Open Orchestration 101
ONS2017 Tutorial
April 3, 2017

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Agenda

- Why Open Orchestration?
- Introduction to Open Orchestration
- Open Orchestration at ONS
SDN/NFV = Unprecedented Transformation

Transformation

Agility
Differentiation
Flexibility and Choice
Revenues

Design Time
Operational Expenses
Development Costs

Business  Technology  Operations  Organization
Open Source: Moving up the stack
Linux Foundation Networking & Orchestration

Service

Reference Architecture

Control

Infrastructure

2013  2015  2017
2014  2016
Why this matters – 2nd Industrial Revolution

- Parallels with mechanization in early 20th century
  - Power initially produced locally and transferred mechanically

- Limitations
  - Inflexible factory layout
  - Design time complications for heterogenous machines
  - Inefficiencies
  - CapEx, OpEx
Enter Electrification

- Electrification allowed factories to outsource power to utilities
  - More efficient engines
  - Less transmission loss
  - New factory layouts
  - Lighting
- Utilities supplied the motors and consulting to retrofit old factories
- Maximum gains when factories switched to “electric native” machines
Back to the future

- SDN/NFV will follow a similar trajectory to the cloud.
- VNFs are our ‘electric motors’
- Network transformation allows operators to focus on their value-add of serving the customer.
- Creates new business possibilities
One final point…

Initial benefits based on existing business processes

<table>
<thead>
<tr>
<th>Electrified factories</th>
<th>SDN/NFV</th>
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<tbody>
<tr>
<td>Cleanliness</td>
<td>Agility</td>
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<tr>
<td>Fire safety</td>
<td>Flexibility</td>
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<tr>
<td>Lighting</td>
<td>CapEx, OpEx savings</td>
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<td>Space</td>
<td>Automation</td>
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Emergent benefits when new business processes are adopted

<table>
<thead>
<tr>
<th>Transformed manufacturing</th>
<th>Transformed service delivery</th>
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<tbody>
<tr>
<td>Transformed operations</td>
<td>Transformed operations</td>
</tr>
<tr>
<td>Transformed the business</td>
<td>Transformed the business</td>
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Open Orchestration Value Proposition

It’s about the services
- Model-Driven Automation
- End-to-Services

Support for brownfields
- Connectivity services
- PNFs, VIMs, etc.

Tailored to the operator
- Modular framework
Orchestration: More than MANO...
Key functionality

- Design
- Analytics
- Orchestration
- Policy
- Control
User Story: Virtual CPE

• Operator designs a vCPE-based Internet service with Firewall, Policy Control, NAT
  • Expressed in a data model (TOSCA, YANG, HEAT)
  • Entered into the catalog
1. Operator designs the service.

2. Customer purchases the service through the Internet.

3. Operator deploys the service.
   - 3.1 deploy NS
   - 3.2 configure network

4. Customer uses the service.
User Story (Inside the Orchestrator)

**Global-Service-O (GSO)**
- Overlay NS
- Overlay NS Topology/Graph

**NFV-O (Enterprise)**
- Overlay NS (Enterprise)
- Underlay NS DC Topology/Graph
- Firewall
- Policy Control
- Enterprise Transport

**SDN-O**
- Underlay NS
- Underlay NS Topology/Graph
- EMS1: pCE
- Controller 1: Connectivity 1
- Controller 2: Connectivity n
- EMS2: TTGW
- Transport
- Note: service chaining could also be here

**NFV-O (DC)**
- Overlay NS (DC)
- Underlay NS DC Topology/Graph
- vCPE
- vNAT
- vPN
- DC Transport

**Design Time Catalogue**

**Enterprise VIM**

**Enterprise SDN Controller**

**EMSs**

**SDN Controllers**

**DC VIM**

**DC SDN Controller**
Don’t Under Estimate the Human Side

1. “Share everything”
2. “Play fair.”
3. “CLEAN UP YOUR OWN MESS.”
4. “Say you're SORRY when you HURT somebody.”
5. “Live a balanced life - learn some and drink some and draw some and paint some and sing and dance and play and work everyday some.”
6. When you go out into the world, . . . stick together.
As applied to ONAP . . .

- The sandbox that’s best is the one with the most kids in it . . .
- . . . especially when everyone brings their toys
The Announcement

February 27, 2017

The Linux Foundation Announces Merger of Open Source ECOMP and OPEN-O to Form New Open Network Automation Platform (ONAP) Project

MANO Marriage: ECOMP, Open-O Converge as ONAP

LightReading

The Logical Happens: Open-O Merges with ECOMP

SD Times

Largest network merger in open source history creates new ONAP Project

Linux Foundation combines open source ECOMP, Open-O into ONAP

RCR Wireless News
## ONAP Presence at ONS2017

<table>
<thead>
<tr>
<th>Day/Type</th>
<th>Topic/Presenter/Title</th>
<th>Notes</th>
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<tbody>
<tr>
<td>April 3, Monday 9-12 <strong>Education</strong></td>
<td>Orchestration 101, ONAP overview (ECOMP+OPEN-O), MEF-LSO-ONAP architecture (LF, OPEN-O, AT&amp;T, MEF)</td>
<td>Most Comprehensive Tutorial on Network Automation</td>
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<td>April 3, Monday, <strong>Hackathon</strong> – all day</td>
<td>Integrating VNFs on ONAP</td>
<td>Community can integrate VNFs on ONAP Framework using VNF guidelines</td>
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<td>April 3, Monday, CFP Session 3.30 PM</td>
<td>Modelling Interplay – China Mobile</td>
<td>Focus on the TOSCA, Yang Models</td>
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<td>April 4-5 <strong>EXHIBIT HALL</strong></td>
<td>LF Booth – ONAP Branding and floor presentation</td>
<td>Quick Overview &amp; Q&amp;A discussions</td>
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<td>April 4-5 <strong>53 Solution Show case</strong></td>
<td>Virtual Functions on ONAP (AT&amp;T), vCPE over SDN &amp; NFV (OPEN-O)</td>
<td>Demos in ONAP POD at Solution Showcase</td>
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<td>April 6, Thursday – Closing Keynote 9.30 AM</td>
<td>Harmonization – LF, Chris Rice and Madam Yang – Official PR on launching ONAP to community</td>
<td>Presentation &amp; discussion on mainstage</td>
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<td>April 6, Thursday – Mini Summit 10.30-5.00</td>
<td>Deep dive around Requirements, Architecture, Roadmaps across ONAP</td>
<td>Being worked</td>
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<td>April 6 Thursday - PM GB F2F meeting &amp; joint TSC/GB/Marketing Reception</td>
<td>Welcome Reception and face to face introduction of GB, TSC &amp; Marketing</td>
<td>Being worked</td>
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Thank You
www.linuxfoundation.org