# Linking BGP SR-TE to Spring concepts

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# Linking BGP SR + BGP SR-TE to Spring Concepts + drafts

**Presentation Presents Problems and Things for Spring to Consider**

**Solution-1:** To better coordinate with Spring, add a Cross-WG section to drafts that includes:

- Link to Spring WG documents [RFC, WG, ID]
- Link to PCE WG documents
- Link to SRv6ops WG documents

**Solution 2:** WG Shepherd reviews will post Cross-WG information for BGP SR, BGP SR-TE, BGP-LS on IDR WG wiki

# Problem

SituSpring creates the concept + IDR creates the BGP mechanism:

- SR-TE: Tunnel Encapsulation Attribute with SR Policy [RFC9830]
- SR: BGP Prefix SID attribute [RFC8669]

1. How do we know if BGP mechanism aligns with the concept?
2. How do we know if BGP mechanism help or hinder the SRPM functions?
3. How does the system encourage interoperability implementations?

Next 5 slides – Show details for your “at Home” viewing

Blue = at IESG Yellow = near IDR WG LC, Red = Adoption pending

| Tunnel Encap TLV | Encap SubTLV [1] | SubTLVs processed [RFC9830] | NLRI attached to (defined) | RFC or Draft |
|---|---|---|---|---|
| **SR Policy [15]** | **No** | **List 1:**<br>Preference [12],<br>Binding SID [13],<br>ENLP [14], Priority [15],<br>SRv6 Binding SID [20],<br>Segment List [128],<br>SR Policy Candidate Path Name [129]<br>SR Policy Name [130]<br><br>SubTLVs from RFC9012 are ignored | 1/73 or 2/73 (SR Policy SAFI) | RFC9830 |
| | | **Explicit NULL Label Policy**<br>**NRP:** | | WG Drafts |
| **SubSubTLVS for Segment list** | | **SubSubTLVs for Segment list**<br>Segment A… Segment K,<br>Weight, Metric, Path segment,<br>Path MTU, ELP<br>Reverse segment list (with subTLVS) | | See draft list<br>On the next slide |

| BGP Prefix-SID Attribute | SubTLVs | NLRI attached to (defined) | RFC or Draft |
|---|---|---|---|
| BGP Prefix-SID (attribute 40) | Label Index [1] | 1/4 (IPv4 Labeled Unicast), 2/4 (IPv6 Labeled Unicast), | RFC8669 |
| | Originator SRBG [3] | | RFC8669 |
| | SRV6 Transport | 1/4 (IPv4 Labeled Unicast), 2/4 (IPv6 Labeled Unicast), | [IA-Transport] |

**IA-Transport = draft-sa-idr-bgp-srv6-mpls-transport-iw-02.txt**

**Tunnel Encaps Attribute (23)**
- **Tunnel Type: SR Policy**
  - **Binding SID [RFC9830]**
  - **Preference [RFC9830]**
  - **Priority [RFC9830]**
  - **Policy Name [RFC9830]**
  - **NRP:** [**draft-ietf-idr-sr-policy-nrp-06]**
  - **Explicit NULL Label Policy** (ENLP) **[draft-ietf-idr-bgp-sr-mpls-elp-00]**
  - **Segment List [RFC9830]**
    - **Weight [RFC9830]**
    - Metric: [draft-ietf-idr-sr-policy-metric]
    - **Segment list identifier: [draft-ietf-idr-sr-policy-seglist-id]**
    - Path Segment: [draft-ietf-idr-sr-policy-path-segment]
    - Path MTU: [draft-ietf-idr-sr-policy-path-mtu-14]
    - **Segment [types A-K: RFC9830, RFC9831]** [types L-O: draft-ietf-idr-sr-te-policy-attr-04.txt]
    - **ELP [draft-ietf-idr-bgp-sr-mpls-elp-00]**
    - Reverse Segment List [draft-ietf-idr-sr-policy-path-segment]
      - Path Segment [draft-ietf-idr-sr-policy-path-segment]
        - Segment [draft-ietf-idr-sr-policy-path-segment]
        - Segment [draft-ietf-idr-sr-policy-path-segment]

**Tunnel Encaps Attribute (23)**

**Tunnel Type: SR Policy**

**Binding SID [RFC9830]**

**Preference [RFC9830]**

**Priority [RFC9830]**

**Policy Name [RFC9830]**

**NRP: [draft-ietf-idr-sr-policy-nrp-06]**

**Explicit NULL Label Policy** (ENLP) **[draft-ietf-idr-bgp-sr-mpls-elp-00]**

Headend behavior [draft-lin-idr-sr-policy-headend-behavior-05]

L2 Headend Behavior [draft-lin-idr-sr-policy-headend-behavior-05]

CP Validity [draft-chen-idr-bgp-sr-policy-cp-validity-04]

Template ID [draft-zhang-idr-sr-policy-template-07]

Schedule Time Information [draft-zzd-idr-sr-policy-scheduling-10]

**Segment List [RFC9830]**

SubSubTLVs under segment list

Constituent SR Policy [draft-jiang-idr-sr-policy-composite-path-04]

Color

Weight

Fowarding Class

Per flow (optional)

**Tunnel Encaps Attribute (23)**

**Tunnel Type: SR Policy**

**Binding SID [RFC9830]**

**Preference [RFC9830]**

**Priority [RFC9830]**

**Policy Name [RFC9830]**

**NRP:** [**draft-ietf-idr-sr-policy-nrp-06]**

**Explicit NULL Label Policy** (ENLP) **[draft-ietf-idr-bgp-sr-mpls-elp-00]**

**Policy Candidate Path Administrative Flags** [draft-lin-idr-sr-policy-admin-flags-03]
[draft-liu-idr-sr-segment-list-optimize-01]

**Segment List [RFC9830]**

**Weight [RFC9830]**

Metric: [draft-ietf-idr-sr-policy-metric]

BLI List [draft-zhang-idr-sr-policy-enhanced-detnet-03.txt

**Segment list identifier: [draft-ietf-idr-sr-policy-seglist-id]**

Path Segment: [draft-ietf-idr-sr-policy-path-segment]

Path MTU: [draft-ietf-idr-sr-policy-path-mtu-14]

**Segment [types A-K: RFC9830, RFC9831]** [**types L-O**: draft-ietf-idr-sr-te-policy-attr-04.txt]

**ELP [draft-ietf-idr-bgp-sr-mpls-elp-00]**

**Segment List Administrative Flags** [draft-lin-idr-sr-policy-admin-flags-03]
[

# Thought questions for Spring

1. Do All the Identifiers help?
   - SR Candidate Policy: Name, Binding SID, NRP
   - Segment list ID, Path Segment

2. How many of the metrics are useful?

For Candidate Path: Preference, Priority

For Segment list

**Weight** **[RFC9830]**

Metric: [draft-ietf-idr-sr-policy-metric]

BLI List [draft-zhang-idr-sr-policy-enhanced-detnet-03.txt

**Segment list identifier: [draft-ietf-idr-sr-policy-seglist-id]**

Path Segment: [draft-ietf-idr-sr-policy-path-segment]

Path MTU: [draft-ietf-idr-sr-policy-path-mtu-14]

# Thought Questions for Spring

3. How and Why does color interact at different levels
 - TLV, SubTLV, SubsubTLV?  (Interoperability ??)

4. Could any of the head end actions interact or conflict?

**Explicit NULL Label Policy** (ENLP) **[draft-ietf-idr-bgp-sr-mpls-elp-00]**

**nrp** **[draft-ietf-sr-policy-nrp]**

Headend behavior [draft-lin-idr-sr-policy-headend-behavior-05]

L2 Headend Behavior [draft-lin-idr-sr-policy-headend-behavior-05]

CP Validity [draft-chen-idr-bgp-sr-policy-cp-validity-04]

Template ID [draft-zhang-idr-sr-policy-template-07]

Schedule Time Information [draft-zzd-idr-sr-policy-scheduling-10]

# Questions for SRv6ops

(optimization: draft-liu-idr-segment-list-optimize-01)

1. Is it a problem to carry both the End SID and VPN SID?
2. Do SRv6 deployments seeing these optimization problems?

- Problem 1: PSP (Penultimate Segment Pop) behavior may not be executable.
- Problem 2: The forwarding efficiency of egress node decreases
  (double lookup/pop) – VPN SID, then END SID
- Problem 3: Increase in size of header by carrying VPN SID AND EndSID

# Background slides (for Questions)

# Tunnel Encapsulation Attribute [RFC9012]

- [RFC9012]  - original TLVs
- [RFC9015] – Service Function Chaining SFC
- [RFC8365] + [RFC7510] - Encapsulations tunnels included
- [RFC8926] – Geneve Encaps

**Current work**

- [RFC9830] – BGP SR TE  (draft-ietf-idr-sr-policy*)
- [SDWAN] - draft-ietf-idr-sdwan-edge-discovery
- [MC-CTL] – draft-ietf-bess-multicast-controller
- [Geneve] - draft-ietf-bess-evpn-geneve-09.txt

Assigned by IANA

Arista specific – lack of online specifications

| Tunnel Encap TLV | Encap SubTLV [1] | SubTLVs | NLRI attached to (defined) | RFC or Draft |
|---|---|---|---|---|
| L2TPv3 over IP [1] | **Yes** | Protocol type [2], Color [4] , Tunnel Egress Endpoint [6], DS field [7] , UDP Port [8], Embedded Label handling [9], MPLS Label Stack [10], Prefix-SID [11] | 1/1 (IPv4 Unicast), 2/1 (IPv6 Unicast), 1/4 (IPv4 Labeled Unicast), 2/4 (IPv6 Labeled Unicast), 1/128 (VPNv4 Labeled Unicast), 2/128 (VPNv6 Labeled Unicast), 25/70 (EVPN) | [RFC9012] |
| GRE [2] | **Yes** | | | |
| IP in IP [7] | **No** | | | |
| VXLAN [8] | **Yes** | | | |
| NVGRE [9] | **Yes** | | | RFC8365 RFC9012 |
| MPLS in GRE [11] | **Yes** | | | |
| VXLAN GPE [12] | **No** | | | |
| MPLS in UDP [13] | **No** | Unknown limit | TBD | RFC7510 |
| **SR Policy [15]** | **No** | List 1 | 1/73 or 2/73 (SR Policy SAFI) | RFC9830 |
| Geneve [19] | **No** | Geneve SubTLV | 25/70 (EVPN) | GENEVE |
| ANY-Encap [20] | **No** | List 2 | TBD | MC-CTL |
| SDWAN Hybrid [25] | **No** | List 3 | 1/1, 2/1, 1/128, 2/128, 1/74, 2/74 | SDWAN |
| Load balancing | No | List 4 | TBD | MC-CTL |
| Segment list | No | List 5 | TBD | MC-CTL |