Performance Analysis of Inter-Domain Path Computation Methodologies

draft-dasgupta-ccamp-path-comp-analysis-00.txt

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Motivation

• Identify performance metrics for comparison
  – Path cost
  – Signaling Failure
  – Crankback Signaling (RFC4920)
  – Failed TE-LSP/Bandwidth on link failure
  – TE-LSP/Bandwidth setup capacity

• Quantify these metrics on realistic topologies and traffic loads using simulations

• Useful data to share with the community

• Not to draw any conclusion per say
## Topologies and TE-LSP Sizes

<table>
<thead>
<tr>
<th>Domain Name</th>
<th># of nodes</th>
<th># of links</th>
<th>OC48 links</th>
<th>OC192 links</th>
<th>[0,20) Mbps</th>
<th>[20,100) Mbps</th>
</tr>
</thead>
<tbody>
<tr>
<td>$D_1$</td>
<td>17</td>
<td>24</td>
<td>18</td>
<td>6</td>
<td>125</td>
<td>368</td>
</tr>
<tr>
<td>$D_2$</td>
<td>14</td>
<td>17</td>
<td>12</td>
<td>5</td>
<td>76</td>
<td>186</td>
</tr>
<tr>
<td>$D_3$</td>
<td>19</td>
<td>26</td>
<td>20</td>
<td>6</td>
<td>14</td>
<td>20</td>
</tr>
<tr>
<td>$D_4$</td>
<td>9</td>
<td>12</td>
<td>9</td>
<td>3</td>
<td>7</td>
<td>18</td>
</tr>
<tr>
<td>MESH Backbone</td>
<td>83</td>
<td>167</td>
<td>132</td>
<td>35</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>SYM Backbone</td>
<td>29</td>
<td>37</td>
<td>26</td>
<td>11</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

### Diagrams

- **MESH**
- **SYM**
Scenarios Analyzed

• TE-LSP setup
  – Per-domain method (PD-Setup)
  – (PCE) BRPC method (PCE-Setup)

• Link Failures in the network
  – Per-domain method (PD-Failure)
  – (PCE) BRPC method (PCE-Failure)

• Results presented here are for MESH
• Results for SYM in the draft and are similar
### Path Cost

1. Max path cost distribution
2. Average path cost distribution

- 1. Max path cost for a TE-LSP in the simulation
- 2. Average of all path costs for a TE-LSP in the simulation
Signaling Failure

- Number of signaling failures experienced while setting up/rerouting a TE-LSP over the duration of the simulation.
Crankback Signaling

1. Number of crankbacks distribution
2. Delay from crankback distribution

- 1. Total number of crankbacks while setting up/rerouting a TE-LSP over the duration of the simulation
- 2. Sum of link costs the crankback signal traverses = proportional delay during setup

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Failed TE-LSP/Bandwidth on link failure

- TE-LSPs where no route is found after a link on its route fails
Conclusion

• Several significant metrics for performance analysis are identified
• Metrics quantified under realistic scenarios
• Important insight into the two path computation methodologies
• Useful data for the community