Performance Measurement Using RFC 6374 with UDP Path for Segment Routing Networks

draft-gandhi-spring-rfc6374-srpm-udp-05

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Agenda

- Requirements and Scope
- History of the Draft
- Updates Since IETF-104
- Summary
- Next Steps

Requirements and Scope

Requirements:

- Delay and Loss Performance Measurement (PM)
  - ✓ Links and End-to-end P2P/ P2MP SR Paths
    - ✓ Links include physical, virtual, LAG (bundle), LAG member, numbered/unnumbered links
  - ✓ Applicable to SR-MPLS/SRv6 data planes
- No need to signal to PM parameters - spirit of SR
  - ✓ Stateless on egress node - spirit of SR
  - ✓ State is in the probe message
- Handle ECMP for SR Paths

Scope:

- Use RFC 6374 defined probe message formats
- Use RFC 7876 (IP/UDP OOB return path) defined probe response messages
- **User defined** IP/UDP path for PM probe messages

History of the Draft

- Mar 2018
  - Draft was published *draft-gandhi-spring-udp-pm-00*
- July 2018
  - Presented *draft-gandhi-spring-udp-pm-01* at IETF 102 Montreal in SPRING WG
- Nov 2018
  - Presented *draft-gandhi-spring-udp-pm-02* at IETF 103 Bangkok in SPRING and IPPM WGs
- Feb 14, 2019
  - Draft was renamed to *draft-gandhi-spring-rfc6374-srpm-udp-00*
- Mar 2019
  - Presented *draft-gandhi-spring-rfc6374-srpm-udp-00* at IETF 104 Prague in SPRING WG

Updates Since IETF-104 (Revision-00)

Updates:

- ✓ Add loopback measurement mode
- ✓ Reference for probe message processing rules
  - ✓ TTL value, UDP Checksum and Router Alert
- ✓ Reference for example provisioning model
- ✓ Align with draft-gandhi-mpls-rfc6374-sr
  - ✓ Return Path TLVs for SR
- ✓ Various editorial changes to address review comments

Open Items:

- None

Next Steps

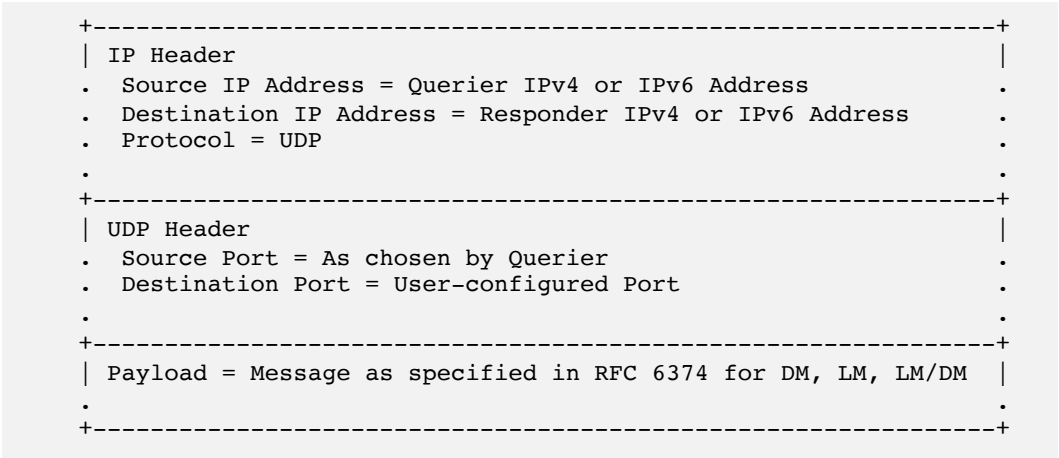
- Welcome your comments and suggestions
- Like to request for WG adoption

Thank you

Backup

Probe Query Messages

- IP/UDP path is defined for PM probe query messages for delay and loss measurements for SR links and end-to-end P2P and P2MP SR Paths.
- Payload contains [RFC6374] defined message for DM or LM or Combined LM/DM.
- User-configured UDP **port1** is used for identifying DM probe packets.
- User-configured UDP **port2** is used for identifying LM probe packets.
- User-configured UDP **port3** is used for identifying Combined LM/DM probe packets.



Probe Query for SR-MPLS and SRv6 Policy

For performance delay/loss measurement of end-to-end SR Policy, the probe query messages are sent on the SR Policy path with:

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

User-configured destination UDP **port1** is used for DM probe messages and **port2** is used for LM probe messages (unauthenticated mode) – same as Links.

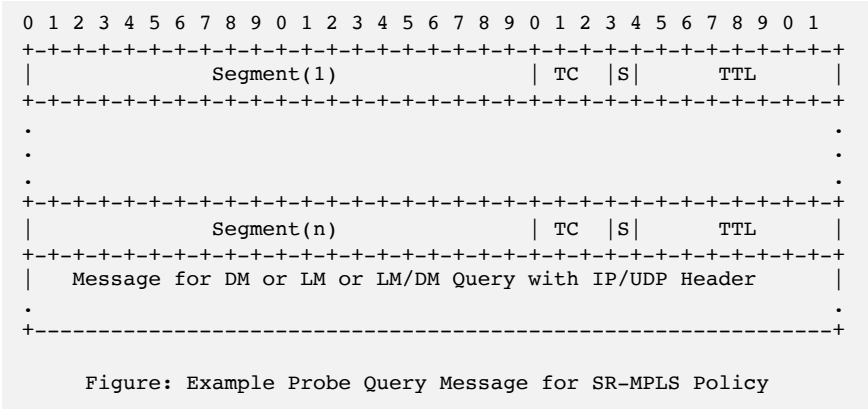
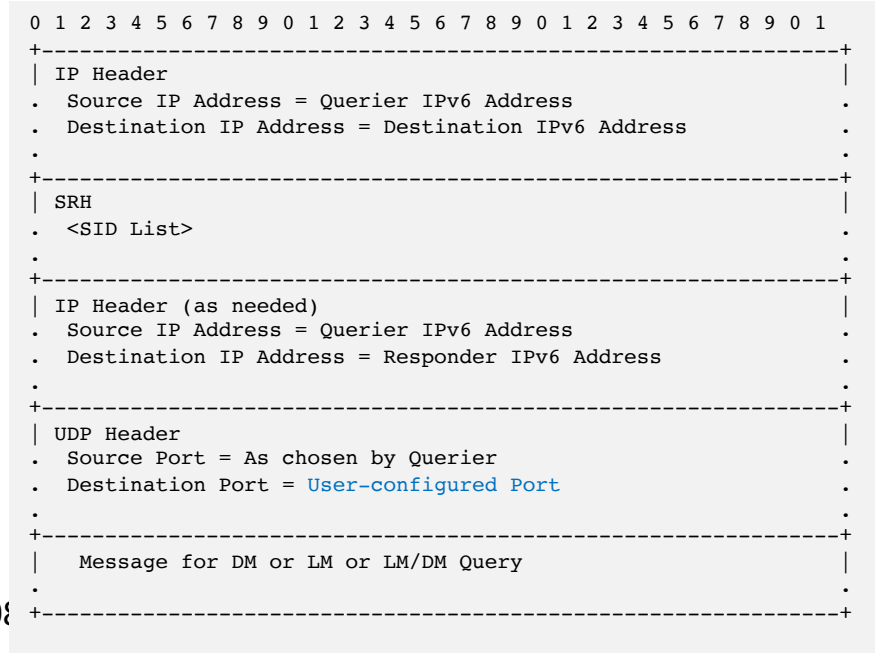


Figure: Example Probe Query Message for SR-MPLS Policy



Probe Response Messages

- Probe response messages can be sent in-band (two-way measurement) or out-of-band (one-way measurement) for SR links and SR Policies.
- Use the information from the UDP Return Object (URO) TLV [RFC7876] from the received Probe query message payload, otherwise use the IP/UDP information (Source IP Address and Source UDP port) from the received Probe query message header.

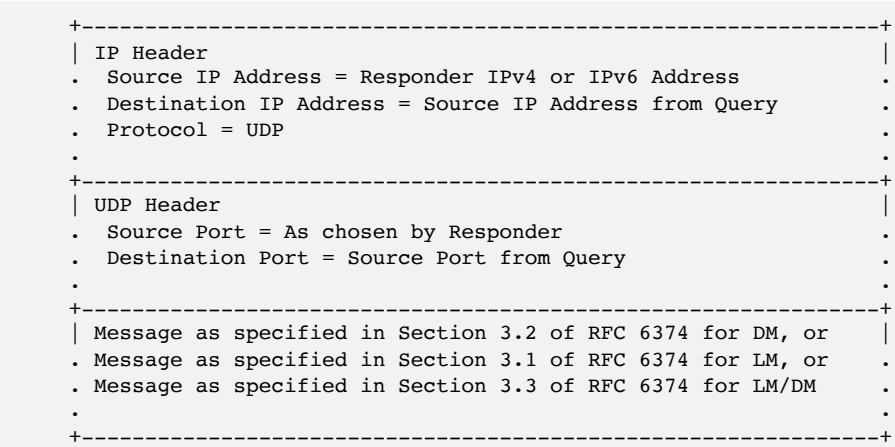


Figure: Probe Response Message

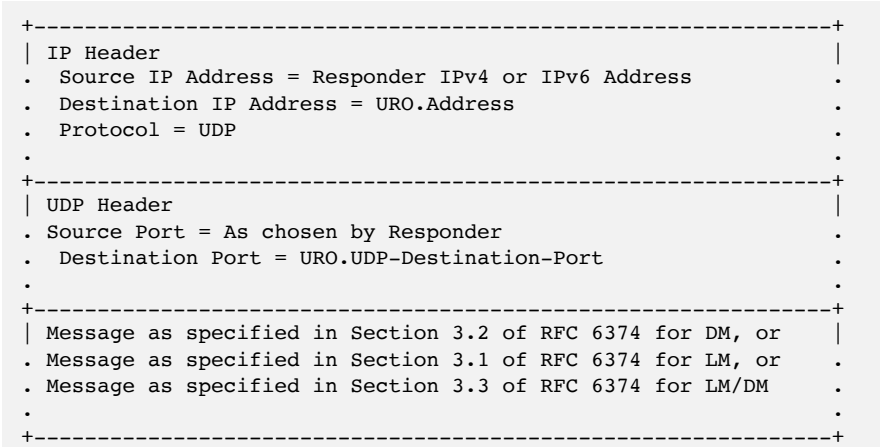


Figure: Probe Response Message Using URO from Probe Query

Return Path TLV for Two-way Measurement

Sub-TLV Types:

- Type (value TBA1): SRv6 Segment List of the Reverse Path
- Type (value TBA2): SRv6 Binding SID [draft-ietf-pce-binding-label-sid] of the Reverse SR Policy

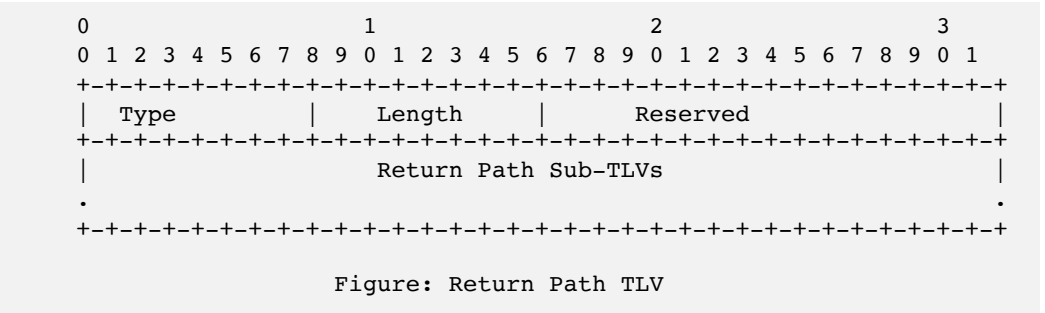


Figure: Return Path TLV

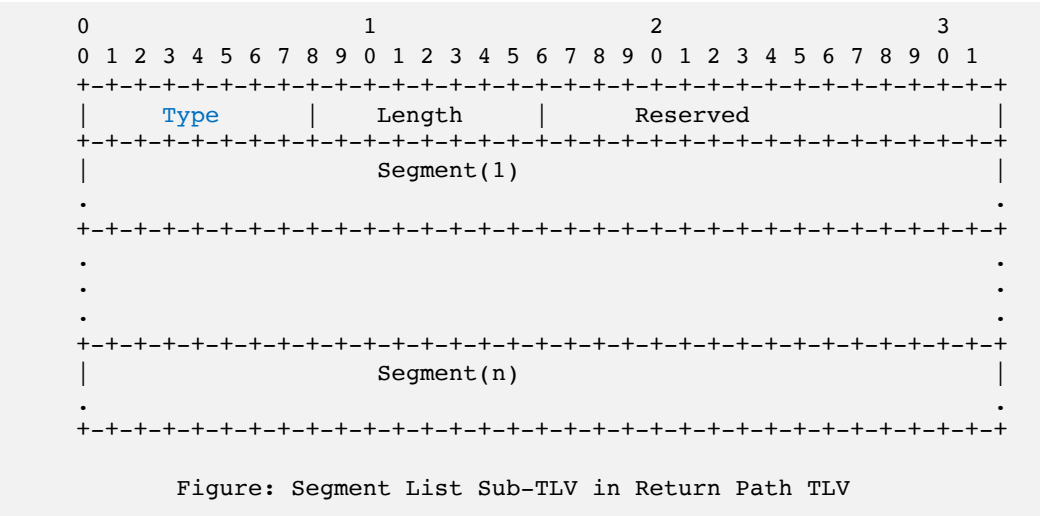


Figure: Segment List Sub-TLV in Return Path TLV

Authenticated Mode

- Define Sequence Number TLV for Probe Query and Response messages.
- Useful when some probe query messages are lost, or they arrive out of order.
- Used for authentication of probe messages.

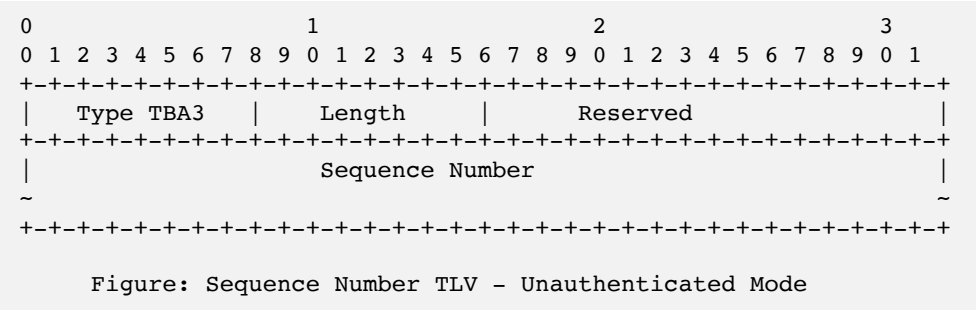


Figure: Sequence Number TLV - Unauthenticated Mode

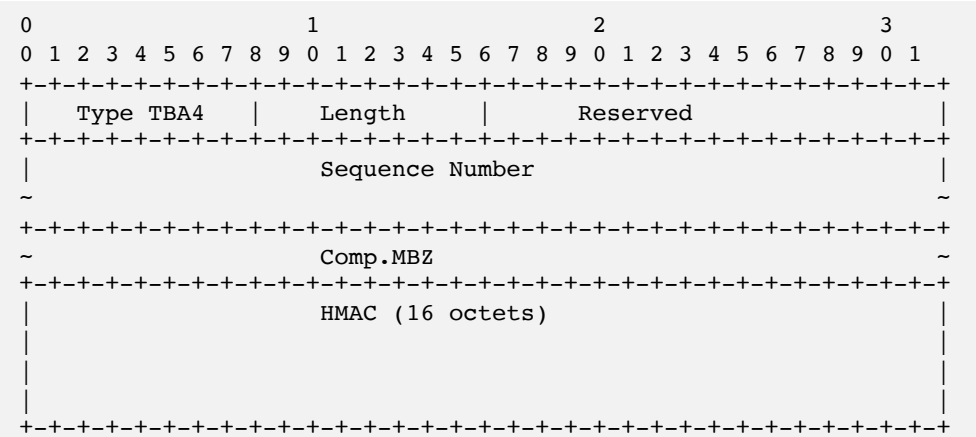


Figure: Sequence Number TLV - Authenticated Mode

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 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