Use Case Automation
(An example of OSS integration)

Integration Team
<table>
<thead>
<tr>
<th>Category</th>
<th>Summary</th>
<th>Owner</th>
<th>Impacted Components</th>
<th>GO/NO GO</th>
<th>Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSC Must Have</td>
<td>Improve our E2E Process Automation</td>
<td>TSC</td>
<td>AAI, SO, SDC, APPC, VFC, CCSDK + Documentation</td>
<td>GO based on bootcamp details during F2F event</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>SP3 - Footprint Optimization</td>
<td>TSC</td>
<td>OOM + ALL</td>
<td>GO</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>CI/CD</td>
<td>TSC</td>
<td>Infrastructure</td>
<td>Already in progress /Demo planned in Paris</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Document as You Code</td>
<td>Documentation Project</td>
<td>ALL - Tracked through tickets - Weekly updates</td>
<td>Already in progress</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Security by Design</td>
<td>Security Subcommittee</td>
<td>ALL - Part of Milestone checklist</td>
<td>GO - Need to enhance Milestone Checklist &amp; Final</td>
<td>1</td>
</tr>
</tbody>
</table>
vCPE Use Case Automation
5 Services in vCPE Use Case
Residential Broadband vCPE Use Case

vCPE Use Case

DCAE (collector)
10.0.4.102

DMaaP
10.0.11.1

SDNC
10.0.7.1

ONAP OAM Neutron Network

10.0.101.1

vDHCP
Dynamic Host Config Protocol
10.3.0.0/24

10.4.0.1

10.4.0.2

vAAA
Authorization, Authentication, Accounting

10.0.101.2

vDNS + vPDHCP

10.0.101.3

10.0.101.30

192.168.1.1

10.2.0.1

10.2.0.0/24

CPE_SIGNAL
Neutron Network

10.4.0.3

10.5.0.2

10.5.0.1

10.5.0.3

192.168.1.2

192.168.1.2

BRG Simulator 1 (VPP)
10.3.0.2

BRG Simulator 2 (VPP)
10.3.0.1

10.3.0.0/24

BRG EBC
10.3.0.0/24

CPE_PUBLIC
Neutron Network

10.2.0.10

10.2.0.10

10.2.0.0/24

ONAP configures the Tunnel XC

ONAP configures the vG_MUX left IP Address and the VNI for the VxLAN tunneling

ONAP configures the vG_MUX right IP Address and the VNI for the VxLAN tunneling

Web Server
## vCPE Service Tasks

<table>
<thead>
<tr>
<th>#</th>
<th>Tasks</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Add new subcategory BRG to SDC Allotted Resource from Category Management page</td>
<td>Provision</td>
</tr>
<tr>
<td>2</td>
<td>Initialize demo data</td>
<td>Provision</td>
</tr>
<tr>
<td>3</td>
<td>VNFs onboarding</td>
<td>Provision</td>
</tr>
<tr>
<td>4</td>
<td>Create services for infra, vbng, vbrg and vgmux</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Download vbng and bgmux csars</td>
<td>VNF onboarding, service design and distribution</td>
</tr>
<tr>
<td>6</td>
<td>Create allotted resource for vbng and bgmux</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Create customer service</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Distribute all services</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Create availability zone in A&amp;AI</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Add customer SDN-ETHERNET-INTERNET in A&amp;AI</td>
<td>Provision</td>
</tr>
<tr>
<td>11</td>
<td>Run on SDNC cluster node <code>ip route add 10.3.0.0/24 via 10.0.101.10 dev ens3</code></td>
<td>Provision</td>
</tr>
<tr>
<td>12</td>
<td>Run on SDNC pod <code>/opt/sdnc/bin/addIpAddresses.sh VGW 10.5.0 22 250</code></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Configure SNIRO</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Preload network and vfmodules for services of infra, vbng, vbrg and vgmux and deploy those services</td>
<td>Service instantiation</td>
</tr>
<tr>
<td>15</td>
<td>Run heatbridge for vgmux</td>
<td>Provision</td>
</tr>
<tr>
<td>16</td>
<td>Run healthcheck-k8s.py to verify VNFs</td>
<td>Verification</td>
</tr>
<tr>
<td>17</td>
<td>Add custom flow trigger in SO</td>
<td>Provision</td>
</tr>
<tr>
<td>18</td>
<td>Preload and deploy customer service</td>
<td>Service instantiation</td>
</tr>
<tr>
<td>19</td>
<td>Push closed loop policy from pap pod</td>
<td>Provision</td>
</tr>
<tr>
<td>20</td>
<td>Service assurance</td>
<td>Verification</td>
</tr>
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# vCPE Service Tasks with Automation

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<td>14</td>
<td>Preload network and vfmodule for services of infra, vbng, vbrg and vgmux and deploy them</td>
<td>Python script</td>
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<td>20</td>
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<td>Shell commands</td>
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vCPE Service Design with SDC
Service Design Automation with SDC BE and FE API
CI Automation – Before and After

~3 hours for license, SWP onboarding, service creation, resource onboarding and distribution

3 seconds of typing
(30 minutes of sipping coffee while robot does the work)
REST API based service/resource onboarding in test suite

- Add ASDC Catalog Service
  - :FOR \${zip} IN @{model_zip_path} - Add VM resources
    - Setup ASDC Catalog Resource
    - Get ASDC Catalog Resource
    - Add ASDC Resource Instance
  - :FOR \${network} in @{networklist} - Add VM external networks
    - Get ASDC Catalog Resource
    - Add ASDC Resource Instance (including X/Y parameters for the palette)
    - Setup SDC Catalog Resource GenericNeutronNet (this can be replaced with other Virtual Link Types)
- Checkin ASDC Catalog Service
- Request Certify ASDC Catalog Service
- Start Certify ASDC Catalog Service
- Certify ASDC Catalog Service
- Approve ASDC Catalog
- Distribute ASDC Catalog
- Download CSAR

Model agnostic - add service to service_mappings.py for service name to zip file directory location

Model agnostic

Model dependent
For properties/inputs

Use by vCPE.py to populate pre-load model data
Automate Preload by Using JSON Template
Instantiate Infra Services

root@oom-rancher:~/integration/test/vcpe# ./vcpe.py infra

vcpe.py: Brief info about this program
vcpe.py init: Add customer service data to SDNC and SO DBs.
vcppe.py infra: Deploy infrastructure, including DHCP, AAA, DNS, Web Server, vBNG, vGMUX, vBRG.
vcppe.py bgp: Deploy bgp only (for testing after infra succeeds).
vcppe.py customer: Deploy customer service, including vGW and vALMs
vcpe.py loop: Test closed loop control

Ready to deploy infrastructure? y/n: [ ]
Access ONAP Infrastructure via Kubernetes and Openstack API

vCPE Automation with Kubernetes and Openstack APIs

Kubernetes Cluster

10.0.0.9/16

10.0.10/16

Openstack

OAM Network 10.0.0.0/16

vBRG VM

DPDK

VPP

10.3.0.2/24

BRG_BNG net

vBNG VM

SDNC Pod

Node VM

Pod

Node VM

SDNC Pod

Node VM

SDNC Pod
Access ONAP Infrastructure via Kubernetes and Openstack API

ONAP Automation with Kubernetes and Openstack

Routing table

<table>
<thead>
<tr>
<th>Destination</th>
<th>Gateway</th>
<th>Genmask</th>
<th>Flags</th>
<th>Metric</th>
<th>Ref</th>
<th>Use</th>
<th>Iface</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.3.0.0</td>
<td>10.0.101.10</td>
<td>255.255.255.0</td>
<td>UG</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>ens3</td>
</tr>
</tbody>
</table>

Set up SNAT to receive RESTCONF config from SDNC cluster node IP

Configure route for SDNC cluster node IP

Openstack
Instantiate Customer Service

Ready to deploy customer service? y/n: y
Enter the BRG MAC address: fa:16:3e:6e:e1:05
• Interface IPs are assigned correctly and VNIs aligned (healthcheck-k8s.py)
• Data plane verification works (ping and curl commands)
• Closed loop events are sent (vcpe.py)
Suggestion of Using vCPE Use Case to Test New Platform Features

- SO building blocks
- Controller Design Studio for post-instantiation configuration
vCPE Demo Setup
vCPE Demo

http://vcpedemo.onap.org/bunny.mp4
1. ONAP E2E Automation - Eric Debeau, etc
2. vCPE VPP VNF Deep Dive - Eric Multanen, Intel
3. vCPE Use Case - Customer Service Instantiation - Gil Bullard
4. Residential Broadband vCPE Drafts for discussion