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Validity of SR Policy Candidate Path
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Abstract

An SR Policy comprises one or more candidate paths of which at a given time one and only one may be active (i.e., installed in forwarding plane and usable for steering of traffic). Each candidate path, in turn, may have one or more segment lists of which one or more may be active. When multiple segment lists are active, traffic is load balanced over them. Currently, a candidate path is valid as long as at least one of its segment lists is active. However, this default validity criterion does not meet the requirements of some scenarios.

This document defines the new candidate path validity criterion.

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1. Introduction

SR Policy architecture are specified in [RFC9256]. An SR Policy comprises one or more candidate paths of which at a given time one and only one may be active (i.e., installed in forwarding plane and usable for steering of traffic). Each candidate path, in turn, may have one or more segment lists of which one or more may be active. When multiple segment lists are active, traffic is load balanced over them. Currently, a candidate path is valid as long as at least one of its segment lists is active. However, this default validity criterion does not meet the requirements of some scenarios.

This document defines the new candidate path validity criterions based on [RFC9256]. For the segment list invalidation rules, refer to [RFC9256] and [I-D.liu-spring-sr-policy-flexible-path-selection]. This document does not change the segment list invalidation rules.

1.1. Requirements Language

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in BCP 14 [RFC2119] [RFC8174] when, and only when, they appear in all capitals, as shown here.

2. Motivation

The candidate path validity criterion defined in [RFC9256] does not meet the requirements of the following scenarios:

```
                                   +-------------------------+
                         +---------| SL1(Weight 1, 100Mbps) |
+-----------------+      |         +-------------------------+
|  CP1 (200Mbps) |------+
+-----------------+      |         +-------------------------+
                         +---------| SL2(Weight 1, 100Mbps) |
                                   +-------------------------+
```

Figure 1

The SR Policy POL1 has two candidate paths: CP1 and CP2, and CP1 is the active candidate path (it is valid and has the highest Preference). The two segment lists (SL1 and SL2) of CP1 are installed as the forwarding instantiation of the SR Policy POL1. Each segment list is assumed to have a maximum capacity of 100Mbps. CP1 carries a total of 200Mbps of traffic. Within POL1, flow-based hashing is performed across each SL based on its relative weight. With an equal weight assigned to each SL, the fraction of flows steered into each SL is 50%, meaning each SL carries 100 Mbps of traffic.

At this time, if one of the segment lists is determined to be invalid by the rule defined in [RFC9256], the remaining segment list cannot carry the full 200Mbps of traffic due to its capacity limit. However, the CP1 remains the active candidate path according to [RFC9256], as a candidate path is valid as long as it has at least one valid segment list.

3. Validity of a Candidate Path

A headend MAY be informed about the validity control parameters of a candidate path for an SR Policy <Color, Endpoint> by various means including: via configuration, PCEP, or BGP. The detailed protocol extension will be described in a separate document.

This document defines the following validity control parameters under candidate path to control the validity judgment of candidate path:

* Minimum Valid Segment List(SL) Count: 8-bit value, The value is 0-0xff.

  Indicates the minimum number of valid segment lists under the active candidate path. When the number of valid segment lists under candidate path is greater than or equal to this field, the candidate path is considered valid.

  A value of 0 indicates no requirement for minimum segment list count.

  A value of 0xff indicates that the candidate path is considered valid only if all the segment lists are valid.

* Minimum Cumulative SL Weight: 32-bit value, The value is 0-0xffffffff.

  Indicates the minimum value of the sum of the weights of the valid segment list under the active candidate path.

  When the sum of the weights of the valid segment lists under the candidate path is greater than or equal to this field, the candidate path is considered valid.

  A value of 0 indicates no requirement for Minimum Cumulative SL Weight.

  A value of 0xffffffff indicates that the candidate path is considered valid only if all the segment lists are valid.

candidate path is considered valid only if both validity control parameters are satisfied.

If both the Minimum Valid SL Count and the Minimum Cumulative SL Weight are set to 0, The validity of candidate paths must be determined according to the mechanism defined in [RFC9256].

4. Use Cases for Candidate Path Validity

The following scenarios illustrate how the validity control parameters of a candidate path defined in Section 3 address the capacity and validity issues described in Section 2.

* Minimum valid SL count: Following the scenario in Section 2, where the aggregate traffic load is 200 Mbps and each SL has a capacity of 100 Mbps, an operator can configure a "Minimum Valid SL Count" of 2. In this case, the candidate path is rendered invalid as soon as any single segment list becomes invalid. This prevents the candidate path from remaining active when its capacity is insufficient to carry the full traffic load.

* Minimum Cumulative SL Weight: Alternatively, an operator can assign a weight of 1 to both SL1 and SL2 to reflect their identical 100 Mbps capacity. By setting the "Minimum Cumulative SL Weight" to 2, the operator ensures the candidate path remains active only when the aggregate capacity meets the 200 Mbps demand. If one segment list becomes invalid, the sum of the weights of the remaining valid SLs becomes 1, falling below the threshold. Consequently, CP1 is declared invalid, thus preventing the steering of 200 Mbps of traffic into a single 100 Mbps link.

5. IANA Considerations

This document makes no request of IANA.

6. Security Considerations

The security considerations of segment routing in [RFC9256] are applicable to this document.

7. Acknowledgements

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8. References

8.1. Normative References

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, DOI 10.17487/RFC2119, March 1997, <https://www.rfc-editor.org/info/rfc2119>.

[RFC8174] Leiba, B., "Ambiguity of Uppercase vs Lowercase in RFC 2119 Key Words", BCP 14, RFC 8174, DOI 10.17487/RFC8174, May 2017, <https://www.rfc-editor.org/info/rfc8174>.

[RFC9256] Filsfils, C., Talaulikar, K., Ed., Voyer, D., Bogdanov, A., and P. Mattes, "Segment Routing Policy Architecture", RFC 9256, DOI 10.17487/RFC9256, July 2022, <https://www.rfc-editor.org/info/rfc9256>.

8.2. Informative References

[I-D.liu-spring-sr-policy-flexible-path-selection] Liu, Y., Lin, C., Peng, S., Chen, R., and Z. Ali, "Flexible Candidate Path Selection of SR Policy", Work in Progress, Internet-Draft, draft-liu-spring-sr-policy-flexible-path-selection-14, 17 April 2026, <https://datatracker.ietf.org/doc/html/draft-liu-spring-sr-policy-flexible-path-selection-14>.

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