Signaling Composite Candidate Path of SR Policy using BGP-LS
draft-li-idr-bgpls-sr-policy-composite-path-01

Abstract

   Segment Routing is a source routing paradigm that explicitly
   indicates the forwarding path for packets at the ingress node. An SR
   Policy is associated with one or more candidate paths, and each
   candidate path is either dynamic, explicit or composite. This
   document specifies the extensions to BGP Link State (BGP-LS) to carry
   composite candidate path information in the advertisement of an SR
   policy.

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[1](#). Introduction

As described in [[RFC7752](#)], BGP Link State (BGP-LS) provides a
mechanism by which link-state and TE information can be collected
from networks and shared with external components using the BGP
routing protocol.

Segment routing (SR) [[RFC8402](#)] is a source routing paradigm that
explicitly indicates the forwarding path for packets at the ingress
node. The ingress node steers packets into a specific path according
to the Segment Routing Policy (SR Policy) as defined in
[[I-D.ietf-spring-segment-routing-policy](#)].

An SR Policy is associated with one or more candidate paths. A
composite candidate path acts as a container for grouping of SR
Policies. As described in section 2.2 in
[[I-D.ietf-spring-segment-routing-policy](#)], the composite candidate
path construct enables combination of SR Policies, each with explicit
candidate paths and/or dynamic candidate paths with potentially
different optimization objectives and constraints, for a load-
balanced steering of packet flows over its constituent SR Policies.

[I-D.ietf-idr-te-lsp-distribution] describes a mechanism to collect
the SR policy information that is locally available in a node and
advertise it into BGP-LS updates. This document extends it to
provide some extra information to carry composite candidate path
information in the BGP-LS advertisement.

2. Terminology

   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
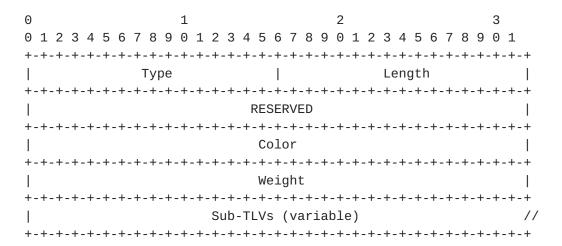   capitals, as shown here.

3. BGP-LS Extensions for Composite Candidate Path

   [RFC7752] defines the BGP-LS NLRI that can be a Node NLRI, a Link
   NLRI or a Prefix NLRI. The corresponding BGP-LS attribute is a Node
   Attribute, a Link Attribute or a Prefix Attribute.
   [I-D.ietf-idr-te-lsp-distribution] describes a mechanism to collect
   the SR Policy information that is locally available in a node and
   advertise it into BGP Link State (BGP-LS) updates. This section
   defines a new sub-TLV which is carried in the optional non-transitive
   BGP Attribute "LINK_STATE Attribute" defined in [RFC7752].

3.1. Constituent SR Policy TLV

   Segment Routing Policy (SR Policy) architecture is specified in
   [I-D.ietf-spring-segment-routing-policy]. A SR Policy can comprise
   of one or more candidate paths, and each candidate path is either
   dynamic, explicit or composite. A composite candidate path can
   comprise of one or more constituent SR policies. The endpoints of
   the constituent SR Policies and the parent SR Policy MUST be
   identical, and the colors of each of the constituent SR Policies and
   the parent SR Policy MUST be different.

   The Constituent SR Policy TLV is used to report the constituent SR
   policy(s) of a composite candidate path. The TLV has following
   format:

```
0                   1                   2                   3
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|             Type              |            Length             |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                           RESERVED                            |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                            Color                              |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                            Weight                             |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                       Sub-TLVs (variable)                    //
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

   where:

   o Type: to be assigned by IANA.

   o Length: the total length of the value field not including Type and
      Length fields.

   o Reserved: 32 bits reserved and MUST be set to 0 on transmission
      and MUST be ignored on receipt.

   o Color: 4 octets that indicates the color of the constituent SR
      Policy.

   o Weight: 4 octet field that indicates the weight associated with
      the SID-List for weighted load-balancing. Refer Section 2.2 and
      2.11 of [I-D.ietf-spring-segment-routing-policy].

   o Sub-TLVs: no sub-TLV is currently defined.

4. Operations

   The document does not bring new operation beyond the description of
   operations defined in [RFC7752] and
   [I-D.ietf-idr-te-lsp-distribution]. The existing operations defined
   in [RFC7752] and [I-D.ietf-idr-te-lsp-distribution] can apply to this
   document directly.

   Typically but not limit to, the BGP-LS messages carring composite
   candidate path information along with the SR policy are distributed
   to a controller.

   After configuration, the composite candidate path information will be
   advertised by BGP update messages. The operation of advertisement is
   the same as defined in [RFC7752] and
   [I-D.ietf-idr-te-lsp-distribution], as well as the receiption.

5. Security Considerations

   Procedures and protocol extensions defined in this document do not
   affect the security considerations discussed in
   [I-D.ietf-idr-te-lsp-distribution].

6. IANA Considerations

   This document defines a new TLV in the BGP-LS Link Descriptor and
   Attribute TLVs:

```
+-------+--------------------------+--------------+
| Value | Description              | Reference    |
+-------+--------------------------+--------------+
| TBA   | Constituent SR Policy TLV | This document |
+-------+--------------------------+--------------+
```

7. Contributors

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