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SRv6 Policy SID List Optimization Advertisement
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Abstract

In some use cases, an SRv6 policy's SID list ends with the policy endpoint's node SID, and the traffic steered (over policy) already ensures that it is taken to the policy endpoint. In such cases, the SID list can be optimized by excluding the endpoint Node SID when installing the policy. This draft specifies a BGP-LS extension to indicate whether the endpoint's node SID is included or excluded in installing SID list(s) of the Candidate Path (CP) of an SRv6 policy.

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1. Introduction

Segment Routing (SR) [RFC8402] allows a node to steer a packet flow along any path. A Segment Routing Policy (SR Policy) [RFC8402] is an ordered list of segments that represent a source-routed policy. The headend node is said to steer a flow into an SR Policy. The packets steered into an SR Policy have an ordered list of segments associated with that SR Policy written into them. Segment Routing Policy Architecture [RFC9256] updates [RFC8402] as it details the concepts of SR Policy and steering into an SR Policy. [RFC8986] describes the representation and processing of this ordered list of segments for Segment Routing over IPv6 (SRv6). [RFC9857] defines a mechanism to collect the Segment Routing Policy information that is locally available in a node and advertise it into BGP Link-State (BGP-LS) updates.

The SRv6 policy SID list may end with the policy endpoint's Node SID or the penultimate hop adjacency SID. If the computed SID list ends with the policy endpoint's node SID and the overlay SID in the steered traffic (over policy) already ensures that the traffic is taken to the policy endpoint with the same intent, the SRv6 policy

endpoint device needs to process back-to-back local node SIDs. Examples of overlay SID containing the local node SID are a service SID, a binding SID for transit policies, an EPE SID, etc. From a compression efficiency viewpoint, carrying back-to-back end-point node SID is inefficient. The SID list in the packet can be optimized by excluding the end-point node SID when installing the policy. End-point node SID exclusion improves the compression efficiency and makes packet processing more efficient for the policy endpoint.

Excluding the policy endpoint’s node SID is possible in most use cases, but not all. For example, if the SRv6 policy is used to carry MPLS traffic, as described in [I-D.ietf-spring-srv6-mpls-interworking], it is not possible to exclude the policy endpoint’s node SID. Specifically, the endpoint’s node SID inclusion or exclusion is a policy attribute.

This draft specifies a BGP-LS extension to indicate whether the endpoint’s node SID is included or excluded in installing SID list(s) of the Candidate Path (CP) of an SRv6 policy.

2. 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.

3. Terminology

Headend node: Packet flows are steered into an SR Policy on a node where it is instantiated called a headend node [RFC9256].

SR: Segment Routing.

SID: Segment Identifier.

SRv6: Segment Routing over IPv6 data plane.

4. Overview of BGP Extensions

IFN-flag (Install Final Node-sid) in the SR Candidate Path State TLV specified in [RFC9857] is proposed to indicate whether the endpoint node SID is included or excluded in installing SID list(s) of the Candidate Path (CP). The flag is applicable only to SR policies with SRv6 data plane. The flag MUST NOT be set and MUST be ignored for SR policies with SR-MPLS data plane.

IFN (Install Final Node-sid) - 1 bit (Bit Position TBD1):

* If set to 1 indictaes the endpoint node SID is installed when installing the SRv6 Policy SID list(s) used to carry the data traffic.

* If set to 0 indictaes the endpoint node SID is excluded when installing the SRv6 Policy SID list(s) used to carry the data traffic.

5. Cross WG Information

5.1. Link to Spring WG

This document implements the procedures in Section 4 of [I-D.ietf-spring-srv6-policy-sid-list-opt] via BGP. This spring feature requires both this document and [RFC9857] to be implemented.

5.2. Interaction with SRV6ops Recommendations

For SRv6 deployment recommendations of the BGP-LS extension implemented by this document, please refer to Section 5.2 of [I-D.ietf-srv6ops-srv6-deployment].

6. Security Considerations

TBA

7. IANA Considerations

TBA

8. Acknowledgments

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