UDP Path for In-band Performance Measurement for Segment Routing Networks

draft-gandhi-spring-udp-pm-02

Rakesh Gandhi - Cisco Systems (rgandhi@cisco.com) - Presenter
Clarence Filsfils - Cisco Systems (cfilsfil@cisco.com)
Daniel Voyer - Bell Canada (daniel.voyer@bell.ca)
Stefano Salsano - Universita di Roma "Tor Vergata" (stefano.salsano@uniroma2.it)
Pier Luigi Ventre - CNIT (pierluigi.ventre@cnit.it)
Mach Chen - Huawei (mach.chen@huawei.com)

Sagar Soni - Cisco Systems (sagsoni@cisco.com)
Patrick Khordoc - Cisco Systems (pkhordoc@cisco.com)
Zafar Ali - Cisco Systems (zali@cisco.com)
Daniel Bernier - Bell Canada (daniel.bernier@bell.ca)
Dirk Steinberg - Steinberg Consulting (dws@dirksteinberg.de)

103rd IETF @ Bangkok

Agenda

- Requirements and Scope
- Probe Query Message
- Probe Response Message
- Return Path, Sequence Number and Block Number TLVs
- ECMP Support
- Next Steps

Requirements and Scope

Requirements:

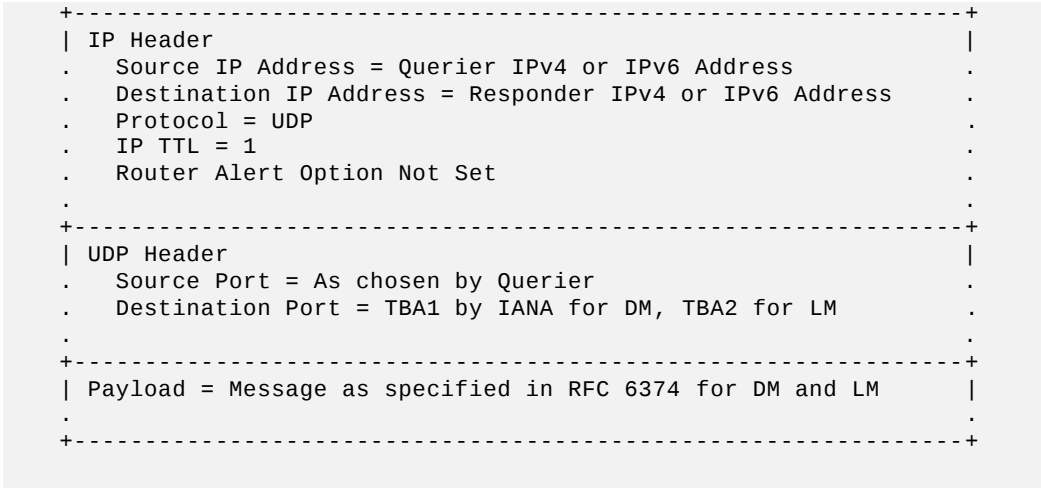
- Delay and Loss Performance Measurement (PM) for SR links and end-to-end P2P and P2MP SR Policies
- Applicable to SR-MPLS/SRv6 data planes
- No need to bootstrap PM session (e.g., to negotiate UDP port) - spirit of SR
- Stateless on egress node - spirit of SR
- One-way and two-way measurements
- Handle ECMP for SR Policies

Scope:

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

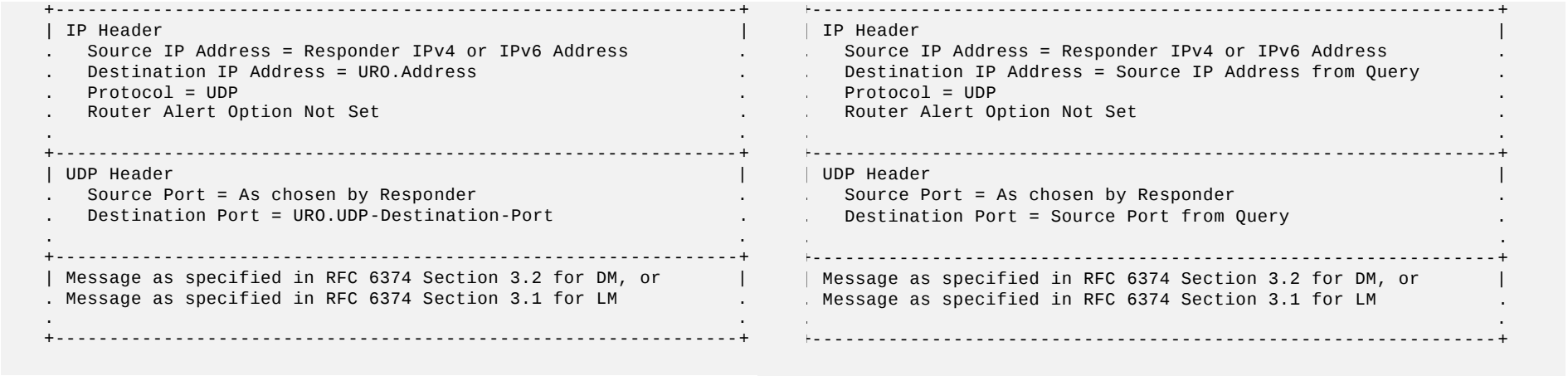
Probe Query Messages

- 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 Policies.
- For **end-to-end** performance measurement, the probe query messages are sent in-band with MPLS label stack SR-MPLS Policies and SRv6 SRH with SID list for SRv6 Policies.
- Payload contains [RFC6374] defined message for DM or LM.
- UDP port IANA-TBA1 is used for identifying DM probe packets.
- UDP port IANA-TBD2 is used for identifying LM probe packets.



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.



Return Path TLV

- For two-way end-to-end performance measurement of SR Policies, the responder node needs to send the probe response messages in-band on a specific reverse SR path.
- Querier node can request the responder node to send the probe response messages back on a given reverse path (e.g. co-routed path) by adding a Return Path Segment List (RPSL) TLV in the probe query messages.

- TBA3: SR-MPLS RPSL
- TBA4: SRv6 RPSL
- TBA5: SR-MPLS BSID
- TBA6: SRv6 BSID

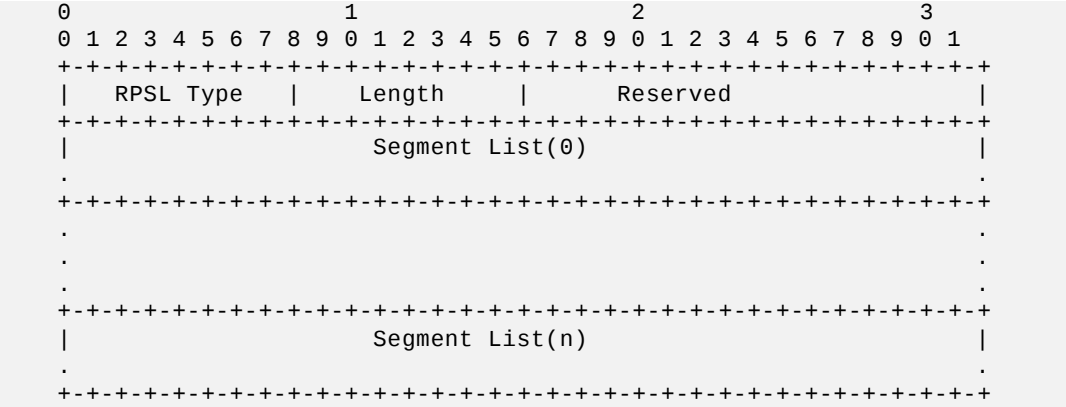


Figure 7: Return Path Segment List TLV

Sequence Number TLV

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

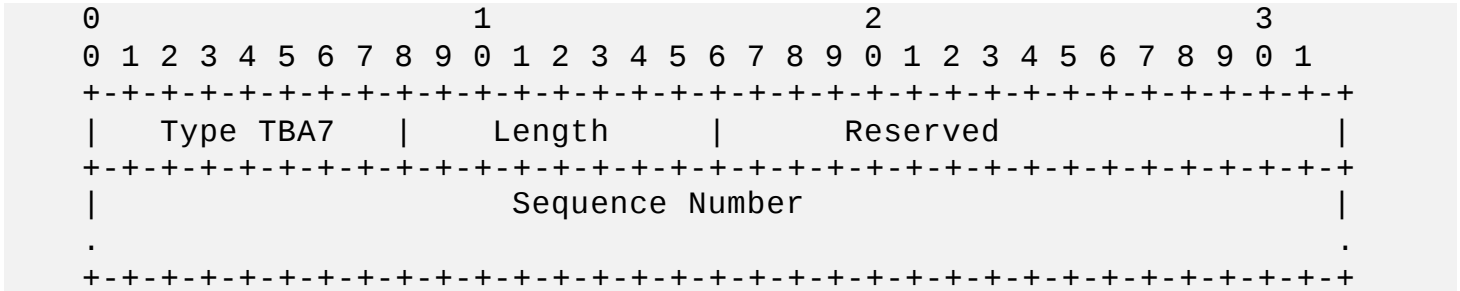


Figure 10: Sequence Number TLV

Block Number TLV

- Define Block Number TLV for Probe Query and Response messages.
- [RFC8321] requires to identify the Block Number (color) of the traffic counters carried by the probe query and response messages.

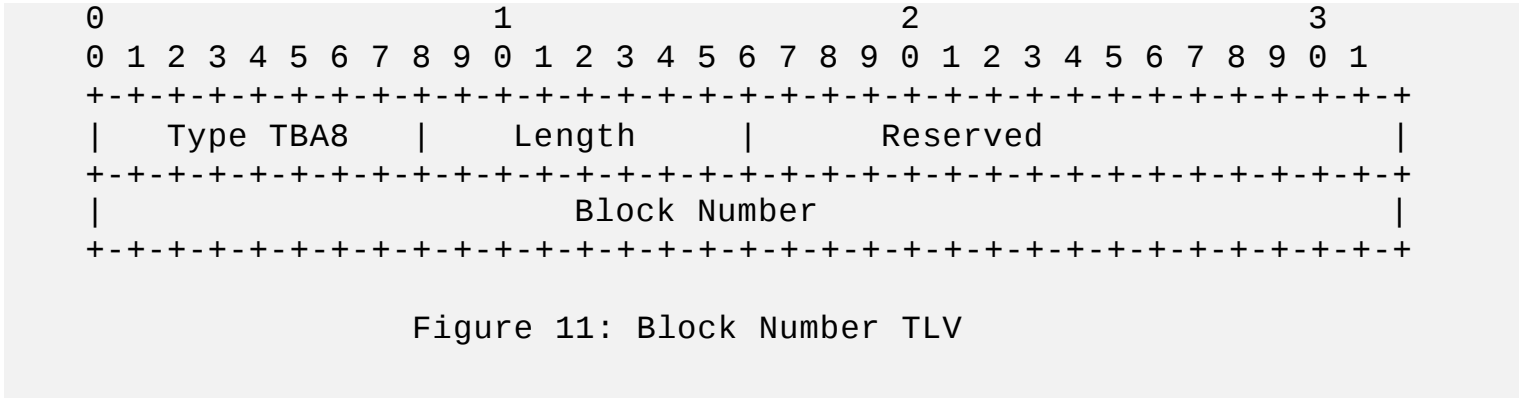


Figure 11: Block Number TLV

ECMP Support

- SR Policy can have ECMP between the ingress and transit nodes, between transit no des and between transit and egress nodes.
- Sending PM probe queries that can take advantage of the hashing function in forwar ding plane.
- Existing forwarding mechanisms are applicable to PM probe messages:
  - For IPv4 and IPv6
    - Different Destination/Source Addresses or Source UDP ports in IP/UDP head er.
  - For SR-MPLS
    - Entropy label.
  - For SRv6
    - Flow Label in SRH.

Next Steps

- Welcome your comments and suggestions
- Implementations of building blocks already exist (e.g. RFC6374, IP/UDP paths for probes as in RFC 7876)
- Request for WG adoption

Thank you.