PCECC for P2MP / SRv6

draft-dhody-pce-pcep-extension-pce-controller-p2mp-00
draft-dhody-pce-pcep-extension-pce-controller-srv6-00
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Introduction

RFC 8283 is published

• An architecture for use of PCE/PCEP in a network with central control.
• Introduces the architecture for PCE as a central controller and examines the motivations/applicability for PCEP as a control protocol in this environment.
• A PCE-based central controller can simplify the processing of a distributed control plane by blending it with elements of SDN and without necessarily completely replacing it.

PCECC Extentions

• Basic PCECC [I-D.zhao-pce-pcep-extension-for-pce-controller] WG adoption call
• PCECC-SR [I-D.zhao-pce-pcep-extension-pce-controller-sr] WG adoption pending
• Both were presented in IETF 102
Basic PCECC Mode

LSPs are provisioned as explicit label instructions at each hop on the end-to-end path.

Each router along the path must be told what label forwarding instructions to program and what resources to reserve.

The controller uses PCEP to communicate with each router along the path of the end-to-end LSP.

PCECC will take responsibility for managing some part of the MPLS label space for each of the routers that it controls.
PCECC-P2MP

• [I-D.ietf-pce-stateful-pce-p2mp] specify the extensions that are necessary in order for the deployment of stateful PCEs to support P2MP TE LSPs

• PCECC – P2MP additional requirement
  • A branch node is an LSR that replicates the incoming data on to one or more outgoing interfaces.

• At the branch node N3 -
  • Incoming Label : B
  • Outgoing Label: (C, towards N4) and (D, towards N5)
  • 3 instances of CCI object in PCIInitiate message for each label
PCECC-P2MP

• A new M-bit is added in PCECC-CAPABILITY

• CCI Object Type = 1 for MPLS Label is already defined

• For P2MP branch node, multiple CCI objects with outgoing flag is included.

• No change in RBNF required; <cci-list> takes care of it!

<PCInitiate Message> ::= <Common Header>  
                           <PCE-initiated-lsp-list>
Where:
                           <Common Header> is defined in [RFC 5440]

                           <PCE-initiated-lsp-list> ::= <PCE-initiated-lsp-request>
                           [<PCE-initiated-lsp-list>]

                           <PCE-initiated-lsp-request> ::= 
                           (<PCE-initiated-lsp-instantiation>
                           | <PCE-initiated-lsp-deletion>
                           | <PCE-initiated-lsp-central-control>)

                           <PCE-initiated-lsp-central-control> ::= <SRP>
                           (<LSP>  
                           <cci-list>) |  
                           (<FEC>  
                           <CCI>)

                           <cci-list> ::= <CCI>
                           [<<cci-list>]>
SR PCECC Mode

PCECC can use PCEP for SR SID (Segment Identifier) distribution on the SR nodes.

- SR SID is just another central controller instruction (CCI)
- A new CCI Object Type for SR is defined

PCECC needs to be in control of label space to make SR SID allocation

- Node/Prefix
- Adjacency
PCECC-SRv6

• [I-D.negi-pce-segment-routing-ipv6] extends the PCEP-SR procedure to include support for SRv6 paths.

• PCECC-SRv6 require support for SRv6 SID allocation and distribution via PCEP.

• A new CCI object type for SRv6 is needed.

• A new I-bit is added in PCECC-CAPABILITY for SR in IPv6 and a new PST is defined.

• On receiving the SRv6 node/prefix SID allocation:
  • For the local SID, update SID with associated END function in "My Local SID Table".
  • For the non-local SID, use the local routing information to determine the next-hop and download the forwarding instructions accordingly.

• Similarly each adjacency is assigned a SRv6 adj SID
PCECC-SRv6

These fields are already defined for SR-MPLS!

Associated “function” of the SRv6 SID

128-bit SRv6 Segment

Question: is it worth encoding LOC:FUNC separately?
<table>
<thead>
<tr>
<th>Question &amp; Next Steps</th>
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<tbody>
<tr>
<td>Are these features useful?</td>
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<tr>
<td>Are these extensions on the right track?</td>
</tr>
<tr>
<td>Reviews?</td>
</tr>
</tbody>
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Thank You!