PCEP Extensions for Establishing Relationships Between Sets of LSPs

draft-ietf-pce-association-group-03
Introduction

- A generic mechanism to create a grouping of LSPs in the context of a PCE.
- This grouping can then be used to define associations between sets of LSPs or between a set of LSPs and a set of attributes.
- ASSOCIATION Object is defined for this purpose.
  - Can be carried in PCUpd, PCRpt, PCInitiate and PCReq.
- Other documents define Association Types
  - WG - Diversity, Policy.
  - Individual - Protection, Bi-direction, VN, attributes, MBB, ECMP, multi-layer.
## Associations

<table>
<thead>
<tr>
<th>Dynamic Associations</th>
<th>Operator-Configured Associations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Associations that are created dynamically by the PCEP peers (E.g. Protection)</td>
<td>Association that are created by the operator manually (E.g. Policy)</td>
</tr>
<tr>
<td>The associations along with the set of LSPs are conveyed to a PCEP peer.</td>
<td>PCEP speaker then could ask for a LSP to join the operator-configured association. Association are known to the PCEP peer before hand via manual configurations.</td>
</tr>
<tr>
<td>The association identifier is allocated dynamically by the PCEP speaker</td>
<td>The association identifier, type, as well as the association source IP address is manually configured by the operator.</td>
</tr>
<tr>
<td>The association exist as long as the LSP state.</td>
<td>The association exist until removed manually by the operator.</td>
</tr>
</tbody>
</table>
Operator-configured Association Range

- For the association types that could be dynamic and operator-configured, it is necessary to configure a range of association identifiers that are marked for operator-configured associations to avoid any association identifier clash.

- Dynamic associations MUST NOT use the association identifier from this range.

- This range needs to be communicated to a PCEP peer in the Open Message.

  - Operator-configured Association Range - OP-CONF-ASSOC-RANGE TLV
  - Advertise the Operator-configured Association Range for an association type.
  - For association types that are only dynamic or only operator-configured, the TLV can be skipped.
  - Each association type can specify the default value for the operator-configured association range for their respective association type.
## New Error Codes

<table>
<thead>
<tr>
<th>Error-Type</th>
<th>Error-Value</th>
<th>Meaning</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Association Error</td>
<td>1</td>
<td>Association-type is not supported</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Too many LSPs in the association group</td>
<td>Limit set by operator or local policy</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Too many association groups</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Association unknown</td>
<td>Used in PCReq</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>Operator-configured association information mismatch</td>
<td>Mismatch with local configured information</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>Association information mismatch</td>
<td>Mismatch with past information</td>
</tr>
</tbody>
</table>
Processing Rules

- The association information is cleared along with the LSP state information.

- When a PCEP session is terminated, after expiry of State Timeout Interval at PCC, the LSP state associated with that PCEP session is reverted to operator-defined default parameters or behaviors. Same procedure is also followed for the association information.

- On session termination at the PCE, when the LSP state reported by PCC is cleared, the association information is also cleared.

- Where there are no LSPs in a association group, the association is considered to be deleted.

- In case the LSP is delegated to another PCE on session failure, the association information set by the PCE remains intact, unless updated by the new PCE.

- Upon LSP delegation revocation, the PCC MAY clear the association created by the PCE, but in order to avoid traffic loss, it can perform this in a make-before-break fashion.
Summary of Updates

- Dynamic and Operator-Configured Association.
- Operator-Configured Association Range.
- Removed restriction of who could initiate association with LSP that do not share the Head node.
- Removed the restriction on Association Source.
- Error Handling
- Manageability and Security Considerations
Note to Association Draft Authors

- State if the association-type is
  - Dynamic
  - Operator-Configured
  - Both

- In case of Both, set aside a default range for Operator-Configured Association.

- Thanks!
Status and Next Step

• Discussed with all association draft authors
• Incorporated comments from Stephane, Rakesh, and Mustapha! Thanks!
• More eyes and reviews are welcome!
• Lets discuss IANA Early Allocation / Last Call?
Thank you!