          Analysis Framework For Extensions of SRv6 Encapsulation
           draft-filsfils-spring-analysis-fmwk-ext-srv6-encap-01

Abstract

   This document provides a framework for analysis of multiple proposals
   to extend SRv6 encapsulation with the objective of minimizing
   encapsulation size or leveraging legacy equipment. It defines
   relevant metrics to evaluate each proposal.

Requirements Language

   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 RFC 2119 [RFC2119].

Status of This Memo

   This Internet-Draft is submitted in full conformance with the
   provisions of BCP 78 and BCP 79.

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   This Internet-Draft will expire on January 28, 2021.

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1. Introduction

Traffic traversing an SR domain is encapsulated in an outer IPv6
header with an optional Segment Routing Header (SRH) for its journey
through the SR domain [I-D.ietf-6man-segment-routing-header].

This document provides a framework for analysis of multiple proposals
to extend SRv6 encapsulation with the objective of minimizing
encapsulation size or leveraging legacy equipment. It defines
relevant metrics to evaluate each proposal.

Future revisions will evaluate and document the metrics for each
proposal, compare them and draw conclusions.

2. Metrics

Metrics are identified as metric:score. Metric is the abbreviation
of the metric name, and score is an integer reporting its evaluation.
A proposal with a metric (M) and score of zero is represented as M:0.

A score may vary based on the number and type of instructions in a
segment list. Three types of segments are considered: T for
topological, S for service, and V for VPN.

A proposal with a metric (M), computed for a segment list of 5
topological segments followed by 1 VPN segment, with a score of 10 is
represented as M(5T.1V):10.

A score may vary based on node parameters. Three parameters are
considered: N the number of nodes in the network, I the number of IGP
algorithms [I-D.ietf-lsr-flex-algo] configured at the node, and A the
number of adjacency SIDs configured at the node.

A proposal with metric (M), computed for a node in a network of 100
nodes with 1 IGP algorithm and 5 adjacency SIDs configured at the
node, with a score of 10 is represented by M(100N.1I.5A):10.

2.1. Compliance

The compliance metric (C) records how aligned a proposal is with the
SRv6 solution.

o C.RFC8402: compliance with [RFC8402]

o C.SRH: compliance with [I-D.ietf-6man-segment-routing-header]

o C.PGM: compliance with [I-D.ietf-spring-srv6-network-programming]

o C.IGP: compliance with [I-D.ietf-lsr-isis-srv6-extensions]

o C.BGP: compliance with [I-D.ietf-bess-srv6-services]

o C.POL: compliance with [I-D.ietf-spring-segment-routing-policy]

o C.BLS: compliance with [I-D.ietf-idr-bgpls-srv6-ext]

o C.SVC: compliance with [I-D.ietf-spring-sr-service-programming]

o C.OAM: compliance with [I-D.ietf-6man-spring-srv6-oam]

Each of the above metrics are assigned a compliance value:

o 10: complies with the specification

o 5: extends the specification

o 0: redefines the specification

C.TOT is the sum of all C.* metrics listed above. It provides an
overall assessment of the proposal's alignment with the SRv6 RFCs and
working group drafts.

2.2. Data Plane Efficiency

The data plane efficiency metric (D) records the data plane
forwarding efficiency of the proposed solution. Two separate metrics
are used:

o D.PRS(segment list): worst-case number of headers parsed during
   processing of the segment list.

o D.LKU(segment list): worst-case number of FIB lookups during
   processing of the segment list.

2.3. State Efficiency

The state efficiency metric (S) records the number of additional FIB
entries (states) required by the proposed solution.

o S(node parameters): the number of additional FIB entries for a
   node, given a set of parameters.

2.4. Encapsulation Size

The encapsulation size metric (E) records the number of bytes
required for the proposals

o E(segment list): the number of bytes required to encapsulate a
   packet traversing the SR domain with segment list applied at an SR
   source node. Specifically, the number of bytes from the beginning
   of the encapsulating IPv6 header to the beginning of the packet
   traversing the SR domain, including any and all headers in
   between.

3. Variables For Metrics

For the E, D.PRS, D.LKU metrics the following segment lists are used
during analysis.

o 5T.1V

o 10T.1V

o 15T.1V

o 5T.1S.5T.1V

o 4T.1S.4T.1S.4T.1V

This list may be updated in subsequent revisions of this document.

For the S metric the following node parameters are used in analysis.

o   1500N.2I.100A

This list may be updated in subsequent revisions of this document.

4. Analysis of Proposals

To be completed in subsequent revisions of this document.

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