Open. Together.
Telco & openEDGE Validation of CORD SEBA Reference Design on the OCP Platform

Siddharth Gogar, SDN & DevOps Infrastructure Engineer, Flex Power Modules
Agenda

**Flex & OCP**
- JBOD
- System Integration
- Automation & Lab

**Flex OCP Validations**
- Accomplishments

**SEBA**
- POD Architecture
- Test Cases
- Test Results
OCP Based Deployment Requires Multiple Area in Cadence

Engage
- Solutions Design & Engineering
- Platform & Product Validation

Implement
- System Integration
- Supply Chain Management

Deploy
- Regulatory & Compliance
- Global Logistics, Support & Services
Flex is Growing OCP-based Products and Service Offerings
ONF Reference Designs Validation on OCP Platforms at Flex

Flex “CloudLabs” VPN Network

Trellis: Dev/Test
CORD on OCP Validation
SEBA: Test Plan

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SEBA Architecture

**Hardware**
- 1 GE management switch to which all OLTs AGG and compute node management ports
- 1 physical AGG switch (Tomahawk)
- 3 compute nodes connected to AGG switch
- Up to 16 EdgeCore OLTs with NNI port connected to the AGG switch
- Up to 64 ONUs on each PON port

**Virtualization**
- Gateway VM instantiated on one of the compute nodes
- Abstract OLT instantiated on one of the compute nodes

**External**
- AT&T External BNG, DHCP Server (RG & POD), Radius Server, External OSS, Public Internet

Source: https://wiki.opencord.org/pages/viewpage.action?pageId=4982370
SEBA Validation Steps

1. Server image test image deployment
2. Server validation
3. Network interconnect validation
4. SEBA Server image deployment & Config
5. Cloud infrastructure deployment
6. CORD deployment
7. SEBA testing with Robot OS

A. System inventory check (Ansible)
B. Firmware version check (Ansible + fw utils)
C. Benchmarks
   A. CPU speed (Spec)
   B. Memory bandwidth (Stream)
   C. Disk IOPS / Latency (fio)
   D. Network throughput (iPerf)
   E. System performance (Unixbench)
SEBA Architecture on OCP Hardware

SEBA Hardware Specs

Switch – ECS Accton 6712 40G

OCP Server
• MSL Leopard-DDR4-V2
• 2x Intel Xeon CPU E5-2683 v4 @ 2.10GHz 16c
• DDR4 256.0 GiB RAM
• 2x 40G MT27500 Family [ConnectX-3] NIC
• 1x Western Digital 1TB
SEBA Scenario Testing

“SEBA is the residential use case and provides optimizations so that network traffic can run 'fastpath' straight to the backbone without requiring VNF processing on a server”

RG -> OLT -> Fabric -> Destination

Jenkins
ONF Jenkins Builds & Results

**Deployment**

Stage View

<table>
<thead>
<tr>
<th>Parse deployment configuration file</th>
<th>Clean up</th>
<th>Add CORD repository</th>
<th>Install CORD Kafka</th>
<th>Install Logging Infrastructure</th>
<th>Install Monitoring Infrastructure</th>
<th>Install etcd-cluster</th>
<th>install voltha</th>
<th>Install ONOS</th>
<th>Install xos-core</th>
<th>Install seba-services</th>
<th>Install base-kubernetes</th>
<th>Install att workflow</th>
<th>Reinstall OLT software</th>
<th>Restart OLT processes</th>
<th>Configure R-CORD - Fabric and whitelist</th>
<th>Configure R-CORD - Subscriber</th>
<th>Configure R-CORD - OLT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Day 25</strong></td>
<td>03:16</td>
<td>1s</td>
<td>10s</td>
<td>20s</td>
<td>50s</td>
<td>10s</td>
<td>50s</td>
<td>10s</td>
<td>10s</td>
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<td>10s</td>
<td>10s</td>
<td>10s</td>
<td>10s</td>
</tr>
<tr>
<td><strong>Day 24</strong></td>
<td>03:16</td>
<td>1s</td>
<td>10s</td>
<td>20s</td>
<td>50s</td>
<td>10s</td>
<td>50s</td>
<td>10s</td>
<td>10s</td>
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<td>10s</td>
<td>10s</td>
<td>10s</td>
<td>10s</td>
<td>10s</td>
</tr>
</tbody>
</table>

**Results**

Stage View

<table>
<thead>
<tr>
<th>Parse deployment configuration file</th>
<th>OpenStack Nebula Ripe</th>
<th>Test Configurations</th>
<th>Subscriber Inventory and TopTalk Tests</th>
<th>Push URLs and results</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Day 25</strong></td>
<td>03:16</td>
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Link to Build Jobs:
SEBA POD UI: CORD 6.1

RG@ubuntu:~$ nohup ping 10.8.2.100 > ping_log.txt &

RG -> OLT -> Fabric -> Destination
<table>
<thead>
<tr>
<th>SN</th>
<th>Group</th>
<th>Test</th>
<th>TestCase ID</th>
<th>Results Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>test1</td>
<td>Verify End-end ping with ONU in Correct Location</td>
<td>Validates E2E Ping Connectivity and object states for the given scenario: Configure whitelist with correct ONU location Validate successful authentication/DHCP/E2E ping</td>
<td>ATT_Test001</td>
<td>PASS</td>
</tr>
<tr>
<td>test2</td>
<td>Test by removing ONU from Whitelist, and re-add ONU to Whitelist for a successful ping</td>
<td>Validates E2E Ping Connectivity and object states for the given scenario: Configure whitelist with correct ONU location Validate successful authentication/DHCP/E2E ping Remove ONU from whitelist Validate failed authentication/DHCP/E2E ping Add ONU to whitelist Validate successful authentication/DHCP/E2E ping</td>
<td>ATT_Test001</td>
<td>PASS</td>
</tr>
<tr>
<td>test3</td>
<td>Test with ONU in Wrong Location and re-add ONU in Correct Location for a successful ping</td>
<td>Validates E2E Ping Connectivity and object states for the given scenario: Configure whitelist with correct ONU location Validate successful authentication/DHCP/E2E ping Update whitelist with wrong ONU location Validate failed authentication/DHCP/E2E ping Update whitelist with correct ONU location Validate successful authentication/DHCP/E2E ping</td>
<td>ATT_Test001</td>
<td>PASS</td>
</tr>
<tr>
<td>test4</td>
<td>Test by Removing Subscriber and re-creating the Subscriber for a successful ping</td>
<td>Validates E2E Ping Connectivity and object states for the given scenario: Configure whitelist with correct ONU location Validate successful authentication/DHCP/E2E ping Remove subscriber model Validate successful authentication (expected with the ONF pod setup) but failed DHCP/E2E ping Recreate subscriber model Validate successful authentication/DHCP/E2E ping</td>
<td>ATT_Test001</td>
<td>PASS</td>
</tr>
<tr>
<td>test5</td>
<td>Test by Skipping Subscriber Provisioning and re-provisioning Subscriber</td>
<td>Validates E2E Ping Connectivity and object states for the given scenario: Configure whitelist with correct ONU location and skip provisioning subscriber Validate successful authentication (expected with the ONF pod setup) but failed DHCP/E2E ping Provision subscriber Validate successful authentication/DHCP/E2E ping</td>
<td>ATT_Test001</td>
<td>PASS</td>
</tr>
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Source: https://wiki.opencord.org/display/CORD/December+Release
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<th>Test Case ID</th>
<th>Results</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>test6</td>
<td>Test by skipping Authentication</td>
<td>Validates failed authentication/DHCP/E2E Ping with the following scenario: Configure whitelist with correct ONU location and skip RG authentication Validate failed authentication/DHCP/E2E Ping</td>
<td>ATT_Test001</td>
<td>PASS</td>
<td></td>
</tr>
<tr>
<td>test7</td>
<td>Test with ONU not in Whitelist</td>
<td>Validates failed E2E Ping Connectivity and object states for the given scenario: Skip whitelist configuration for ONU Validate failed authentication/DHCP/E2E Ping</td>
<td>ATT_Test001</td>
<td>PASS</td>
<td></td>
</tr>
<tr>
<td>test8</td>
<td>Test with ONU not in Whitelist and by skipping Subscriber Provisioning</td>
<td>Validates E2E Ping Connectivity and object states for the given scenario: Skip whitelist configuration for ONU and subscriber provisioning Validate successful authentication but failed DHCP/E2E ping Configure whitelist with correct ONU location Validate successful authentication (expected with the ONF pod setup) but failed DHCP/E2E ping Provision subscriber Validate successful authentication/DHCP/E2E ping</td>
<td>ATT_Test001</td>
<td>PASS</td>
<td></td>
</tr>
<tr>
<td>test9</td>
<td>Test with ONU in Wrong Location</td>
<td>Validates E2E Ping Connectivity and object states for the given scenario: Configure whitelist with wrong ONU location Validate failed authentication/DHCP/E2E Ping</td>
<td>ATT_Test001</td>
<td>PASS</td>
<td></td>
</tr>
<tr>
<td>test10</td>
<td>Test with ONU in Wrong Location and Skip Subscriber Provisioning, Then fix ONU in Correct Location and Provision Subscriber</td>
<td>Validates E2E Ping Connectivity and object states for the given scenario: Configure whitelist with wrong ONU location and skip subscriber provisioning Validate failed authentication/DHCP/E2E ping Configure whitelist with correct ONU location Validate successful authentication (expected with the ONF pod setup) but failed DHCP/E2E ping Provision subscriber Validate successful authentication/DHCP/E2E ping</td>
<td>ATT_Test001</td>
<td>PASS</td>
<td></td>
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</table>
ONF Jenkins Test Automation for SEBA POD
Flex SEBA POD: Test Summary
End-to-End Scenario Test Logs
Customer, Partner & Community Engagement Lab

• Continue working on comprehensive plan to test, validate and certify CORD platform and components using Flex SEBA POD

• Continue collaborating with ONF Certification Brigade to define CORD Certification program (CCP) and its execution

• Extend in house automated test and validation framework to validate CORD platform and components with Flex SEBA POD

• Collaborate with Vendors & Service Providers to demonstrate Telco use-cases and support CORD deployments
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OCP Global Summit | March 14–15, 2019