Benchmarking Methodology for MPLS Segment Routing
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IETF 117 Update

Luis Contreras (Telefonica)
Bruno Decraene (Orange)
Giuseppe Fioccola (Huawei)
Eduard Vasilenko (Huawei)
Paolo Volpato (Huawei)

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Recap of Draft’s Target

- There is no standard method to benchmark the foundational Segment Routing (SR) [RFC8402] packet forwarding capabilities of network devices.
- SR leverages the source routing paradigm.
  - The headend node steers a packet through an SR Policy [I-D.ietf-spring-segment-routing-policy], instantiated as an ordered list of segments.
  - A segment is referred to by its Segment Identifier (SID).
  - SR supports per-flow explicit routing while maintaining per-flow state only at the ingress nodes to the SR domain.
- The SR architecture can be instantiated on two data-plane:
  - SR over MPLS (SR-MPLS), and
  - SR over IPv6 (SRv6).
- This document is limited to SR-MPLS. It aims to extend the efforts of [RFC1242], [RFC2544] and [RFC5695] to an SR-MPLS network.
An SR Policy is instantiated through the MPLS Label Stack: the Segment IDs (SIDs) of a Segment List are inserted as MPLS Labels.

The forwarding functions available for MPLS networks allow implementing the SR operations. SR-MPLS applies three operations on the forwarding plane:

- **PUSH** [Label Push]. One or more MPLS labels are pushed on top of an incoming packet, before the packet is sent out of a physical/virtual interface.
- **NEXT** [Label Pop]. The topmost label is removed. The next action depends on the instruction associated with the active SID. It equals to Penultimate Hop Popping (PHP).
- **CONTINUE** [Label Swap]. It associates an incoming label with an outgoing interface and outgoing label. The packet is forwarded to the outgoing interface. It is equivalent to Ultimate Hop Popping (UHP).

The benchmark procedure can be similar to RFC5695 with extensions:

- Test SID list longer than 1 SID (2 are recommended, many are optional).
- Different Reporting Format.
- At least one protocol for the SID population is recommended (ISIS or OSPF or SR Policy).

The tests (throughput, buffer size, latency, etc.) are repeated for every operation.
Draft’s History (main changes)

- Version -00 submitted on March 2022
- Version -01 presented at IETF 113 – Initial test methodology discussed
- Version -02 presented at IETF 114 – Incorporated comments from the chairs and the list to review the test setup and methodology, trial duration and traffic verification
- Versions -03 and -04 submitted in October 2022 and presented at IETF 115 – Included further comments on buffer’s size test, ways for equalizing the link’s load balancing
- Version -05 submitted on February 2023 – Addressed comments on allowing a longer list of SID as an optional test. Bruno joined as coauthor.
- Version -06 uploaded on March 2023 and presented at IETF 116.

- Since then draft stable.
Next Steps

• As requested at IETF 116, we think the draft is stable enough for moving to WG adoption.

• At IETF 116 a final round of reviews was proposed to confirm it.
• People who provided valuable comments to the initial versions of the draft may acknowledge that the comments have been addressed.

• A WG adopted document would help the draft to get more attention from companies doing tests.
• 3rd party tests are also desired before it would become RFC.

Thank you