Probe Response Message

Stand-alone LM Message Format for TWAMP Light

- Loss Measurement (LM) message defined
  - Hardware efficient counter-stamping
    - Well-known locations for transmit and receive traffic counters
  - Stand-alone LM message, not tied to DM
- LM message format is also defined for authenticated mode
- User-configured destination UDP **Port2** is used for identifying LM probe packets
- Does not modify existing TWAMP Light (which is for DM) procedure as different UDP destination **Port2** is used for LM



ECMP Support for SR Path

- SR Path can have ECMP between the ingress and transit nodes, between transit nodes and between transit and egress nodes.
- Sending PM probe queries that can take advantage of the hashing function in forwarding plane.
- Existing forwarding mechanisms are applicable to PM probe messages. Examples are:
  - For IPv4
    - Sweeping destination address in IPv4 header (e.g. 127/8)
  - For IPv6
    - Sweeping flow label in IPv6 header

Thank you