

Workgroup: Network Working Group
Internet-Draft:
draft-zhang-idr-sr-policy-template-01
Published: 28 April 2022
Intended Status: Informational
Expires: 30 October 2022
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BGP SR Policy Extensions for template

Abstract

Segment Routing(SR) Policies can be advertised using BGP. An SR Policy may has lots of constraints, and as the application and features evolve, the SR Policy may need have more and more attribute constraints. To avoid modifying BGP when constraints are added to an SR Policy, we can define a template. The identifier and content of the template are defined by the receiver of the SR Policy. The advertiser of an SR policy only needs to know the ID of the template. When advertising SR policy, the advertiser carries the template ID in the tunnel encapsulation information of the SR policy. After receiving the SR Policy information, the receiver obtains the corresponding template and content according to the template ID, thereby obtaining abundant constraint configuration information.

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

[[I-D.ietf-idr-segment-routing-te-policy](#)] defines some attributes encoding of the SR Policy path. However, in actual applications, there are many other constraints of SR Policy path. These constraints are valid only on the device where the SR Policy path is installed. Such constraints may include backup protection, Bidirectional Forwarding Detection information, traffic statistics collection, or in-situ Flow Information Telemetry detection information, etc. If these constraints are directly delivered through BGP, the BGP SR Policy protocol may change frequently. This document defines a general method to carry the path constraints of SR Policies.

2. Terminology

SR Policy: An ordered list of segments.

Candidate Path: the unit for signaling of an SR Policy to a headend via protocol extensions like Path Computation Element (PCE) Communication Protocol (PCEP) [[RFC8664](#)] [[I-D.ietf-pce-segment-routing-policy-cp](#)] or BGP SR Policy [[I-D.ietf-idr-segment-routing-te-policy](#)].

SRPM: SR Policy Module.

Template: A collection of constraints sets.

Template ID: The identifier of a template.

3. Template ID defination

To support the constraints extension of SR Policies, this document defines a constraint template identifier. The constraint template ID is valid only for the recipient. The SR policy publisher only needs to carry the template ID when publishing the SR policy. The receiver of the SR Policy may create a template corresponding to the template identifier in advance before receiving the SR Policy, or may define a corresponding template after receiving the template definition of the SR Policy. The template can contain any constraints on the SR Policy path, including but not limited to backup protection, Bidirectional Forwarding Detection information, traffic statistics collection, or in-situ Flow Information Telemetry detection information, etc. After receiving the SR Policy information, the receiver matches the template information based on the template ID and adds constraints to the SR Policy based on the constraints defined in the template.

4. SR Policy and Tunnel Encapsulation Attribute Update

As the template ID is defined, the tunnel attribute encapsulation of the BGP SR Policy needs to be updated.

The 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)
    Template ID
    Segment List
      Weight
      Segment
      Segment
      ....
      ....
```

Where Template ID indicates the template ID for the SR Policy candidate path.

4.1. Template ID sub-TLV

A new sub-TLV called Template ID sub-TLV is defined. Template ID sub-TLV specifies the template ID of an SR policy candidate path. Each sub-TLV is encoded as shown in Figure 1.

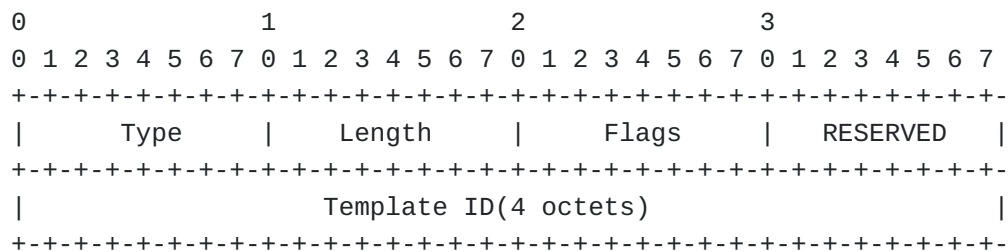


Figure 1: Figure 1: Template ID Sub-TLV

Type: Template ID, 1 octet, TBD.

Length: 6.

Flags: 1 octet of flags. None are defined at this stage. Flags SHOULD be set to zero on transmission and MUST be ignored on receipt.

RESERVED: 1 octet of reserved bits. SHOULD be set to zero on transmission and MUST be ignored on receipt.

Template ID: a 4-octet value.

5. SR Policy Operations

5.1. Advertisement of SR Policies

When BGP advertises an SR Policy, different candidate paths of the same SR Policy may have different template IDs or the same template ID, depending on the constraints required by the candidate paths of the SR Policy.

5.2. Reception of an SR Policy

When a BGP speaker receives an SR Policy NLRI from a neighbor, BGP Speaker determines if it's acceptable as described in [[I-D.ietf-idr-segment-routing-te-policy](#)]. Once BGP on the receiving node has determined that the SR Policy NLRI is usable, it passes the SR Policy candidate path to the SRPM. The SRPM then determines how to use the template ID in SR Policy.

The SRPM should find the template by template ID, and determines the constraints to use when install the candidate path. If there is no template find, the SRPM should ignore the template ID and use the candidate path as there is no template ID.

6. Acknowledgements

TBD.

7. IANA Considerations

This document requests that IANA allocates a new sub-TLV type as defined in Section 4.1 from the "Sub-TLVs for SR Policy" registry as specified.

Value	Description	Reference
TBD	SR Policy Template ID	This document

Figure 2: Figure 2: Template ID sub-TLV

8. Security Considerations

These extensions to BGP SR Policy do not add any new security issues to the existing protocol.

9. References

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