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OAM Requirements for Segment Routing Network
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Abstract

   This document describes a list of functional requirement for OAM in
   Segment Routing (SR) based network.

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1. Introduction

[I-D.ietf-spring-segment-routing] introduces and explains Segment Routing architecture that leverages source routing and tunneling standards which can be applied directly to MPLS dataplane with no changes on forwarding plane and on IPv6 dataplane with new Routing Extension Header.

This document list the OAM requirements for Segment Routing based network which can further be used to produce OAM tools, either through enhancing existing OAM tools or constructing new OAM tools, for path liveliness and service validation.

2. Requirements notation

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC2119].

3. Terminology

SR OAM Packet: OAM probe originated and processed within SR domain(s)

ECMP: Equal Cost Multipath

SR: Segment Routing

UCMP: Unequal Cost Multipath

Initiator: Centralized OAM initiator or PMS as referred in
[I-D.geib-spring-oam-usecase]

[4](). Detailed Requirement list

This section list the OAM requirement for Segment Routing based
network. The below listed requirement MUST be supported with both
MPLS and IPv6 dataplane:

REQ#1:   SR OAM MUST support both On-demand and Continuous OAM
          functionality.

REQ#2:   The SR OAM packet MUST follow exactly the same path as
          dataplane traffic.

REQ#3:   The SR OAM packet MUST have the ability to discover and
          exercise equal cost multipath (ECMP) paths.

REQ#4:   The SR OAM packet MUST have the ability to discover and
          exercise unequal cost multipath (UCMP) paths.

REQ#5:   The SR OAM packet MUST have ability to exercise any
          available paths, not just best path available.

REQ#6:   The forwarding semantic of adjacency Segment ID raises a
          need for additional consideration to detect any failure in
          forwarding to the right adjacency. SR OAM MUST have the
          ability to detect any failure in Node SID and adjacency
          segment based forwarding.

REQ#7:   SR OAM SHOULD have the ability to allow the Initiator to
          control the return path from any transit or egress
          responder.

REQ#8:   SR OAM MUST have the ability to be initialized from an
          arbitrary node to perform connectivity verification and
          continuity check to any other node within SR domain.

REQ#9:   In case of any failure with continuity check, SR OAM SHOULD
          support rapid Connectivity Fault localization to isolate the
          node on which the failure occurs.

REQ#10:   SR OAM SHOULD also have the ability to be initialized from a
          centralized controller.

REQ#11: When SR OAM is initialized from centralized controller, it
         MUST have the ability to alert any edge node in SR domain
         about the corresponding path or service failure. The node
         on receiving the alert MAY take a local protection action or
         pop an informational message.

REQ#12: When SR OAM is initialized from centralized controller, it
         SHOULD support node redundancy. If primary Initiator fails,
         secondary one MUST take over the responsibility without
         having any impact on customer traffic.

REQ#13: SR OAM MUST have the ability to measure Packet loss, Packet
         Delay or Delay variation using Active (using synthetic
         probe) and Passive (using data stream) mode.

REQ#14: When a new path is instantiated, SR OAM SHOULD allow path
         verification without noticeable delay.

REQ#15: The above listed requirements SHOULD be supported without
         any scalability limitation imposed and SHOULD be extensible
         to accommodate any new SR functionality.

REQ#16: SR OAM SHOULD minimize the need to create or maintain per
         path state entry in any other nodes other than the
         Initiator.

REQ#17: When traffic engineering is initiated by centralized
         controller device, and when SR OAM is performed by
         individual nodes, there MUST be a mechanism to communicate
         failure to centralized controller device.

REQ#18: When service instruction is present in SR OAM packet header,
         there MUST be a method to disallow applying the service to
         the OAM packet to handle cases where that may result in
         unintended corruption of the OAM packet.

5. IANA Considerations

This document does not propose any IANA consideration.

6. Security Considerations

This document list the OAM requirement for Segment Routing network
and does not raise any security considerations.

7. Acknowledgement

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