



# Segment Routing Drafts Update

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# IDR Segment Routing Drafts

1. draft-ietf-idr-bgp-prefix-sid
2. draft-ietf-idr-bgppls-segment-routing-epe
3. draft-ietf-idr-te-lsp-distribution
4. draft-previdi-idr-segment-routing-te-policy
5. draft-gredler-idr-bgp-ls-segment-routing-ext
  
6. draft-ietf-idr-te-pm-bgp

# draft-ietf-idr-bgp-prefix-sid

- Version -03
- Changes presented at IETF95 – No changes since
  - Clarification text on SRGB advertisement
  - Updated IANA section
- Multiple interoperable implementations
- Authors believe the document is ready for WG last call

# draft-ietf-idr-bgpls-segment-routing-epe

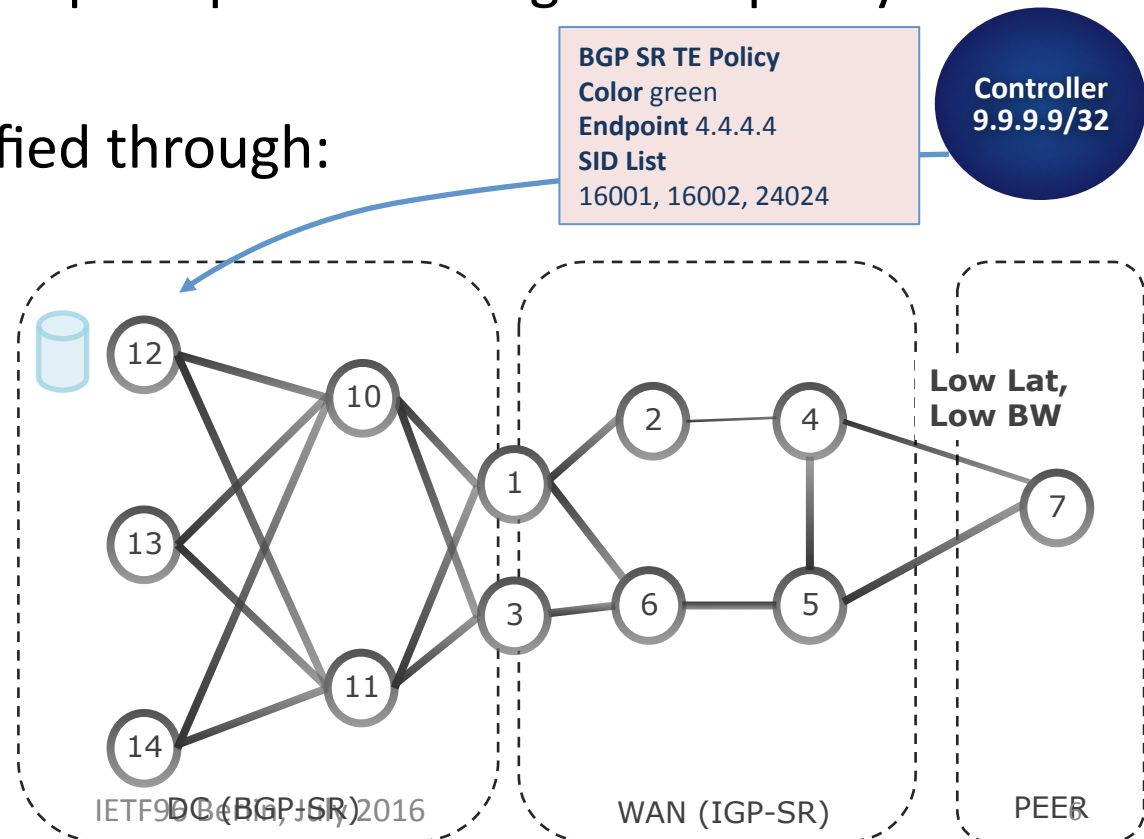
- Version -05
  - After many comments on terminology, reverted to Egress Peer Engineering (EPE)
  - Reminder:
    - EPE supports both iBGP and eBGP and it is not limited to the AS exit use case
    - EPE is used in order to advertise BGP topology of a router: interfaces, sessions, peers, peering ASs

# draft-previdi-idr-segment-routing-te-policy

- Version -02
- Eric Rosen joined as co-author
- Added the “Distinguisher” field in the NLRI in order to discriminate among multiple instances of the same policy (destined to different ingress nodes)
- Added Route-Target in order to control advertisement of the update
- Updated the format of the SR TE Policy SAFI NLRI
- Redefined all the TLVs for encoding the segment list

# draft-previdi-idr-segment-routing-te-policy

- Controller programs an SR TE policy at ingress
- SR TE Policy defines the explicit path from ingress to policy endpoint
- An SR TE Policy is identified through:  
<color, endpoint>

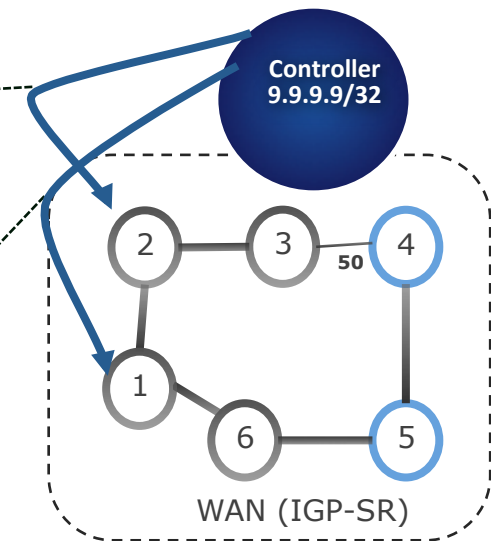


# draft-previdi-idr-segment-routing-te-policy

- In the general case it is assumed that the controller will send the SR TE Policy advertisements to each ingress
  - However, it may be the case that the SR TE Policy advertisements traverse a RR
- For a given <color, endpoint> advertisement, the content is specific to the ingress the advertisement is destined to

```
SR TE Policy SAFI NLRI
Color: green
  Endpoint: 4.4.4.4
Tunnel-Encaps attribute
Binding SID: 4001
Segment List:
  Weight: 100
  16003
  24034
```

```
SR TE Policy SAFI NLRI:
Color: green
  Endpoint: 4.4.4.4
Tunnel-Encaps attribute
Binding SID: 4001
Segment List:
  Weight: 100
  16003
  24034
Segment List:
  Weight: 200
  16006
  16004
```

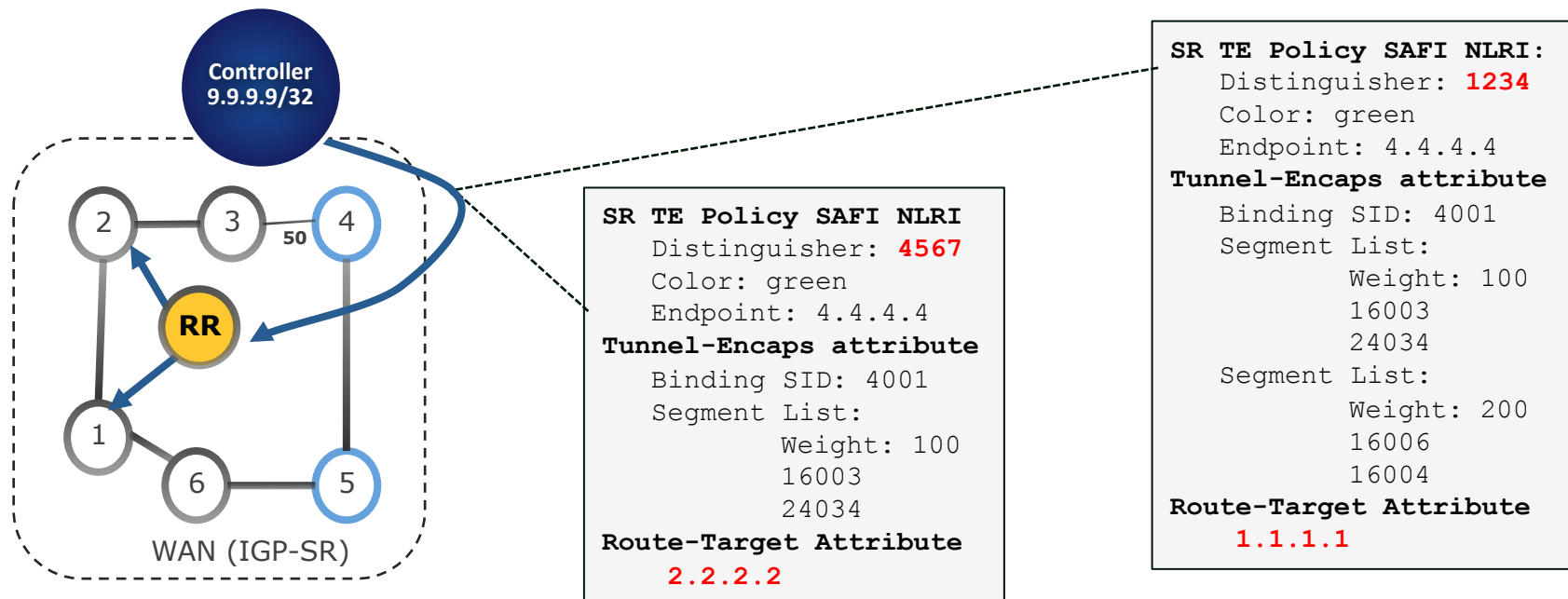


## draft-previdi-idr-segment-routing-te-policy

- Therefore, it is necessary to:
  1. Allow BGP advertisement of multiple instances of the same SR TE Policy and with different content without incurring selection among these instances (e.g., when propagation is done through route reflectors)
  2. Indicate which node is the intended recipient of a given SR TE Policy instance



# draft-previdi-idr-segment-routing-te-policy



- A “distinguisher” field in the NLRI prevents selection among multiple instances of same policy
- A route-target community, if present, tells the receiver to accept the update only if the route-target contains one of its local addresses

# draft-previdi-idr-segment-routing-te-policy

- Updated the format of the SR TE Policy SAFI NLRI
  - Redefined all the TLVs for encoding the segment list
  - Segment List TLV is the only one which may exceed 255 bytes in length
- Authors of draft-ietf-idr-tunnel-encaps agreed to define codepoints  $> 127$  for TLVs having 16 bits of length field
- Segment List TLV is defined with codepoint 128 (to be assigned by IANA)
- Authors believe the document is ready for WG adoption

# draft-ietf-idr-te-lsp-distribution

- Originally, draft-ietf-idr-te-lsp-distribution intended to advertise RSVP-TE Tunnels state into BGP-LS
- Authors and WG agreed to extend the scope and to advertise other forms of traffic engineering state (i.e., policies) such as:
  - IP tunnels
  - Segment Routing TE BGP Policies
  - MPLS cross connect state

# draft-ietf-idr-te-lsp-distribution

- Version -04 - introduced SR TE Policies and IP tunnels
- Version -05
  - Changed terminology to incorporate other policy state. Added introductory text
  - Updated SR TE Policies TLVs according to latest changes in draft-previdi-idr-segment-routing-te-policy (including Binding SID TLV)
  - Added support of MPLS local cross connect state

# draft-ietf-idr-te-lsp-distribution

- New NLRI Type: TE Policy NLRI

```
+++++
| Protocol-ID |
+++++
|
| Identifier
| (64 bits)
|
+++++
// TE Policy Descriptors (variable) //
+++++
```

```
+-----+
| Protocol-ID | NLRI information source protocol |
+-----+
| 8 | RSVP-TE |
| 9 | Segment Routing |
+-----+
```

# draft-ietf-idr-te-lsp-distribution

- TE Policy NLRI Descriptors

Tunnel Identifier (Tunnel ID)    +-----+  
                                  |                  Type                  |                  Length                  |  
                                  +-----+  
                                  |                  Tunnel ID                |  
                                  +-----+

LSP Identifier (LSP ID)    +-----+  
                              |                  Type                  |                  Length                  |  
                              +-----+  
                              |                  LSP ID                  |  
                              +-----+

IPv4/IPv6 Tunnel Head-End Address    +-----+  
                                  |                  Type                  |                  Length                  |  
                                  +-----+  
                                  //                  IPv4/IPv6 Tunnel Head-End Address (variable)                  //  
                                  +-----+

IPv4/IPv6 Tunnel Tail-End Address    +-----+  
                                  |                  Type                  |                  Length                  |  
                                  +-----+  
                                  //                  IPv4/IPv6 Tunnel Tail-End Address (variable)                  //  
                                  +-----+

# draft-ietf-idr-te-lsp-distribution

- TE Policy NLRI Descriptors

```
SR TE Policy TLV +-----+
|                Type                |                Length                |
+-----+-----+-----+-----+-----+-----+-----+-----+
|                Distinguisher (4 octets)                |
+-----+-----+-----+-----+-----+-----+-----+-----+
|                Policy Color (4 octets)                |
+-----+-----+-----+-----+-----+-----+-----+-----+
|                Endpoint (4 or 16 octets)                |
+-----+-----+-----+-----+-----+-----+-----+-----+
```

```
MPLS Cross Connect
+-----+-----+-----+-----+-----+-----+-----+-----+
|                Type                |                Length                |
+-----+-----+-----+-----+-----+-----+-----+-----+
|                Incoming label (4 octets)                |
+-----+-----+-----+-----+-----+-----+-----+-----+
|                Outgoing label (4 octets)                |
+-----+-----+-----+-----+-----+-----+-----+-----+
//                Sub-TLVs (variable)                //
```

# draft-ietf-idr-te-lsp-distribution

- BGP-LS Attribute TLV: TE Policy State TLV

```

+-----+
|                Type                |                Length                |
+-----+-----+
|                                     |                                     |
//          TE Policy State Information (variable)          //
|                                     |                                     |
+-----+-----+

```

contains subTLVs in the form of:

```

+-----+-----+
|Protocol-Origin|  Reserved  |                Length                |
+-----+-----+
|                                     |                                     |
//          Protocol specific TE Policy objects          //
|                                     |                                     |
+-----+-----+

```

```

+-----+-----+
| Protocol | LSP Object |
| Origin  | Origin     |
+-----+-----+
|   1     | RSVP-TE   |
|   2     | PCE       |
|   3     | BGP SR TE Policy |
+-----+-----+

```



# draft-gredler-idr-bgp-ls-segment-routing-ext

- Version -03
- This draft contains all the extensions related to Segment Routing
- Added support of Prefix Attributes as defined in RFC7794 and RFC7684
- Added support of IPv6 Prefix-SID as defined in draft-previdi-isis-ipv6-prefix-sid
- Major work has been done in version -00 (after rename) and all TLVs have been defined within BGP-LS namespace
- Multiple interoperable implementation exists
- Authors believe the document is ready for WG call for adoption

# draft-ietf-idr-te-pm-bgp

- Version -03
- BGP-LS TLVs from ISIS/OSPF TE Metric Extensions
  - RFC7471 and RFC7810
- All TLVs are explicitly defined in the draft
  - No longer a reference to ISIS encoding