Testing your infrastructure and services with the help of OPNFV testperf team

Emma Foley, Georg Kunz & the OPNFV testing community
1. Create awareness for OPNFV test tools
   – Targeting users outside of NFV domain and telcos not active in OPNFV
   – Beneficial for most cloud operators and developers
   – Leverage the extensive tooling OPNFV has built over 4 years

2. Trigger a discussion about the evolution of the OPNFV test tools
   – How to evolve the test tools to address emerging use cases?
   – Learn from people outside of NFV domain about their needs
OPNFV facilitates the development and evolution of NFV components across various open source ecosystems. Through system level integration, deployment and testing, OPNFV creates a reference NFV platform to accelerate the transformation of enterprise and service provider networks. Participation is open to anyone, whether you are an employee of a member company or just passionate about network transformation.

**OPNFV defines use cases, integrates & tests what other projects (OpenStack, Kubernetes, ODL, OVS, fd.io) create!**
What does OPNFV do?

- Development / Integration
- Images / Packages
- Platform Deployment
- Testing & Reporting

Requirements → Development / Integration → Images / Packages → Platform Deployment → Testing & Reporting

Federated OPNFV labs
What does OPNFV test?
OPNFV Test Ecosystem

Functional Testing

- Functest
  - NFVI, VIM APIs + Functions
- RefStack
  - openstack
- Tempest
  - openstack
- Cloudify
  - VNF
- Kubernetes

Non-functional Testing

- Yardstick
  - NFVI & VNF Performance
- Bottlenecks
  - Load tests staging manager
- vsperf, NFVBench
  - NFVI dataplane Performance
- StorPerf
  - NFVI Storage Performance

Test Result Database

Dovetail

OPNFV Compliance Verification

OPNFV Feature Tests

Compliance Verification

OPNFV Test Result Database

Yardstick
OPNFV Test Ecosystem

Functional Testing
- NFVI, VIM APIs + Functions
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OPNFV Feature Tests
- Functest

Non-functional Testing
- Yardstick: NFVI & VNF Performance
- Bottlenecks: Load tests staging manager
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Functest

Description
Functional verification of OpenStack and K8s

Components tested
Cloud infrastructure control plane

Stage deployed
From patch set verification to release gating

Collected metrics
Pass / fail

Project packaging/release
Multiple docker containers

Extensibility
Build with extensibility in mind: based on Xtesting
OPNFV Test Ecosystem

OpNFV Functional Testing

- Compliance Verification
- Test Result Database

OpNFV Non-functional Testing

- Yardstick
- Bottlenecks
- vsperf, NFVBench
- StorPerf

Functional Tests

- NFVI, VIM APIs + Functions
- NFVI & VNF Performance
- Load tests staging manager
- NFVI dataplane Performance
- NFVI Storage Performance

Non-functional Testing

- Dovetail
- OPNFV Compliance Verification

Feature Tests

- RefStack
- Tempest
- Cloudify
- VNF
- Kubernetes
Yardstick

Description
Infrastructure Verification and NFVI/VNF characterisation

Components tested
Cloud infrastructure resources

Stage deployed
CI and pre-production verification

Collected metrics
Performance metrics and pass/fail metrics (HA tests)

Project packaging/release
Docker container

Extensibility
Test cases integrated as scenarios
OPNFV Test Ecosystem

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**OPNFV Feature Tests**
- NFVI & VNF Performance
- Load tests staging manager
- NFVI dataplane Performance
- NFVI Storage Performance

**Test Result Database**
- Dovetail
- OPNFV Compliance Verification
### Bottlenecks

**Description**
Simulates extreme or long term product usage

**Components tested**
- Cloud infrastructure control plane

**Stage deployed**
- CI and performance tuning of infrastructure

**Collected metrics**
- pass/fail metrics

**Project packaging/release**
- Docker container

**Extensibility**
- Test scheduler for other OPNFV tools, e.g. Yardstick, StorPerf

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  - Tempest
  - Cloudify
  - VNF
  - Kubernetes
- **Non-functional Testing**
  - Yardstick
  - Bottlenecks
  - NFV Benchmarks (vsperf, StorPerf)
  - NFVI & VNF Performance
  - Load tests staging manager
  - NFVI Storage Performance

- **OPNFV Feature Tests**
  - NFVI, VIM APIs + Functions

- **Test Result Database**

- **Dovetail**
  - OPNFV Compliance Verification
Description
Optimizing switching technologies and NFVI data path components

Components tested
Virtual switch and packet processing components

Stage deployed
Pre-deployment evaluation

Collected metrics
Performance metrics as reported by traffic generators

Project packaging/release
Source code package

Extensibility
Integration of custom tests possible
OPNFV Test Ecosystem

OPNFV Functional Testing

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OPNFV Feature Tests

Non-functional Testing

NFVI, VIM APIs + Functions

RefStack

Tempest

Cloudify

VNF

Kubernetes

Yardstick

Bottlenecks

vsperf, NFVBench

StorPerf

Load tests staging manager

NFVI dataplane Performance

OPNFV Compliance Verification

Dovetail

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NFVI & VNF Performance

Load tests staging manager

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NFVI dataplane Performance

OPNFV Compliance Verification

Dovetail
Description
Full stack data plane performance measurements

Components tested
Full data plane stack: packet forwarding and virtualization components

Stage deployed
Pre-production, performance tuning and monitoring

Collected metrics
Metrics reported by T-Rex

Project packaging/release
Single self-contained Docker container

Extensibility
Wide range of parameters in PVP, PVVP, SR-IOV etc. scenarios
OPNFV Test Ecosystem

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  - Yardstick
  - Bottlenecks
  - vsperf, NFVBench

- **Non-functional Testing**
  - StorPerf

- **OPNFV Compliance Verification**
  - Dovetail

- **Test Result Database**

- **OPNFV Feature Tests**
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  - Kubernetes
**Description**
Performance measurements of block & ephemeral storage at the VM level

**Components tested**
Storage subsystem

**Stage deployed**
Pre-production and lab environment

**Collected metrics**
Performance metrics in steady state, test failed if no stabilization

**Project packaging/release**
Docker container

**Extensibility**
Wide array of parameters: e.g. nr of VMs, queue depth, I/O access pattern
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OPNFV Test Ecosystem Diagram
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OPNFV Feature Tests

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Dovetail
- OPNFV Compliance Verification

Compliance Verification
OPNFV Compliance Program

- OPNFV Verified Program (OVP) verifies that a commercial cloud platform exposes the same
  - key APIs,
  - behaviors, and
  - characteristics
  as a reference platform defined through a specific selection of test cases

- Main objective: Reduce vendor selection and application onboarding cost
  - Establish industry-accepted technical baseline
  - Simplify RFIs and RFPs

- Main components of OVP
  1. OPNFV test frameworks providing the actual OPNFV and upstream test cases
  2. Dovetail: Wrapper for OPNFV test tools and reporting tool
OPNFV Compliance Program

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  - NFVI Storage Performance
  - StorPerf

Utilized by OVP 2018.09

Candidates for later releases
Addressing emerging use cases
Addressing emerging use cases

• OPNFV traditionally focused on NFVi data center scenarios
  – Medium to large scale deployments in centralized data centers
  – VNFs = legacy Network Functions in VMs

• Emerging use cases impose new requirements on test tools
  – Edge computing
  – Cloud native computing

☞ How to address those requirements?
Summary

• Join us!
  – OPNFV test working group
    • https://wiki.opnfv.org/display/testing/TestPerf
  – OPNFV
    • https://wiki.opnfv.org/, https://www.opnfv.org/
  – OPNFV Verified
    • https://www.opnfv.org/

• Provide feedback and input!
opnfv-users@lists.opnfv.org
  #functest
  #yardstick #nsb
  #bottlenecks
  #nfvbench #vsperf
  #dovetail