Path Computation Element Communication Protocol (PCEP) Extensions to Redundancy Policy

draft-yang-pce-pcep-redundancy-policy-00

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Background

Redundancy protection is a generalized protection mechanism by

- replicating the service packets on redundancy node
- transmitting copies of flow packets over multiple different and disjoint paths
- eliminating the redundant packets at merging node

- `draft-ietf-spring-redundancy-protection-01` introduces Redundancy SID (R SID) and Merging SID (M SID) to execute replication and elimination behavior in data plane
- `draft-geng-spring-redundancy-policy-04` introduces Redundancy Policy to instruct multiple redundancy forwarding paths in control plane
- `draft-yang-idr-bgp-redundancy-policy-00` introduces BGP extensions to advertise Redundancy Policy attribute in control plane
- This I-D introduces PCEP extensions to request path computation and protection method, and advertise Redundancy Policy in control plane
What is Redundancy Policy?

• is a variant of SR Policy with minimum changes
• to instruct the replication of service packets and assign more than one redundancy forwarding paths
• applies to both SR-MPLS and SRv6
PCEP Extensions Summary

1. two new TLVs of RP Object to support the request of redundancy path computation and protection method
2. one new TLV to distribute the Candidate Path Flag of an SR Policy
RP Object sub-TLVs(1) - Redundancy Protection TLV

- **Type**: to be allocated by IANA.
- **Length**: 16-bit value to indicate the length of the value portion in bytes.
- **Flags**: 8-bit bitmap to indicate the redundancy constraint of path computation that PCC requires.
- **Number**: 8-bit value to indicate how many redundancy forwarding paths requires. The range of the number is recommended from 2 to 8.
- **RESERVED**: 16-bit of reserved bits.

- Request PCE to compute multiple redundancy forwarding paths with the intention of redundancy protection.
- PCC MUST include the Redundancy Protection TLV in PCReq message.
- PCE replies with the required number of redundancy forwarding paths with the computed paths.
RP Object sub-TLVs(2) - Protection Type TLV

- **Type**: to be allocated by IANA.
- **Length**: 16-bit value to indicate the length of the value portion in bytes.
- **Protection**: 4-bit value to indicate the protection type of path computation that PCC requires. The following Table gives the values and corresponding protection types.
- **RESERVED**: 24-bit of reserved bits.

- Request PCE to differentiate the protection types.
- PCC MUST include the Protection Type TLV in PCReq message.
- PCE replies with the specific protection type in PCRep message.
SR Policy Candidate Path Flag TLV

- **Type**: to be allocated by IANA.
- **Length**: specifies the length of the value field not including Type and Length fields.
- **Flag**: 8-bit bitmap of Flag. A new registry "SR Policy Candidate Path Flags" is created. One flag is defined at this writing.
- **RESERVED**: 3-octet of reserved bits.

- The definitions of SR Policy Association Type (SRPAT) and SR Policy Association Group (SRPAG) apply same to Redundancy policy
- A new SR Policy Association Type TLV called SR Policy Candidate Path Flag TLV is defined.
- This Flag identifier MUST NOT change for a given LSP during its lifetime.
- When these rules are not satisfied, the PCE MUST send a PCErr message with Error-Type = 26 "Association Error", Error Value = TBD4 "SR Policy Candidate Path Flag Mismatch".

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IANA Considerations

• Three new TLVs

<table>
<thead>
<tr>
<th>Value</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>TBD1</td>
<td>Redundancy Protection TLV</td>
</tr>
<tr>
<td>TBD2</td>
<td>Protection Type TLV</td>
</tr>
<tr>
<td>TBD3</td>
<td>SR Policy Candidate Path Flag TLV</td>
</tr>
</tbody>
</table>

• One new Error-Value within the "Association Error" Error-Type

<table>
<thead>
<tr>
<th>Error-Type</th>
<th>Meaning</th>
<th>Error-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>26</td>
<td>Association Error</td>
<td>TBD4: SR Policy Candidate Path Flag Mismatch</td>
</tr>
</tbody>
</table>
Next step

1. Discussion on mailing list
2. Keep align with progress in SPRING

As always, comments and suggestions are greatly welcome! Thank you for listening!