2015 ONF/SDN Market Opportunities Tutorial

Intent Networking

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Topics

- What is Intent-based networking?
- The proposed NEMO project
- Call to Action
What is Intent?

Prescription

- Bob wants two aspirin.
- Existing rule: Bob is not allowed to have aspirin.
- Result: Bob gets nothing.

Intent (Declarative)

- Bob wants headache pain relief.
- Existing rule: Bob not allowed to have aspirin.
- Result: Bob gets acupuncture and his headache goes away.

Ideas from HP’s Intent slides
Expressing Intent

Subject  Predicate  object

ONF NBI

Bob wants headache relief!

Context:
Bob has had headaches for weeks
What is Intent Networking?

Manages the Network by Goals, not Prescription

- **Uses a common API** and abstraction to hide many of the network specific details
- **A portable way of integrating networked applications** with network infrastructure
- **A single Intent “rendering engine”** is the exclusive single writer of flow rules and arbiter of all resource usage.
- **Extending Controller functionality** is realized by extending Intent “language” and then implementing additional renderer modules to translate that intent into southbound device control

Many Proof-of-Concepts (2014-2015) and initial trials
Operator’s dreams

Nightmare
• Three wonderful services that SDN controllers provide collide
• SDN controllers fight over control of network, and both controllers fail because each assumes control [multi-writers problem]

Delightful
• Users select what they want on a portal
• Intent engine runs and network automatically creates network based on users preloaded constraints
“Evolving NBI” with “clear architecture”, “domain specific”, and “intent” that help drive “Open Source efforts” necessary for “vibrant SDN ecosystem”.  

NBI WG charter 1.1

Intent Based Nemo – ODL/OPNFV

80/20 Goal:
Simple NBI

Has 20% of commands that Used by 80% of Applications
### NEMO Language Syntax in Brief

#### Resource Access

**Object Model**

<table>
<thead>
<tr>
<th>Role</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Node</td>
<td>Node entity_id Type {FN</td>
</tr>
<tr>
<td>Connection</td>
<td>Connection entity_id Endnodes (node1_id,node2_id) SLA key, value Properties key1, value1, ...</td>
</tr>
<tr>
<td>Flow</td>
<td>Flow entity_id Match/UnMatch key1, value1</td>
</tr>
</tbody>
</table>

#### Operation Handling

**Operation Model**

<table>
<thead>
<tr>
<th>Action</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Query</td>
<td>Query key Value (value) From entity_id</td>
</tr>
<tr>
<td>Policy</td>
<td>Policy policy_id Applieeto entity_id Condition {expression} Action {forwardto</td>
</tr>
<tr>
<td>Commit / Withdraw</td>
<td></td>
</tr>
<tr>
<td>Notification</td>
<td>Notification entity_id On key Every period RegisterListener callbackfunc</td>
</tr>
</tbody>
</table>

#### Extended Model Definition

<table>
<thead>
<tr>
<th>Definition</th>
<th>Model Type</th>
<th>Property Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Node definition</td>
<td>NodeModel &lt;node_type&gt;</td>
<td>Property {&lt;data_type&gt;: &lt;property_name&gt;}</td>
</tr>
<tr>
<td>Connection definition</td>
<td>LinkModel &lt;Link_type&gt;</td>
<td>Property {&lt;data_type&gt;: &lt;property_name&gt;}</td>
</tr>
<tr>
<td>Action definition</td>
<td>ActionModel &lt;Action_Name&gt;</td>
<td>parameter {&lt;data_type&gt;: &lt;property_name&gt;}</td>
</tr>
</tbody>
</table>
An Example: Bandwidth on Demand

- There is a virtual link between the branch and headquarter offices.
  - The bandwidth of the vlink can be adjusted on demand
  - The adjustment can be triggered by "conditions" meet, e.g. The bandwidth will be adjusted when the timing meets.

NEMO Script:

Node branch;
Node headquarter;
Connection tunnel Type P2P
  Endnodes branch, headquarter;

Policy day ApplyTo tunnel
  Condition time>8am & time <6pm
  Operation set:bandwidth=10G;
Policy night ApplyTo tunnel
  Condition (time>0am & time <8am)|(time>6pm & time <0am)
  Operation set:bandwidth=1G;
Call to Action

Use the Intent NBI

Write Code for Open Source

IETF Work

ONF Intent NBI

12 key requirements

Work on Standards

Intent Language

Intent Yang Models

Intent Info Models
Q&A

The Best part of any talk .... ,
Thank you
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