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BGP SR Policy Extensions for Metric  
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Abstract

An SR Policy consists of one or more Candidate Paths (CPs), each comprising one or more segment lists. BGP can be used to propagate SR Policy CPs to the SR Policy headend nodes in the network. After an SR Policy CP is installed on the headend node, packets can be steered into the SR Policy.

For a particular BGP destination, if there are multiple BGP routes with different next-hops, BGP best path selection is performed and the IGP metric to the next-hop node may be used for tie-breaking to select the best path. When the path to the next-hop is resolved over an SR Policy, the IGP metric of the SR policy is needed for BGP path selection.

This document defines the BGP extensions to carry the IGP metric of segment lists when BGP is used to propagate SR Policy CPs.

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 BCP 14 [RFC2119] [RFC8174] when, and only when, they appear in all capitals, as shown here.

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## 1. Introduction

An SR Policy [RFC9256] is associated with one or more Candidate Paths (CPs), each of which is expressed as a segment list or a set of segment lists.. BGP SR Policy [RFC9830] can be used to propagate SR Policy CPs to the SR Policy headend nodes in the network. After an SR Policy CP is installed on the headend node, packets can be steered into the SR Policy.

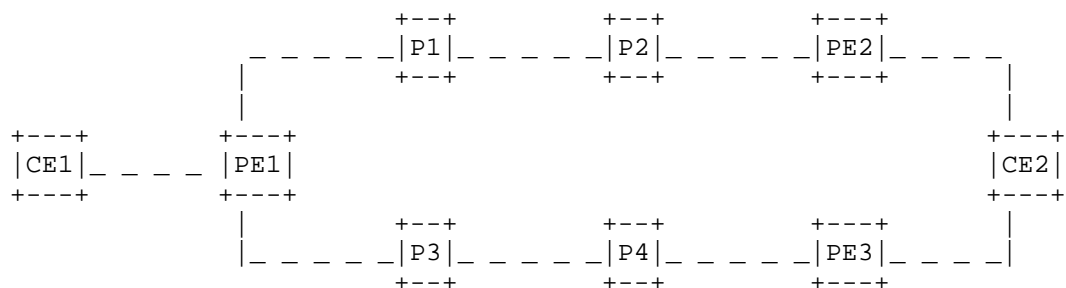
For a particular BGP destination, if there are multiple BGP routes with different next-hops, BGP best path selection [RFC4271] is performed and the IGP metric to the next-hop node may be used for tie-breaking to select the best path. When the path to the next-hop is resolved over an SR Policy, the IGP metric of the SR policy is needed for BGP path selection.

This document defines the BGP extensions to carry the IGP metric of segment lists when BGP is used to propagate SR Policy CPs.

## 2. A Typical Scenario

In network scenarios where there are multiple BGP routes to a particular destination prefix with different next-hops, and some of which are resolved via SR Policy, the metric of the SR Policy may be needed for BGP best path selection.

The specific scenarios are as follows:



On PE1, the BGP route to the prefix advertised by CE1 has two candidate next-hops: PE2 and PE3. The BGP best path selection to the prefix of CE1 may be based on the IGP metric of the paths from PE1 to PE2 and from PE1 to PE3 respectively. The path toward PE2 is resolved via SR Policy-1, whose endpoint is PE2; similarly, the path toward PE3 is resolved via SR Policy-2. PE1 needs to know the the

IGP metrics of the SR Policies to select the SR Policy which best meet the requirement. Thus the IGP metric of the Segment Lists which constitute the SR Policy CP needs to be conveyed to the headend node of SR Policy.

### 3. SR Policy and Tunnel Encapsulation Attribute Update

In order to carry the metric of an SR Policy CP, the tunnel encapsulation attribute of the BGP SR Policy is extended.

The BGP SR Policy Encoding structure is as follows:

SR Policy SAFI NLRI: <Distinguisher, Policy-Color, Endpoint>

Attributes:

Tunnel Encaps Attribute (23)

Tunnel Type: SR Policy

Binding SID

Preference

Priority

Policy Name

Policy Candidate Path Name

Explicit NULL Label Policy (ENLP)

Segment List

Weight

Metric

Segment

Segment

....

....

Where the metric indicates the metric for the segment list.

### 3.1. Metric sub-TLV

A new sub-TLV called Metric Sub-TLV is defined. Metric sub-TLV specifies the metric of an SR policy Segment List. Each sub-TLV is encoded as shown in Figure 1. More than one metric Sub-TLVs may be present in one Segment List to refer to the metric values of different metric types.

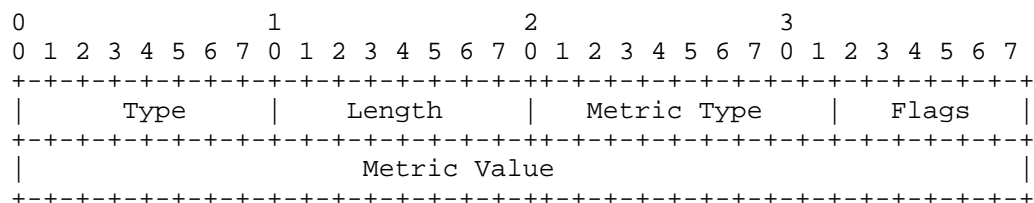


Figure 1: Metric Sub-TLV

\* Type: Metric, 1 octet, TBD.

\* Length: 6 octets.

\* Metric Type: 1-octet field which identifies the type of the metric being used. The metric-type code points are listed in Section 7.2.

\* Flags: None are defined at this stage. Flags MUST be set to zero on transmission and MUST be ignored on receipt.

\* Metric Value: 4-octet value which indicates the metric of the computed path.

### 4. Metric Process of SR Policy Segment List

When an SR Policy headend node receives the SR Policy segment list with the metric field, the metric may be of any of the defined types: (IGP metric, Min Unidirection Link delay, TE metric, Hop Count, or SID List length).

The rules for processing SR Policy metrics are as follows:

1. The type of metric to use is determined by the local policy, which can be user-configured. For example, the user specifies the IGP metric as local policy.
2. The metric of the Active Candidate Path is used as the metric of the SR Policy.
3. The metric of the Active Candidate Path uses the maximum metric value of the specified metric type in all segment lists.

## Example:

SR Policy: (Headend:1::1, Color: 2, EndPoint: 2::2)  
 Candidate path preference: 200  
 Segment list 1: (IGP metric: 20)  
 Segment list 2: (IGP metric: 30)  
 Candidate Path preference: 100  
 Segment list 1: (IGP metric: 40)  
 Segment list 2: (IGP metric: 30)  
 Local policy: IGP metric  
 Active candidate path: preference 200  
 Active candidate path metric: 30, which is the maximum IGP metric  
 of all segment lists in the candidate path.

Taking the scenario in Figure 1 as an example, according to the rules above, the metric of SR Policy 1 is 30, and the metric of SR Policy 2 is 40, then according to the BGP path selection tie-breaking rule, the BGP route with next-hop PE2 is selected as the metric of SR Policy 1 is smaller than that of SR Policy 2.

## 5. Acknowledgements

The authors would like to thank Liyan Song for the review and discussion.

## 6. IANA Considerations

## 6.1. New sub-TLV Registration: Metric Sub-TLV

IANA is requested to assign a new code point for Metric Sub-TLV in the "SR Policy Segment List Sub-TLVs" registry of the "BGP Tunnel Encapsulation" registry group.

Value	Description	Reference
TBD	Metric	This document

Figure 2: Metric sub-TLV

## 6.2. Registry of BGP SR Policy Metric Type

The semantics of the Metric Type field in the Metric sub-TLV defined in this document is identical to the metric types in the "BGP-LS SR Policy Metric Types" registry in the "BGP-LS Parameters" registry group. IANA is requested to rename the existing registry to "BGP/BGP-LS SR Policy Metric Types" registry. This is to allow the sharing of this registry for metric types in both BGP SR Policy and BGP-LS SR Policy. There is no change to the code points in this

registry.

## 7. Security Considerations

The BGP extensions defined in this document do not affect the base BGP security model. The BGP SR policy extension specified in this document is based on [RFC9830]. The security requirements and mechanisms described in [RFC9830] also apply to this document. SR operates within a trusted SR domain [RFC8402] and its security considerations also apply to BGP sessions which are used for distributing SR Policy information.

The distribution of SR Policy with metric information may pose additional mission-critical or commercially sensitive information about the network. The BGP sessions used for SR Policy distribution not automatic established and require configuration, network operator needs to ensure that only trusted nodes (that include both routers and controller applications) within the SR domain are configured to receive such information.

## 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>>.
- [RFC4271] Rekhter, Y., Ed., Li, T., Ed., and S. Hares, Ed., "A Border Gateway Protocol 4 (BGP-4)", RFC 4271, DOI 10.17487/RFC4271, January 2006, <<https://www.rfc-editor.org/info/rfc4271>>.
- [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>>.
- [RFC9830] Previdi, S., Filsfils, C., Talaulikar, K., Ed., Mattes, P., and D. Jain, "Advertising Segment Routing Policies in BGP", RFC 9830, DOI 10.17487/RFC9830, September 2025, <<https://www.rfc-editor.org/info/rfc9830>>.

## 8.2. Informative References

- [RFC8402] Filsfils, C., Ed., Previdi, S., Ed., Ginsberg, L., Decraene, B., Litkowski, S., and R. Shakir, "Segment Routing Architecture", RFC 8402, DOI 10.17487/RFC8402, July 2018, <<https://www.rfc-editor.org/info/rfc8402>>.
- [RFC9857] Previdi, S., Talaulikar, K., Ed., Dong, J., Gredler, H., and J. Tantsura, "Advertisement of Segment Routing Policies Using BGP - Link State", RFC 9857, DOI 10.17487/RFC9857, October 2025, <<https://www.rfc-editor.org/info/rfc9857>>.

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