VBaaS: VNF Benchmark-as-a-Service

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Outline

Introduction

VBaaS

Use Cases

Related Work

Conclusion
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)
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
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 (VNF Developer 1)</strong></td>
<td>Metrics</td>
</tr>
<tr>
<td></td>
<td>Active: [Bandwidth, Latency, ..]</td>
</tr>
<tr>
<td></td>
<td>Passive: [CPU, Memory, ..]</td>
</tr>
<tr>
<td></td>
<td>Correlated: [CPU vs Latency]</td>
</tr>
<tr>
<td><strong>Firewall (VNF Developer 2)</strong></td>
<td></td>
</tr>
</tbody>
</table>

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

VBaaS Workflows

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>
<tr>
<td>Provision</td>
<td>Test-before-deploy</td>
</tr>
<tr>
<td>Assurance</td>
<td>Service continuity</td>
</tr>
<tr>
<td>Tear-down</td>
<td>Audit</td>
</tr>
</tbody>
</table>
VBaaS Details
VNF and NFVI PoPs performance profiles

Figure: Correlation of VBaaS 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
Projects

- T-NOVA
- Trilogy
- Unify
Open Source

- OPNFV: Yardstick and vSwitchPerf
CONCLUSION
Summary

“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

If VNF-FG deployed?

Yes

Wait Manager establish connection

Send benchmark tasks

Process and store benchmark reports in VNF-IB

No

Figure: VBaaS Activities Flow
Figure: VBaaS Recursive API
Figure: VBaaS Deployments Optimization
Backup Slides

Figure: VBaaS and Unify: General Ideas
Figure: VBaaS and Unify Abstractions
Backup Slides

Figure: VBaaS and Unify Bis-Bis
Backup Slides

**Figure:** VBaaS and Unify Universal Node