VBaaS: VNF Benchmark-as-a-Service
(draft-rorosz-nfvrsg-vbaas-00.txt)

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BMWG, IETF 94
11/3/2015
Outline

Motivations

VNF Benchmarking as a Service (VBaaS)

A Use Case: UNIFYing Carrier Network and Cloud Resources

Summary
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Summary
VNF Benchmarking

Actors as in the Figure

Problem to be solved:
▶ Gain information autonomously about VNFs’ benchmark metrics with given reserved resources at given VIM (NFVI PoP).

An important usage:
▶ Orchestration (e.g., NFVO) needs to know throughput, latency (and jitter) performance values for a given resource allocation (cpu, memory, storage) of a VNF at a VIM.
VNF Benchmarking

Actors as in the Figure

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How? VNF Benchmarking as a Service (VBaaS)

VBaaS objectives
▶ "Black box" VNF benchmarking, with respect to the NVFO.

VBaaS uses NFVO (or VIMs) to deploy benchmark measurements, e.g., by VNF-FG.
How? VNF Benchmarking as a Service (VBaaS)

VBaaS objectives

▶ “Black box” VNF benchmarking, with respect to the
  ▶ NVFO
  ▶ Benchmarking Service
How? VNF Benchmarking as a Service (VBaaS)

VBaaS objectives

- “Black box” VNF benchmarking, with respect to the
  - NVFO
  - Benchmarking Service
- VBaaS uses NFVO (or VIMs) to deploy benchmark measurements
  - e.g., by VNF-FG
VBaaS Process Walk-through

[VNF1: {10Mbps, 200ms}]
{{2CPU, 8GB}@PoP1}
{{4CPU, 4GB}@PoP3}]
{20Mbps,300ms}...}
{VNF2: ...}
Usage: Benchmarking, Dimensioning and Verification

Benchmarking
To measure VNF’s throughput, latency, jitter parameters for given cpu, memory, storage reservation at given VIM.
Usage: Benchmarking, Dimensioning and Verification

Benchmarking
To measure VNF’s throughput, latency, jitter parameters for given cpu, memory, storage reservation at given VIM.

Dimensioning
To determine cpu, memory, storage reservation parameters for given VNF at given VIM for target throughput, latency, jitter parameters.
Usage: Benchmarking, Dimensioning and Verification

Benchmarking
To measure VNF’s throughput, latency, jitter parameters for given cpu, memory, storage reservation at given VIM.

Dimensioning
To determine cpu, memory, storage reservation parameters for given VNF at given VIM for target throughput, latency, jitter parameters.

Verification
To assess if given throughput, latency, jitter parameters of a VNF is met with given cpu, memory, storage reservation at given VIM.
### Usage: Benchmarking, Dimensioning and Verification

**Benchmarking**
To measure VNF’s throughput, latency, jitter parameters for given cpu, memory, storage reservation at given VIM.

**Dimensioning**
To determine cpu, memory, storage reservation parameters for given VNF at given VIM for target throughput, latency, jitter parameters.

**Verification**
To assess if given throughput, latency, jitter parameters of a VNF is met with given cpu, memory, storage reservation at given VIM.

**Observation**
Dimensioning and verification boil down to benchmarking operation(s).
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Recursive Orchestration with VBaaS

UNIFYing carrier network and cloud resources

- Recurrent joint software and networking control API\(^a\)

\(^a\)draft-unify-nfvrg-recursive-programming-02
Recursive Orchestration with VBaaS

UNIFYing carrier network and cloud resources

- Recurrent joint software and networking control API
- Flexibility in resource virtualization with Big Switch with Big Software (similar to SDN Controller’s Virtualized Data Plane concept)
Recursive Orchestration with VBaaS

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VBaaS is part of each orchestration component; options:

\[ ^{a} \text{draft-unify-nfvr-g-recursive-programming-02} \]
Recursive Orchestration with VBaaS

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- request VNF profiling from the virtualization provider;

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Recursive Orchestration with VBaaS

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- Recurrent joint software and networking control API
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VBaaS is part of each orchestration component; options:
- request VNF profiling from the virtualization provider;
- do it on your own “transparently” over the underlying substrates.

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\[\text{\textsuperscript{a}}\text{draft-unify-nfvrge-recursive-programming-02}\]
Capability reporting

- Based on a virtualization yang model each execution environment can report VNF benchmarking results.

```
+-------------------------+ VBaaS +-------------------------+
| Orchestration | API-1 | Orchestration |
| (NFVO | Consumer) | (NFVO | Producer) |
+---------+-------+ +---------+-------+
| 1)get-config() | | 2)rpc-reply(virt) | <-------->
| <<-------------------------> |
| 3)edit-config(NF1@cap) | +-------------------------> |
| 4) rpc-ok | | 5)<notification> |
| <<-------------------------> | <<-------------------------------+-----+
| 6)get-config(NF1@cap) | 7)rpc-reply(NF1@cap) | |
VBaaS Request and Reporting as Capabilities

Capability reporting

- Based on a virtualization yang model each execution environment can report VNF benchmarking results.
- Consumer can request a capability report by defining partial capability entries
  - Providing only performance KPI means a dimensioning request
  - Providing only resource allocation means a benchmarking request
  - Providing both mean verification

```
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- This work is partially supported by Ericsson Brazil.
Summary

Autonomous VNF Benchmarking service seems inevitable to support agile VNF development of 3rd parties.

VNF Benchmarking as a Service (VBaaS) aims at

▶ defining complementary functional components to ETSI NFV and other approaches;

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Summary

Autonomous VNF Benchmarking service seems inevitable to support agile VNF development of 3rd parties.

VNF Benchmarking as a Service (VBaaS) aims at

- defining complementary functional components to ETSI NFV and other approaches;
- defining interfaces to the VBaaS service;
- defining possible VBaaS work-flows.

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