

IETF 101 - BMWG

VNF Benchmarking Methodology - 01

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Agenda

1. What do we know so far about benchmarking VNFs?
2. What would we like to propose to BMWG?
 - 2.1. Why the draft was updated? Which issues was it trying to address?
 - 2.2. Which are the major technical changes?
 - 2.3. Which issues are unresolved? Which issues needs further discussion.
 - 2.4. What is still missing in the draft? Future plans for the draft?

1. Obtaining Knowledge about Benchmarking VNFs

What is a VNF?



(e.g., P4Runtime API)



(e.g., NSDI USENIX 2017)

NetBricks

(e.g., OSDI 2016, open source code at github)

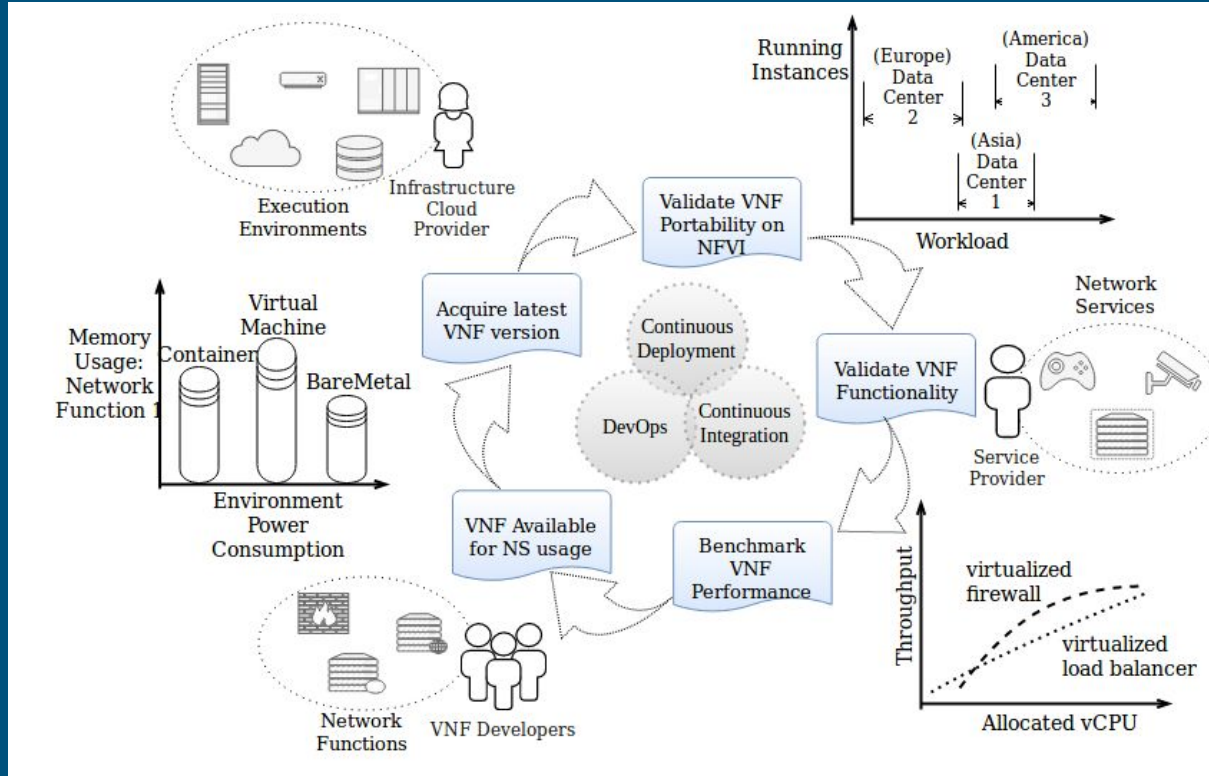


ETSI NFV Proof-of-Concept
SDN Enabled Virtual EPC Gateway

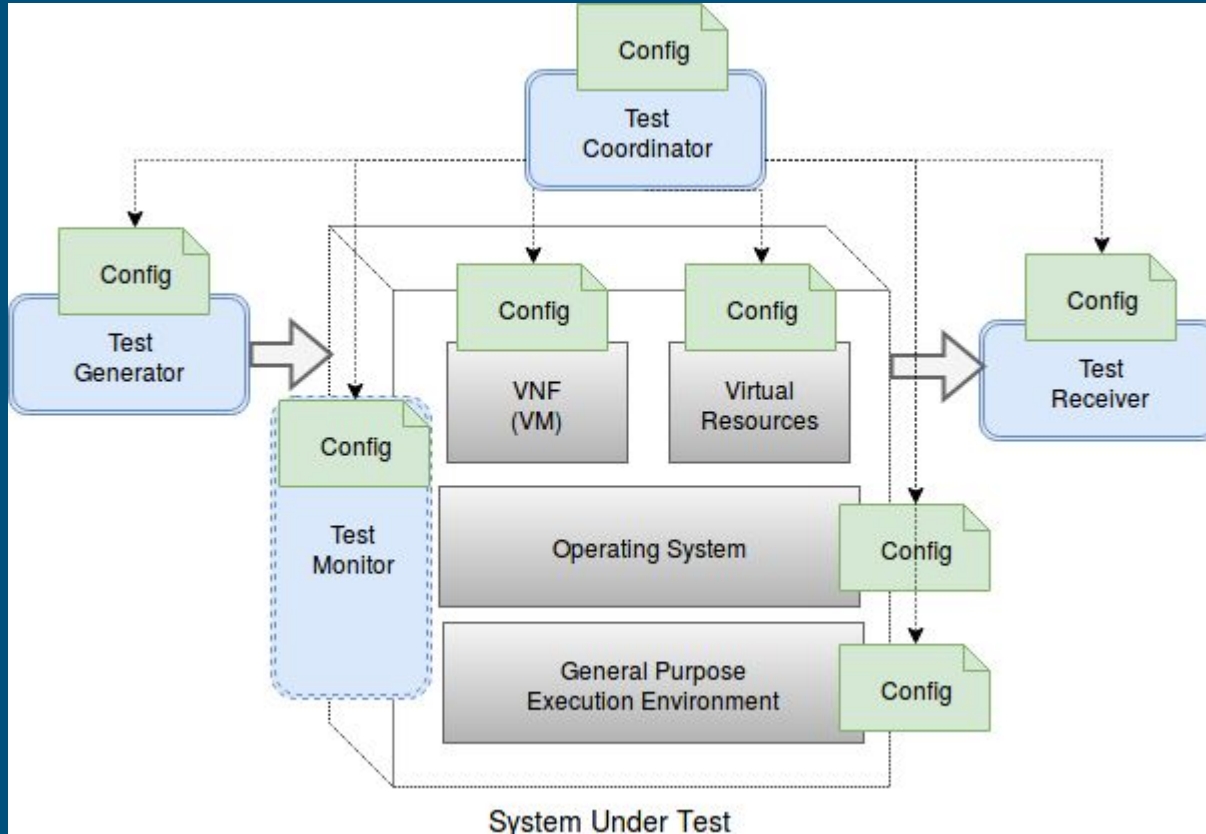


(e.g., Evolved Packet Core Network)

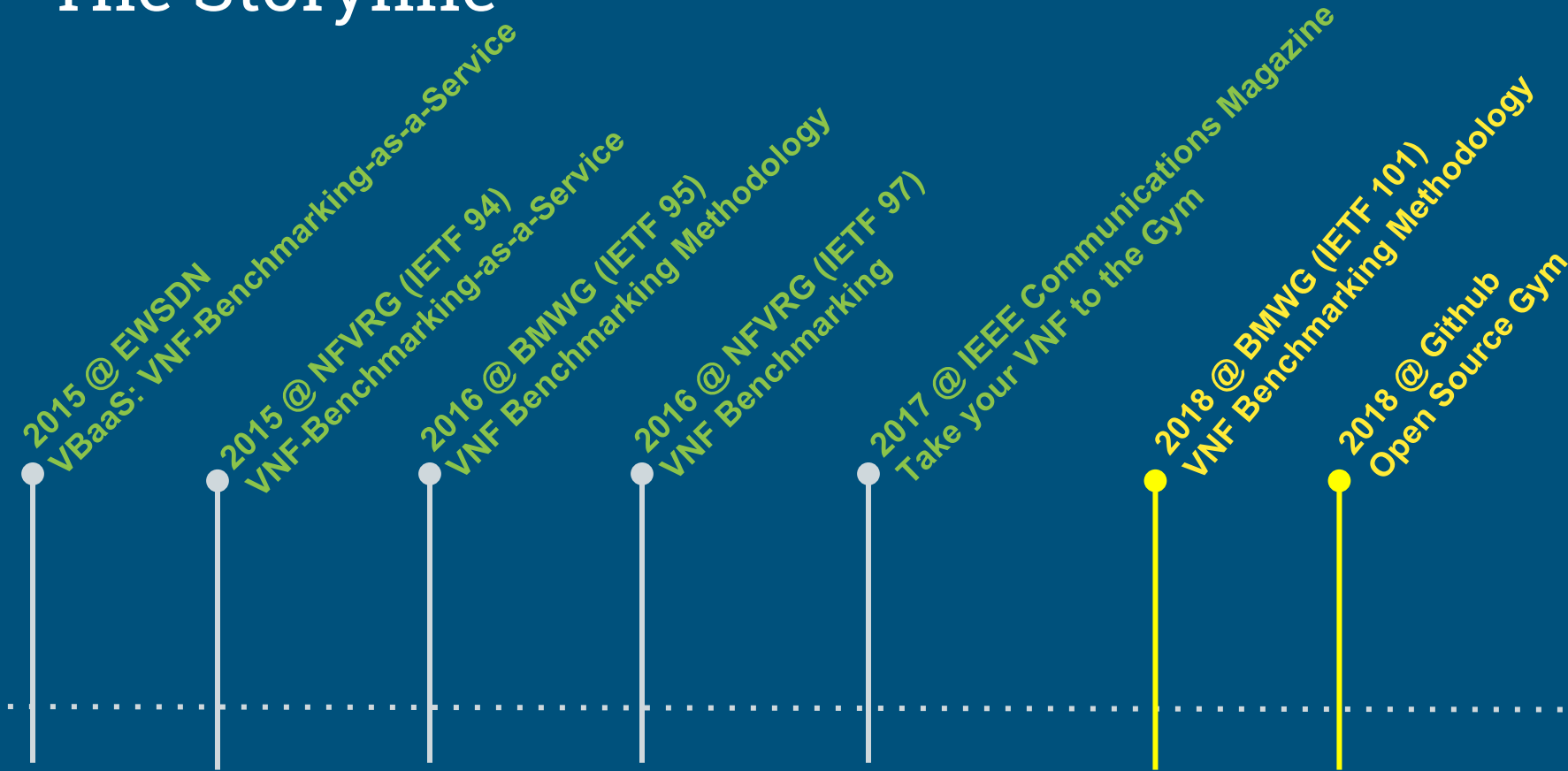
Why do we need VNF benchmarks?



In what does a VNF performance depends on?



The Storyline



2. Contributions for IETF BMWG

draft-rosa-bmwg-vnfbench-01

- ❖ Why the draft was updated? Which issues was it trying to address?
 - Initially not focused on the methodology itself
- ❖ **Rewriting** work done so far, based on experiences with running code
- ❖ Build solid foundation for VNF Benchmarking Methodology
 - Specific VNF Benchmarking Methodologies derived from this memo
- ❖ Approach state-of-the-art publications and common standardization efforts (e.g., ETSI NFV Pre-deployment Testing)

Scope

“This document assumes VNFs as **black boxes** when defining VNF benchmarking methodologies.”

“**White box** approaches are assumed and analysed as a particular case under **proper considerations** of internal VNF instrumentation.”

Terminology

We do follow ETSI's NFV Framework Terminology (Normative Reference)

In addition to RFC1242 and considerations addressed in RFC8172

We have not found another reference addressing NFV inside IETF

Considerations

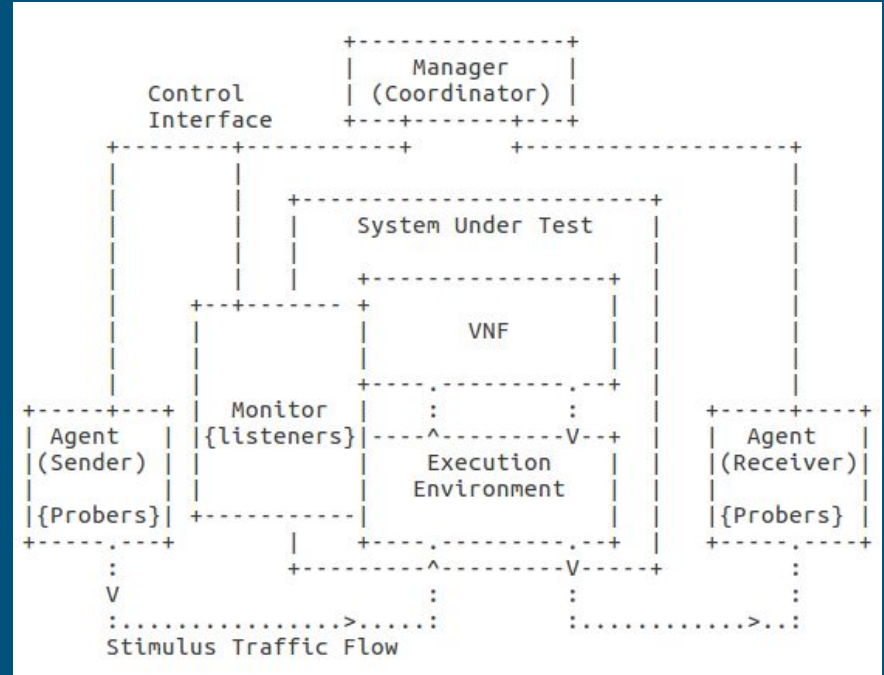
❖ Which are the major technical changes?

Common ideas utilized along the draft:

- VNF Testing Methods: Dimensioning, Verification, Benchmarking
- Generic VNF Benchmarking Setup
- Deployment Scenarios
- Influencing Aspects

Generic VNF Benchmarking Setup

- Generic components
 - White or black boxes
 - Possibly composed in single elements
 - Monitor is optional
- Varied deployment scenarios
 - Open for customization
 - e.g., VNF as traffic receiver
- All components possibly have influencing aspects on VNF performance



Methodology: General Description

- Definitions:
 - VNF-BL: VNF Benchmarking Layout - structural and functional parameters
 - VNF-PP: VNF Performance Profile - extracted metrics (correlated with VNF-BL)
- Configurations
 - “Ideally, any person in possession of such annotations and the necessary/associated skeleton of hardware and software components should be able to reproduce the same deployment scenario and VNF benchmarking process.”
- Procedures
 - Common steps in generic VNF benchmarking process

Testing Procedures

- **Trial:** Consists in a single process or iteration to obtain VNF benchmarking metrics as a singular measurement.
- **Test:** Defines strict parameters for benchmarking components perform one or more trials.
- **Method:** Consists of a VNF-BL targeting one or more Tests to achieve VNF benchmarking measurements. A Method explicit ranges of parameter values for the configuration of benchmarking components realized in a Test.

Methodology: Particular Cases

- Particular Testing Methodologies as RFC 8172
 - Noisy Neighbor
 - Representative Capacity
 - Flexibility and Elasticity
 - On Failures
- And additional items:
 - White Box VNF
 - ...

VNF Benchmark Report

- Representative metrics extracted from a VNF Benchmarking process
- Contains a VNF-PP, correlates structural and functional parameters of VNF-BL with targeted/extracted VNF benchmarking metrics of the obtained VNF-PP
 - Aims statistical significance
- Associates VNF-PP metrics with combined set of items in 3x3 Matrix Coverage

Open Source Reference Implementation

Design Principles: comparability, repeatability, configurability, interoperability.

- "Take your VNF to the Gym: A Testing Framework for Automated NFV Performance Benchmarking"
- "Taking Open vSwitch to the Gym: An Automated Benchmarking Approach"

"Gym stands as the open source reference implementation that realizes the VNF Benchmarking Methodologies presented in this document."

"Gym is being released open source at <https://github.com/intrig-unicamp/gym>", and fully available by the second half of 2018 (code refactor and documentation taking place by now)

Outlook

★ Work done:

- Running code to be open source: Gym (reference implementation)
- Initial proposal of common ground for VNF Benchmarking Methodologies

★ Which issues are unresolved? Which issues needs further discussion.

★ What is still missing in the draft? Future plans for the draft?

- Refine scope: should we consider a particular case for white box VNFs?
- Assert terminology (e.g., components' names in generic setup)
- Consider exemplifying benchmarking procedures and parameters
- Explain in depth each benchmarking particular case as a subsection each
- Address considerations for building a report of a VNF benchmark test
- Adjust draft in conformance with RFC2119
- Liaison statement to ETSI NFV?

Thanks!



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