VBaaS: VNF Benchmark-as-a-Service

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Rosa, Raphael V.
Rothenberg, Christian E.
Szabo, Robert

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FEEC/UNICAMP and Ericsson Research Hungary
Outline

Introduction

VBaaS

Use Cases

Related Work

Conclusion
INTRODUCTION
Introduction

Motivation
VNFS and performance metrics

NFV Performance and portability requirements

- Customers Key Quality Indicators (KQIs)
- Dynamic workloads, infrastructure failures, etc
- Service Assurance/Continuity (IT – Telco)

DevOps

* Repeatable and reliable processes
* Modular applications in production-like systems
* Monitor and validate operational quality of services (after and before deployment)
VNF Benchmark-as-a-Service (VBaaS)

Fundamentals

Assist orchestration manager (e.g., NFVO) decisions

On-demand test-before-deploy  Capacity Planning
  = Customized performance assessments
  = Migration, scaling and auditing VNF-FGs

Conformance testing  Compliance and Auditing
  = VNF continuous integration
  = Proactive policy enforcement in infrastructure setups
VBAAS
Proposal

Sweet spot between continuous monitoring vs. static view

Figure: VBaaS motivation points: static view (VBaaS) continuous monitoring
• Why VBaaS?
  - NFV performance reliability (KQIs) and agility (Service Assurance)

• What is VBaaS?
  - VNF/NFVI features (performance) extraction framework

• How VBaaS can be performed?
  - Independently, oriented by orchestration managers requests

• When VBaaS can be used?
  - Whenever costs and time scales favour its associated costs (policies)
Components
Actors and Interfaces

Figure: VBaaS Main Design: Components and Interfaces
## Components

**VBaaS - Information Base**

<table>
<thead>
<tr>
<th>VNFs</th>
<th>VBaaS Profiles</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Router</strong> (VNF Developer 1)</td>
<td><strong>Manager</strong></td>
</tr>
<tr>
<td><strong>Firewall</strong> (VNF Developer 2)</td>
<td><strong>Tools</strong></td>
</tr>
</tbody>
</table>

### Metrics
- Active: [Bandwidth, Latency, ..]
- Passive: [CPU, Memory, ...]
- Correlated: [CPU vs Latency]

### Figure: VBaaS Information Base and VNF Benchmark Profile
USE CASES
Use Cases

VBaaS Workflows

Tear-down
Re(Pro)active Audit
Assurance (Migrate/Scale)
Scaled benchmark
Discovery
VNF | NFVI Certification
Provision (Embedding)
Test before deploy

Figure: VBaaS lifecycle
Use Case: Provision
Test-before-deploy

Figure: VBaaS provision workflow
## Use Cases Comparison

### Table: VBaaS Applicability

<table>
<thead>
<tr>
<th>Workflow</th>
<th>Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discovery</td>
<td>Compliance</td>
</tr>
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<td>Provision</td>
<td>Test-before-deploy</td>
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<td>Assurance</td>
<td>Service continuity</td>
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<td>Tear-down</td>
<td>Audit</td>
</tr>
</tbody>
</table>
Use Cases

VBaaS Details
VNF and NFVI PoPs performance profiles

Figure: Correlation of VBaaS results
VBaaS Details
Profiles Results

Figure: Assumptions of VBaaS reports
1. When NFVI PoPs or VNFs are in certain % of utilization
2. Noisy behaviour
3. Long-term tests
4. Constant flux
5. Recovery exam of failed VNF/NFVI
6. Shared resources, comparison with non-virtualized, metrics dependence, etc
RELATED WORK
Related Work

Projects

- T-NOVA
- Trilogy
- Unify
Open Source

- OPNFV: Yardstick and vSwitchPerf
“Trust, but verify”, maybe better: *verify, then trust*

**VBaaS**

- Motivation: NFV performance reliability/agility and DevOps
- Certification of performance profiles for VNFs and NFVI PoPs
- Instrumentation before VNF-FGs deployment (fine-tune decisions)
- VBaaS processes: discovery, provision, maintenance, tear-down
- Benchmark Considerations!
Future Work

- NFVO decision process for NFVI PoP targets selection
- Benchmark dependencies and consistent tasks
- Correlation of VBaaS results
- Prototyping in Unify architecture
- Input for Multi Domain Distributed NFV
Thanks!

Questions?
Figure: VBaaS Detailed Workflow
Check VBaaS-IB for target VNF

Wait NFVO VNF-FG request

Has VNF-BP?

No

Yes

Embed VNF-BP elements in VNF-FG

Return Benchmark VNF-FG to NFVO

Wait Manager establish connection

Yes

No

Send benchmark tasks

Process and store benchmark reports in VNF-IB

If VNF-FG deployed?

No

Yes

Figure: VBaaS Activities Flow
Figure: VBaaS Recursive API
Figure: VBaaS Deployments Optimization
Figure: VBaaS and Unify: General Ideas
**Backup Slides**

**Figure:** VBaaS and Unify Abstractions
Figure: VBaaS and Unify Bis-Bis
Figure: VBaaS and Unify Universal Node