

Performance Measurement for Segment Routing Networks with MPLS Data Plane

draft-gandhi-mpls-rfc6374-sr-00

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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) for SR links and end-to-end P2P/ P2MP SR Policies
- Delay and Loss extended TE link metrics advertisement in the network
- One-way, two-way and loopback measurement modes

Scope:

- Segment Routing (SR) with MPLS data plane
- RFC 6374 for probe messages
- RFC 7876 (UDP return path) for probe response messages

History of the Draft

- Feb 14, 2018
 - Draft was first published *draft-gandhi-spring-sr-mpls-pm*
- July 2018
 - Draft was introduced at IETF 102 Montreal in SPRING WG
- Nov 2018
 - Presented revision-03 at IETF 103 Bangkok in SPRING and IPPM WGs
- Feb 14, 2019
 - Draft was renamed to *draft-gandhi-spring-rfc6374-srpm-mpls*
- Mar 2019
 - Presented revision-00 at IETF 104 Prague in SPRING WG
- Oct 2019
 - Chairs agreed to progress the work in MPLS WG
 - Draft renamed to *draft-gandhi-mpls-rfc6374-sr*

Updates Since IETF-104

Updates:

- ✓ Added Return Path TLV for two-way measurement
- ✓ Added block number TLV for loss measurement
- ✓ Draft is “Standards Track” due to IANA actions
- ✓ Added loopback measurement mode
- ✓ Added details for P2MP SR Policy
- ✓ Added handling for SR Policy ECMP
- ✓ Various editorial changes to address review comments

Open Items:

- None

PM Probes for SR Links

- For SR links, the PM probe query messages for link delay and packet loss measurements are sent using MPLS GAL/GAch header as defined in [RFC6374].

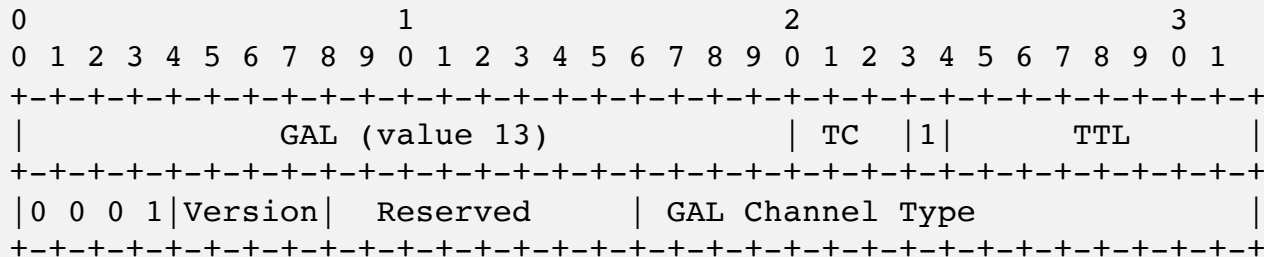


Figure 3: Probe Packet Header for an SR-MPLS Link

SR Link Extended TE Metrics Advertisement

- Measure delay and loss performance of SR Links.
- Compute SR Link Delay metrics (minimum-delay, maximum-delay, average-delay, delay-variance) and SR Link Packet Loss metric.
- SR link extended TE metrics advertised in the network using the TLVs defined in the following RFCs/Drafts:
 - OSPF [RFC7471]
 - ISIS [RFC7810] [RFC8570]
 - BGP-LS [RFC8571]

PM Probes for SR Policy

- For end-to-end measurement of SR Policy, the PM probe query messages for delay and loss measurements are sent on the congruent path with data traffic using MPLS GAL/GAch header as defined in [RFC6374] and SR-MPLS label stack of the SR Policy.

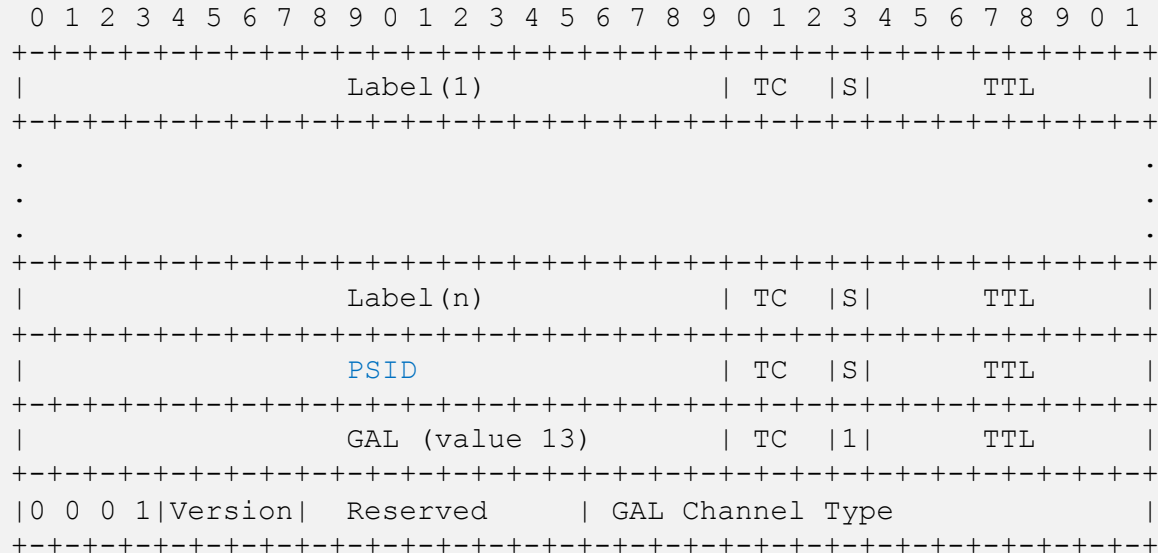


Figure 2: Probe Packet Header for an End-to-end SR-MPLS Policy

Measurement Modes for SR Policy

- One-way Measurement Mode
 - Reply sent out of band IP/UDP path using RFC 7876 mechanisms
- Two-way Measurement Mode
 - Reply sent using Return Path TLV from the probe query message
- Loopback Measurement Mode
 - Probe message carries the return path label stack in the header of the packet

Return Path TLV for Two-way Measurement

- **Type** (value 1): Respond back on Incoming Interface (Layer-3 and Layer-2) (Segment List is Empty)
- **Type** (value 2): SR-MPLS Segment List (Label Stack) of the Reverse SR Path
- **Type** (value 3): SR-MPLS Binding SID [draft-ietf-pce-binding-label-sid] of the Reverse SR Policy

Case 1: Reply on the same bundle member as query

Case 2: Reply on congruent return SR path of a bidirectional SR Policy

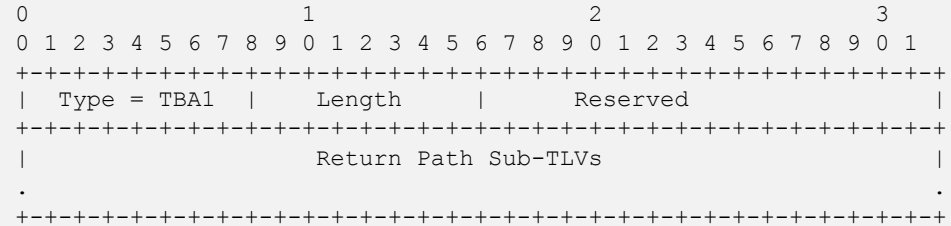


Figure 7A: Return Path TLV

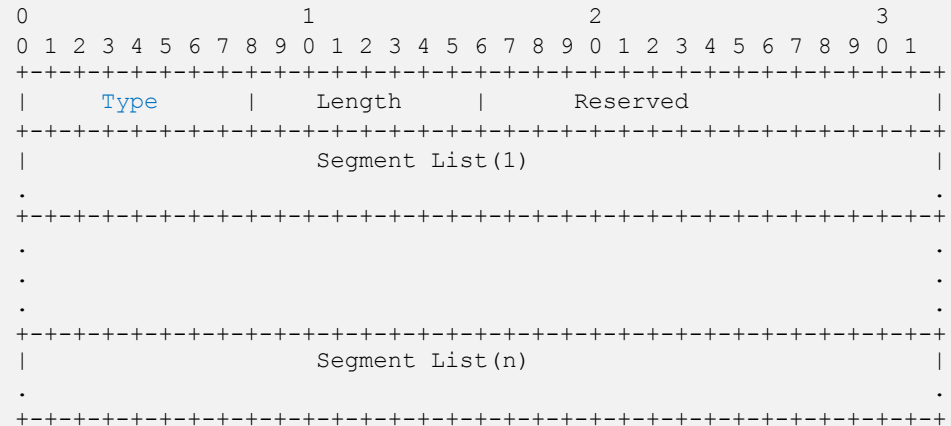


Figure 7B: Segment List Sub-TLV in Return Path TLV

Block Number TLV for Loss Measurement

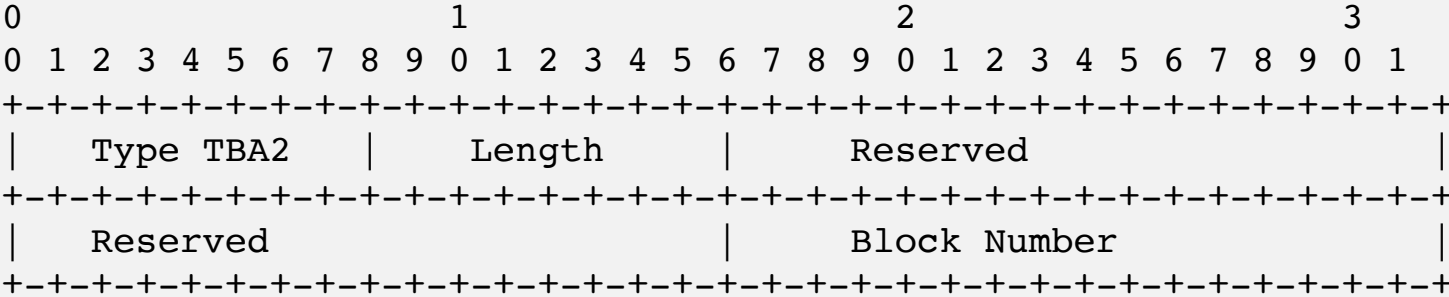


Figure 5: Block Number TLV

PM Probes for P2MP SR Policy

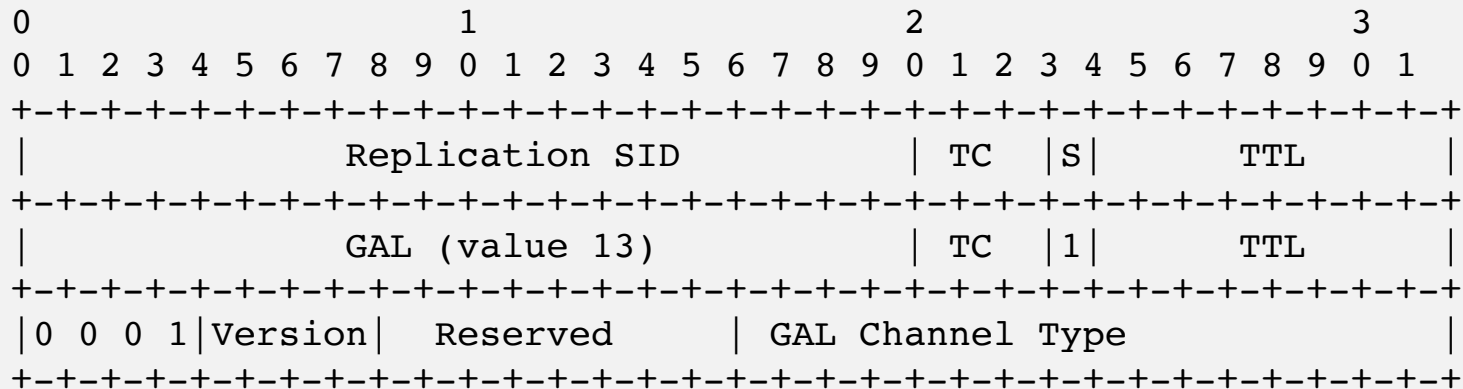


Figure 6: P2MP SR-MPLS Policy

Next Steps

- Welcome your comments and suggestions
- RFC 6374 has been implemented deployed in many networks
- Ready for WG adoption in MPLS WG
 - IANA code-points allocated by MPLS WG
 - Keep SPRING WG in the loop for SR aspects
 - Post draft updates to SPRING mailing list as well
 - Inform SPRING WG about the milestones (adoption, Last Call)
 - From Bruno:
 - please keep SPRING in the loop for the SPRING specific content

Thank you