SR Generic FEC TLV for LSP Ping

draft-nainar-mpls-spring-lsp-ping-sr-generic-sid

Nagendra Kumar Nainar, Ed.
Carlos Pignataro, Ed.
Zafar Ali (Presenter)
Clarence Filsfils
(Cisco Systems, Inc.)
Problem Statement

- Requires new target FEC Stack sub-TLV definition and standardization efforts for each new Segment ID defined.
  - Define new TLV.
  - Update FEC validation procedure of RFC-8029

- Requires domain/node wide software upgrade depending on the type of the Segment ID defined.

- Raises scalability challenges.
Problem Statement (A partial list of New SR FECs)

BGP Peer Node SID

BGP Peer Adj-SID

BGP Peer Set SID

BGP Peer Set SID Sub-TLVs

FEC changes for Flex-Algo
Problem Statement (Cont’ed)

- Requires a lot of information to be derived by the Initiator to include in the Echo Request.
- Complex FEC filling procedures at Ingress (one for each Prefix SID type).
- Complex validation procedures at Egress (one for each Prefix SID type).
Solution

- **SR SID data model is:**
  - Segment ID (Label)
  - SID Assigner

- **FEC validation Procedure**
  - Segment ID to Interface mapping is maintained by any node.
    - Local implementation matter
  - Initiator defines the SID value and LSP EndPoint while triggering LSP Ping
    - Manually defined via CLI or dynamic PCE query.
  - Responder validates the LSP End Point and incoming interface.
    - Respond based on the validation.
### SR Generic Label Sub-TLV

<table>
<thead>
<tr>
<th>SR SID (20 Bits)</th>
<th>SID Assigner (32 Bits)</th>
<th>LSP End Point (Optional; may be 0.0.0.0)</th>
</tr>
</thead>
</table>

- **SR SID**
  - Carries 20 bits of Segment ID used for validation.

- **SID Assigner**
  - Node address of the Segment ID assigner.

- **LSP End Point**
  - Node address of the endpoint that terminates the LSP.
  - LSP End Point may be set to 0.0.0.0 by the initiator.
    - E.g., for parallel adjacency.
  - If LSP End Point address is set, the Egress MAY skip the SID assigner check.
    - E.g., for BSID
Procedure
Prefix SID Validation

- Initiator (R1) triggers LSP Ping with below SR Generic Label Sub-TLV:
  - For Prefix SID 160008 {SID=160008; SID Assigner = R8; LSP-EndPoint = R8}
  - For Prefix SID 161288 {SID=161288; LSP-EndPoint = R8}

- R8 validates if LSP-EndPoint == self; and if 160008 is assigned locally.
Initiator (R1) triggers LSP Ping with below SR Generic Label Sub-TLV:
- For Parallel Adj SID 9378 \{SID=9378; SID Assigner = R7; LSP-EndPoint = R8\}

R8 validates if LSP-EndPoint == self; and if Inteface-I matches interface for 9378.
Procedure
Parallel Adj-SID Validation

- Initiator (R1) triggers LSP Ping with below SR Generic Label Sub-TLV:
  - For Parallel Adj SID 9378 \{SID=9378; SID Assigner = R7; LSP-EndPoint = 0.0.0.0\}

- Responder (R8 or R88) validates if SID Assigned==upstream; validates if Inteface-I matches interface for 9378.
R8 maintains the below mapping:

- 160008 → Incoming Interface: \{Any\}
- 161288 → Incoming Interface: \{Any\}
- 9178 → Incoming Interface: \{Link 1\}
- 9278 → Incoming Interface: \{Link 2\}
- 9378 → Incoming Interface: \{Link 1 or Link 2\}

16000x → Prefix SID for Rx for Algo 0
16128x → Prefix SID for Rx for Algo 128
9zxy → Adj-SID from Rx to Ry over Link z
In a nut shell

- One Target FEC Stack Sub-TLV that covers multiple Segment IDs.
- Drastically reduces the information required on the Initiator.
  - Ease of operation.
- Reduces the information to be processed by the responder.
- Extendable to accommodate future Segment IDs.
IANA Registry Allocation

- Request for a new Sub-TLV for TLV types 1, 16 and 21.
- Value from range 38-31743 (Unassigned range)
- Re-uses existing Return codes and Return Sub-codes
I-D Status

➢ Next Steps:
  o WG feedback sought
  o Textual Contributions Welcomed!
  o WG Adoption after Singapore

➢ Thank you!
Details
Responder behavior

Pre-fix SID Any flex-algo

Orig_addr is self.address??

Yes

sr_label is in local database??

Yes

Top-label == Imp-Null

No

set RSC==10

Yes

set RSC==8 (Label switched)

No

Set RSC == 3 (OK)

No

Top-label == Imp-Null

No

Orig_addr is in Topology database??

Yes

sr_label advertised by orig_addr

No

Set RSC == 10 (no mapping for FEC)

No

sr_label == adj-sid??

Yes

Orig_addr is upstream neighbor??

Yes

Interface-I matches the incoming interface??

Set RSC == 3

No

Set RSC == 35 (Mapping for FEC does not match incoming IF)

No

Set RSC == 3 (OK)

No

Set RSC == 35 (Mapping for FEC does not match incoming IF)

No

Set RSC == 10 (no mapping for FEC)

No

Set RSC == 3 (OK)