OVP Automation Augment with ONAP

Yan Yang (China Mobile)
Kanagaraj Manickam (Huawei)
NE Testing: Reality

- The traditional network element test is divided into two processes: procurement test and network access test.
- Different rounds of test are usually required before a new device obtains the network access license.

Different types of testing will be performed in the network access test:

- Performance testing
- Reliability testing
- Functional testing
- Security testing
- Compatibility testing
- Other testing
The NE testing process is usually divided into four steps: test topology design, test environment setup, task execution and result analysis and certification.

<table>
<thead>
<tr>
<th>Test Topology Design</th>
<th>Test Environment Setup</th>
<th>Test Task Execution</th>
<th>Test Result Analysis &amp; Certification</th>
</tr>
</thead>
<tbody>
<tr>
<td>The tester, the network element manufacturer support personnel, and the test instrument engineer negotiate the test topology on site.</td>
<td>Deploy the test env • Configure the NE • Configure the tester • Monitoring and recording.</td>
<td>Manually record test results, and confirm the test results by three parties.</td>
<td>Manually troubleshoot instrument and network element failures.</td>
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</table>

At least 6 months are required for an NF to get a new or renewed network access permit.

- **Changes after the introduction of NFV**

  - Introduction of open source components
  - Introduction of software component disaggregation
  - The frequency for software upgrades
  - Introduction of new function and service
Objectives:
1. Common NFV automated test platform
2. Self-service certification NFV stores
3. Open ecosystem of 5G + AI and 5G + edge
NFV Testing Automation with OVP+ONAP

Function mapping with ONAP components
• Test Topology Design - ONAP SDC
• Test Environment Deploy - ONAP Orchestrator (SO, VF-C, APPC, etc)
• Test Task Execution - ONAP VTP (VNFSDK, VVP)
• Test Result Certificate - OPNFV OVP

NFV Testing Automation DevOps

ONAP SDC
Test Topology Auto Design
- Workflow: a, b, c
- Template: Infra
- Days-Weeks

ONAP Orchestrator
Test Environment Auto Deploy
- NFVO, VNFM, VIM
- Infra
- Minutes-Hours

ONAP VTP
Test Task Auto Execution
- Test script integration
- Test tools integration
- Test execution
- Test result
- Minutes-Hours

OVP
Test Result Auto Analysis & Certification
- Weeks
**Gap Analysis - Auto Design (SDC)**

**Goal:** Quickly design a test service (topology) composed with tested VNF and test environment

**Current situation:** The service design need to be repeated for each VNF/test vendor

**Possible solution:** Define abstract testing service (topology) template for each type of VNF

**Enhance SDC to support:**

1. Abstract topology template definition
2. Flag the abstract VNF that can be replaced by real VNF
3. Instantiate step1 template using vendor VNF into a deployable template in runtime
Gap Analysis - Auto Deploy (Orchestrator)

**Goal:** Reduce unnecessary replication for different VNF vendor/revision between testing iterations

**Current situation:** The entire test environment need to be redeployed each time

**Possible solution:** Only replace the VNF to be tested

**Enhance Orchestrator to support:**

1. Only deploy the newly updated or upgraded VNF
2. Build the relationship between the existing instances with the new deployed instance
Gap Analysis – Auto Testing (VTP)

Goals:
1. Test instruments integration
2. Integration with OVP portal for automated OVP verification certification
3. VTP capability expansion
   - Loading different test scripts and cases
   - Flexible test process definition
   - Test report customization
VTP scenarios

Certify VNF C&V

VNF:
- Compute Flavor 4GB 2vCPU
- Nw Flavor NIC speed

VTP Portal
(ONAP F release Apr 2020)

VTP Backend

ONAP F
release Apr 2020

Upload certified VNF to public repository

VNF SDK Marketplace/
OVP portal

Pull list of OVP certified VNFs

VTP Test cases

Active Test cases
Passive Test cases

VSP
On-board

SDC
ONAP design-time

VTP Backend

Validation:
Vnf-validation

Compliance:
Csar-validate

VSP Test cases

Badging:
OVP VNF Compliance & Validation

Design-time:
Operator specific VSP compliance check

Runtime:
Active/Passive Test (ONAP G release ??)

SO/VF-C

OpenStack

Flavor List:
- NIC speed
- m1.medium

VNF

ONAP Runtime

Active Test
Passive Test

Telco Environment

Active Test cases
Passive Test cases

Other test env

ONAP design-time
OVP VNF Compliance and Validation Testing with ONAP

The demo shown on 2019 ONS EU

- **VNF Compliance**
  - VNF Compliance Test Cases
  - Testing Tools
  - VNF Test Platform (VTP)

- **VNF Validation**
  - VNF validation Test Cases
  - Testing Tools
  - VNF Test Platform (VTP)

789 numbered requirements

789 numbered requirements

- VNF Requirements

Cover 309 requirements, 213 test cases

- **VNFSDK** – TOSCA compliance test cases
- **VVP** – HOT compliance test cases
Gap Analysis – Auto Analysis & Certification (OVP)

**Goals:**

1. Integrate with test framework to collect the test result automatically (Step 3 manually)

   - **Step 1:** Submission of Participation Form
   - **Step 2:** Testing
   - **Step 3:** Submission of Results
   - **Step 4:** Notification of Reviewers
   - **Step 5:** Community Review of Test Results
   - **Step 6:** Grant Badge

2. Building public certification store

   - Infrastructure
     - OPNFV 2018.09
   - VNF
     - OPNFV 2019.04
   - Lab
     - OPNFV 2019

   OVP Certification Store
Suggestions for OVP

Suggestions: OVP provides common testing platform, focusing on process automation and integration of test tools from different upstream open source projects/communities and third party vendors (SUT vendors and Instrument vendors)

Benefit:
1. Reduce duplication of work across communities, specific test tools and test cases in different areas can be completed in the upstream projects and communities
2. OVP as the open verification program can leverage the capabilities of existing tools to quickly provide automated testing and certification.
Requirements for Vendors/Operators

Capabilities for common automated test platform:
1. Support loading and importing of different forms of use cases and user different executor to execute test case
2. Provide unified tool access standards, providing tool pre-deployment or on-demand deployment capabilities
3. Provide adapter layer to integrate with different SUT

Requirements for SUT vendors and test tools/instruments vendors:
1. No requirements for test case format except for formats not supported by the platform
2. Follow the unified tool access standards to integrate with test platform
3. Follow the SUT adapter layer specification to integrate with test platform
Automation Testing: where are we

Making some progress in Automated Test Environment Setup and Test Task Execution.
VTP Standalone Portal

Developing independent VTP portal to improve the usability of VTP which can combine with OVP Portal to provide test service.
1. Virtual test instrument (vTI) LCM with ONAP (Done)

2. Test process automation (Test NS deployment, test instrument configuration, function and performance test execution)

VTP integrates with virtual test instrument to perform function and performance testing (undergoing)

The verification of the instrument integration solution provides the feasibility basis for OVP to provide functional test certification by integrating third-party test instruments.
NFV Testing Automation Survey in EUAG

Part1: Testing process and content
Part2: Testing Participants and Collaboration
Part3: Test Restrictions
Part4: Changes of NFV Network Element Access Test
Part5: Status and Requirements of Test Automation
Part6: Community Work Requirements

Welcome feedback your requirements to help building open source testing and certification ecosystem

More expertise for NE and test instrument integration (esp. LCM and configuration) is welcome

Contact Information: Yan Yang, email address: yangyanyj@chinamobile.com
Back Slides
VTP Portal and OVP Portal Integration

Have done: 1, 2, 3, 5, 6, 7

Plan to do: 3', 4

8 is operator’s test cases

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VTP Portal

1. Certify VNF C&V

VTP Backend

2. Execute test cases

3. Upload test result

3'. Upload VNF passed the test to public repository

OVP portal

4. Test Operator VSP Compliance check

VNF list

a. badged VNF list
b. tested VNF list

5. Pull list of OVP certified VNFs

VNFSDK Marketplace

6. Validation: VnF-validation

Operator compliance test: Flavor/security match-test

VTP Test cases

7. Execute test cases

Compliance: Csar-validate

OpenStack

- Flavor List:
  - with SRIOV
  - m1.medium

ONAP

ONAP FLAVORS:

ONAP - VNF

VSP On-board

SDC