Applicability of Stateful PCE

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draft-zhang-pce-stateful-pce-app-00.txt

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Outline

• Introduction

• General Considerations for Stateful PCE

• Stateful PCE Applicability

• Summary and Next Step
Introduction

What is stateful PCE?

- A PCE having the following two databases: (RFC4655)
  
  o Traffic Engineering DB (TED)
    - Topology
    - Resource Usage Information
  
  o LSP DB
    - The set of computed paths
    - Reserved resources in use in the network
      (i.e. information about existing LSPs)
General Considerations

◆ Architecture Considerations
  o Composite PCE architecture NOT RECOMMENDED for stateful PCE
  o Not exclude the co-existence of stateful and stateless PCEs

◆ LSP DB Synchronization
  o Between stateful PCE and the network
  o Among stateful PCEs in single, multiple domain or multiple layer networks

◆ PCE Survivability/Reliability

◆ Delegation and Policy
Stateful PCE Applicability (1/4)

- Impair-aware RWA in WSON networks

A NEW request (C – E)

**Constraint**: do not impact existing traffic (e.g. LSP1, LSP2)

LSP1 ($\lambda_1$, modulation & impairment info.)

LSP2 ($\lambda_2$, modulation & impairment info.)

Node A

Node B

Node C

Node D

Node E

WSON network

Existing LSP

Stateful PCE

Stateless PCE

Having LSP info.

No LSP Info.
Stateful PCE Applicability (2/4)

- Recovery
  - Protection – Objective: shared protection, against single link failure

Step 1:
PCReq (E-F)
Working + Protection

Step 2:
Working: E-F
Constraint: no share with W2
Protection: E-H-I-F

Step 3:
Working: E-F
Protection: E-H-I-F

Diagram:
- A to B
- C to D
- E to F to G
- H to I
- Existing Working LSP
- Existing Protection LSP
- New LSP request (e.g., E->F)
Stateful PCE Applicability (3/4)

◆ Recovery

- Restoration – multiple rerouting requests (not necessarily the same time)

**Step 2:**
1) Any other affected LSPs? Yes
2) Reroute all affected LSPs

**Step 1:**
- PCReq (E-F)
- C-D failed

**Step 3:**
- Reroute Replies (LSP1, LSP2)
Stateful PCE Applicability(4/4)

- Time-based Scheduling

<table>
<thead>
<tr>
<th>LSP ID</th>
<th>Time</th>
<th>Resource</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>T1-T2</td>
<td>E-C-D-G</td>
</tr>
<tr>
<td>2</td>
<td>T2-T4</td>
<td>E-C-D-F</td>
</tr>
<tr>
<td>3</td>
<td>T3-T4</td>
<td>E-F</td>
</tr>
</tbody>
</table>

- SRLG Diversity
- Defragmentation in flexible grid networks
- Maintenance of Virtual Network Topology
- GCO (Incremental)
- P2MP Application
Summary & Next Step

• Stateful PCE work should be driven by the general applicability and use cases. This document addresses these needs.

• Welcome feedback from the meeting or mailing list and further revision