Interworking of GMPLS Control and Centralized Controller System

CCAMP WG, IETF101, London, UK

draft-zheng-ccamp-gmpls-controller-inter-work-01

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Motivation of this work

DP = Data Plane;
CP = Control Plane (with GMPLS)

GMPLS Control Plane
- RSVP-TE
- OSPF-TE
- LMP

Centralized Controllers
- ACTN Controllers
- RESTconf/YANG
- PCE Protocol

Inter-work?
Changes from -00

• Adding two co-authors;
• Updating the Scenarios that request interwork;
  – Topology Collection & Sync
  – Multi-domain/layer Service Provisioning
  – Controller Reliability
• Make the reference up-to-date;
### Scenario - Topology

#### Interface Type

1. **Neighbor Level**: Topo Discovery and info exchange;
2. **NE Level**: Flooding the info to each connected NE;
3. **From PCE/Controller to NE**: Interaction between PCE/Controllers to NE;

#### Topology Overview

- **Controller**
- **PCE**
- **Transport Network**

#### IF Type: Topology Initiation

<table>
<thead>
<tr>
<th>IF Type</th>
<th>Topology Initiation</th>
<th>Topology Update (e.g. add one node)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>LMP</td>
<td>Number of LMP message: increase accordingly;</td>
</tr>
<tr>
<td>2</td>
<td>OSPF (ISIS)</td>
<td>Message: each message will flood additional info;</td>
</tr>
<tr>
<td>3</td>
<td>PCEP/Netconf</td>
<td>New PCEP session from new node to PCE; Need new message to configure the new node; Database will be updated;</td>
</tr>
</tbody>
</table>

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## Scenario – Service Provisioning

### Service Provisioning Decomposition:
1. **Step:** Path Computation -> Path Establishment -> Database (NE/CTRL)update;
2. **Mode:** Computation & signaling can be either centralized or distributed;

<table>
<thead>
<tr>
<th></th>
<th>Distributed Control Plane</th>
<th>Centralized Path Compute + Distributed Signaling</th>
<th>Centralized Path Compute + Centralized Signaling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Path Compute</td>
<td>OSPF</td>
<td>PCE</td>
<td>PCE</td>
</tr>
<tr>
<td>Path Setup</td>
<td>RSVP</td>
<td>RSVP</td>
<td>PCE/Netconf</td>
</tr>
<tr>
<td>Resource Update</td>
<td>OSPF</td>
<td>OSPF(NE Level, IF #2)</td>
<td>OSPF(NE Level, IF #2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PCEP-LS (NE2PCE, IF#3)</td>
<td>PCEP-LS (NE2PCE, IF#3)</td>
</tr>
<tr>
<td>IETF Ref</td>
<td>RFC3473; RFC4872/3/4; And update</td>
<td>RFC8281</td>
<td>RFC8283</td>
</tr>
</tbody>
</table>
Scenario – Controller Reliability

• Problem: once a controller is shut down (and lose the control of its domain), how will the whole system react?
  – Controller Federation: use a pre-assigned back-up controller or allocate another controller after the problem;
    • This approach may need some new work;
  – Functionality Backup on NE: switch to ‘distributed control plane’ mode.
    • This approach uses existing solutions with little new work;
Summary & Next Step

• Have received good support last time;

• Expectation for consensus on:
  – In some scenarios, centralized and Distributed protocols could be complementary with each others, rather than exclusive of each other;
  – Open to variation on detail in scenarios/protocols;

• Ask for WG Adoption: