BGP Extensions of SR Policy for Path Protection

draft-lp-idr-sr-path-protection

Yao Liu, Peng Shaofu@ZTE

IDR WG         IETF#112          Nov, 2021
Candidate Path for Path Protection:

- An SR Policy allows for multiple candidate paths.
- An single active candidate path is provisioned in the forwarding plane and used for traffic steering.
- Another candidate path MAY be designated as the backup. Configuration or local policy may be needed on the headend node.
- Provide protection only when all the segment lists in the active CP are invalid.

Segment lists for path protection:

- Scenarios like load balancing.
- Flexible protection relationship between segment lists.
- [draft-ietf-pce-multipath] proposes extensions to PCEP to provide backup segment lists for path protection.

This document proposes extensions of BGP to provide path protection using segment list(s) when delivering SR policy.
BGP Extensions for SR Policy

- **B-Flag in Segment List Sub-TLV**
  
  ```
  +-----------------+-----------------+-----------------+
  | Type | Length | B | RESERVED |
  +-----------------+-----------------+-----------------+
  // sub-TLVs
  +-----------------+-----------------+-----------------+
  
  Segment List sub-TLV

- **B-Flag (Backup Flag): one bit. It indicates the segment list acts as a pure backup path in the candidate path.**

- **List Identifier Sub-TLV**
  
  ```
  +-----------------+-----------------+-----------------+
  | Type | Length | RESERVED |
  +-----------------+-----------------+-----------------+
  | List Identifier |
  +-----------------+-----------------+-----------------+
  ~ Optional TLVs
  +-----------------+-----------------+-----------------+
  
  List Identifier Sub-TLV

- **List Identifier: Identifier of the corresponding segment list**

- **List Protection Sub-TLV**
  
  ```
  +-----------------+-----------------+-----------------+
  | Type | Length | RESERVED |
  +-----------------+-----------------+-----------------+
  | Backup List ID 1 |
  +-----------------+-----------------+-----------------+
  | ... |
  +-----------------+-----------------+-----------------+
  | Backup List ID N |
  +-----------------+-----------------+-----------------+
  
  List Protection Sub-TLV

SR Policy SAFI NLRI:
Attributes:
- Tunnel Encaps Attribute (23)
  - Tunnel Type: SR Policy
  - Binding SID
  - SRv6 Binding SID
  - Preference
  - Priority
  - Policy Name
  - Policy Candidate Path Name
  - Explicit NULL Label Policy (ENLP)

Segment List
```List Identifier
```List Protection Info
Weight
Segment
Segment
...
Segment List
...
...
BGP-LS Extensions for Segment List States

- [draft-ietf-idr-te-lsp-distribution] describes a mechanism to collect the Traffic Engineering and Policy information that is locally available in a node and advertise it into BGP Link State (BGP-LS) updates.

- Flags in SR Candidate Path (CP) State TLV

  ++++++++ |S|A|B|E|V|O|D|C|I|T|+++++++ 
  |0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 |
  ++++++++ 

  - S-Flag : Indicates the CP is in administrative shut state
  - B-Flag : Indicates the CP is the backup path

- New Flags in SR Segment List TLV

  ++++++++ |D|E|C|V|R|F|A|T|M|B|S|+++++++ 
  |0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 |
  ++++++++ 

  - S-Flag : Indicates the segment list is in administrative shut state
  - B-Flag : Indicates the segment list is the backup path
History of the Draft

• Presented in IDR in IETF#109
  - comments from Ketan Talaulikar and John Scudder: first in Spring WG before bringing up protocol mechanisms for adoption
• Presented in SPRING in IETF#111
Next Steps

- Request feedbacks and comments
- WG Apotion?
Thank You !