SR-Policy YANG

draft-raza-spring-sr-policy-yang-02

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Overview

- YANG data model for SR Traffic-Engineering Policies
  - Configure, instantiate, and manage

- The model is:
  - Aligned with SR-policy architecture doc (draft-ietf-spring-segment-routing-policy)
  - Generic and apply equally to the SR-MPLS and SRv6 instantiations of SR policies
Modules

- **ietf-sr-policy-types**: defines common and basic types related to an SR policy and related constructs

- **ietf-sr-policy**: defines the model for SR policy configuration and management
ietf-sr-policy-types

- dataplane-type: MPLS or SRv6
- sid-value-type: Label or IPv6 SID
- segment-type
- path-disjointness: link, node, ..
- binding-sid-alloc-mode: Dynamic vs Explicit
- explicit-binding-sid-rule-type: BSID Explicit alloc mode rules/enforcements
- Protocol-origin-type: CLI, PCEP, …
ietf-sr-policy-types (2)

- State:
  - binding-sid-oper-state
  - policy-admin-state
  - policy-oper-state
  - policy-down-reason
  - candidate-path-non-selection-reason
  - binding-sid-unavailable-reason
ietf-sr-policy: Hierarchy

```
segment-routing
  traffic-engineering
    + attributes
      + affinity-map
        ....
        + segment-lists
          segment-list* [name]
          segments
          segment* [index]
          ...
          + explicit-binding-sid-rules
            ...
          + policies
            policy* [color endpoint]
            ...
            + binding-sid
              ...
            + candidate-paths
              candidate-path* [protocol-origin originator discriminator]
              ...
              + type
                + explicit
                  + segment-lists
                    segment-list* [ref]
                    ...
                    + dynamic
                      constraints
                      ...
```

augments: /rt: routing
ietf-sr-policy: Config - Attributes

```
---rw attributes
  ---rw affinity-map
    | ---rw affinity* [name]
    |     ---rw name string
    |     ---rw bit-position? uint16
  ---rw segment-lists
    | ---rw segment-list* [name]
    |     ---rw name string
    |     ---rw segments
    |     | ---rw segment* [index]
    |     |     ---rw index uint32
    |     |     ---rw type? sr-policy-types:segment-type
    |     |     ---rw segment-types
    |     |     | ---rw segment-type-1
    |     |     |     ---rw sid-value? rt-types:mpls-label
    |     |     |     ---rw segment-type-2
    |     |     |     ---rw sid-value? srv6-types:srv6-sid
    |     |     |     ---rw segment-type-3
    |     |     |     | ..
    |     |     |     | ..
    |     |     |     | ...
    |     |     | ---rw segment-type-11
    |     |     |     ..
    |     |     |     ..
    |     | ---rw explicit-binding-sid-rules* [index]
    |     |     ---rw index uint32
    |     |     ---rw rule? sr-policy-types:explicit-binding-sid-rule-type
```
ietf-sr-policy: Config-policy

```plaintext
+++rw policies
    +++rw policy* [color endpoint]
        +++rw color            uint32
        +++rw endpoint         inet:ip-address
        +++rw name?            string
        +++rw description?     string
        +++rw admin-state?     sr-policy-types:policy-admin-state
        +++rw priority?         uint8
        +++rw binding-sid
            | +++rw dataplane?     sr-policy-types:dataplane-type
            | +++rw value?         sr-policy-types:sid-value-type
        +++rw candidate-paths
            +++rw candidate-path* [.....]
```
ietf-sr-policy: Config - candidate-path

---rw candidate-path* [protocol-origin originator discriminator]
  ---rw protocol-origin       sr-policy-types:protocol-origin-type
  ---rw originator           string
  ---rw discriminator         uint32
  ---rw preference            uint32
  ---rw name?                 string
  ---rw description?          string
  ---rw binding-sid {capability-candidate-path-binding-sid}?
    | ---rw dataplane?      sr-policy-types:dataplane-type
    | ---rw value?          sr-policy-types:sid-value-type
  ---rw (type)?              
    ---:(explicit)
      | ---rw segment-lists
      |     ---rw segment-list* [name-ref]
      |     | ---rw name-ref       -> /rt:routing/sr-policy:segment-routing/.../segment-list/name
      |     | ---rw weight?        uint32
    ---:(dynamic)
      | ---rw sid-dataplane-type? sr-policy-types:dataplane-type
  ---rw constraints
    ---rw affinities
      | ---rw exclude-any*     string
      | ---rw include-any*     string
      | ---rw include-all*     string
    ---rw bounds
      | ---rw igp-metric-bound? uint32
      | ---rw te-metric-bound? uint32
      | ---rw latency-metric-bound? uint32
      | ---rw segment-bound?   uint32
    ---rw segment-rules
      | ---rw sid-algorithm?   uint8
  ---rw disjoint-path
    | ---rw group-id?         uint32
    | ---rw disjointness-type? identityref
    | ---rw subgroup-id?      uint32
ietf-sr-policy: policy state

- policy operational state
- policy up/down timestamps
- policy BSID info such as alloc mode, actual value in-use,
  operational state, and forwarding stats
- Per candidate-path info such as:
  - Whether candidate-path is the best candidate-path
  - In case of non-best, the reason for such non-selection
  - Type of candidate-path - explicit or dynamic
- Per segment-list information - such as validity of the segment-list, as well as forwarding state for a valid segment-list.

In addition to configured state

```
+-rw policy* [color endpoint]
  |  +--rw color [uint32]
  |  +--rw endpoint [inet:ip-address]
  |  |  +--ro oper-state? [sr-policy-types:policy-oper-state]
  |  |  +--ro transition-count? [uint32]
  |  |  +--ro up-time? [yang:date-and-time]
  |  +--ro down-time? [yang:date-and-time]
  |  +--rw binding-sid
  |  |  +--ro alloc-mode? [sr-policy-types:binding-sid-alloc-mode]
  |  |  +--ro allocated-sid? [sr-policy-types:binding-sid-value-type]
  |  +--ro oper-state? [sr-policy-types:binding-sid-oper-state]
  +--ro counters
    |  +--ro pkts? [yang:counter64]
    |  +--ro octets? [yang:counter64]
  +--rw candidate-paths
    +--rw candidate-path* [protocol-originator discriminator]
      +--rw protocol-origin [sr-policy-types:protocol-origin-type]
      |  +--rw originator [string]
      |  +--rw discriminator [uint32]
      |  +--rw name [string]
      |  +--ro is-best-candidate-path? [boolean]
      |  +--ro non-selection-reason? [identityref]
      |  +--ro is-valid? [boolean]
      +--rw forwarding-paths
        +--rw forwarding-path* [path-id]
          +--ro path-id [uint8]
          +--ro next-hop-address? [inet:ip-address]
          +--ro next-hop-table-id? [uint32]
          +--ro interface? [interface-ref]
          +--ro sid-list
            |  +--ro ( dataplanetype)?
            |    |  +--ro labels* [label]
            |    |    |  +--ro label [rt-types:mpls-label]
            |    |  +--ro (srv6)?
            |    |    |  +--ro sids* [sid]
            |    |    |    |  +--ro sid [srv6-types: srv6-sid]
            +--ro is-protected? [boolean]
            +--ro is-pure-backup? [boolean]
            +--ro backup-path-id? [uint8]
            +--ro weight? [uint32]
```
ietf-sr-policy: notifications

- policy status: policy operational state changes
- Candidate-path active status and changes
- Explicit Binding SID collision/unavailability events

```
notifications:
  +--- n sr-policy-oper-state-change-event
  |        . . .
  |    +--- ro policy-new-oper-state? sr-policy-types:policy-oper-state
  |    +--- ro policy-down-reason? identityref
  +--- n sr-policy-candidate-path-change-event
    . . .
    |        . . .
    |    +--- ro existing-preference? uint32
    |    +--- ro new-preference? uint32
  +--- n sr-policy-binding-sid-unavailable-event
    . . .
    |    +--- ro policy-binding-sid-value-ref? -> . . .
    |    +--- ro reason? identityref
  +--- n sr-policy-candidate-path-binding-sid-mismatch-event
        . . .
        |    +--- ro existing-candidate-path-preference-ref? -> . . .
        |    +--- ro existing-candidate-path-binding-sid-dataplane-ref? -> . . .
        |    +--- ro existing-candidate-path-binding-sid-value-ref? -> . . .
        |    +--- ro conflicting-candidate-path-protocol-origin? uint8
        |    +--- ro conflicting-candidate-path-preference? uint32
        |    +--- ro conflicting-candidate-path-binding-sid-dataplane? sr-policy-types:dataplane-type
        |    +--- ro conflicting-candidate-path-binding-sid-value? sr-policy-types:sid-value-type
```
Pending Items

- Configuration and Specification of:
  - Traffic steering over SR policy
  - ODN templates

- Executables (RPC actions)
Next Steps

- Asking for WG adoption
- Further updates as per WG feedback