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
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].
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.

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

106th IETF @ Singapore
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

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**Case 1:** Reply on the same bundle member as query
**Case 2:** Reply on congruent return SR path of a bidirectional SR Policy

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**Figure 7A: Return Path TLV**

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**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