

# Considerations for Benchmarking VNFs and their Infrastructure

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[draft-ietf-bmwg-virtual-net](#) (00)

# Current WG 00 Additions

- Using “General Purpose” computing
- Motivated complete desc. of test context: User Story (what’s in the Black Box?)
- Sec3: SUT description = platform and VNFs and...
- Barry Constantine’s comments on the list:
  - “concurrent” VNFs, how many can platform support?
- Sec3.4 Consider interactions/dependencies (placement, HA, VM or Bare Metal)
- Sec 4.1 Scale and capacity benchmarks still needed.
- Sec 4.4 Resolved the question of Scale and the 3x3 Matrix
- new 4.5, Power consumption (need metric(s))

# Assess Benchmark Coverage 3x4

	<b>SPEED</b>	<b>ACCURACY</b>	<b>RELIABILITY</b>	<b>SCALE</b>
Activation/ Creation/Setup				
Operation				
De-Activation/ Deletion/Take- Down				

# Report Results (Capacity = N units)

	<b>SPEED</b>	<b>ACCURACY</b>	<b>RELIABILITY</b>
Activation/ Creation/Setup			
Operation			
De-Activation/ Deletion/Take- Down			

# Report Results (Concurrent VNFs)

VNF #1

	S	A	R
A			
O			
D			

Core 1

VNF #2

	S	A	R
A			
O			
D			

Core 2-5

VNF #3

	S	A	R
A			
O			
D			

Core 6

VNF #4

	S	A	R
A			
O			
D			

VNF #5

	S	A	R
A			
O			
D			

# Next steps

- Marius' comments on the list this week
- Can (some) Benchmarks support network design & modeling?
- Other Comments?
- Then, WGLC?

# Backup

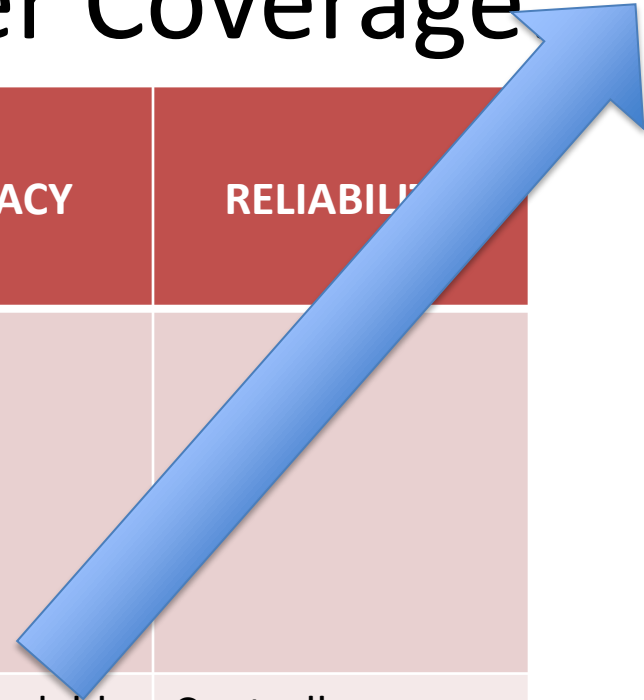
# Some Related Work

- [ETSI NFV:](#)
  - vSwitch Benchmarking Req (Acceleration-related)
  - Pre-deployment Testing of VNFs and Infrastructure
  - Interoperability Testing
- [OPNFV \(Open Platform for NFV\):](#)
  - Characterize vSwitch Performance for Telco NFV
  - Many other testing projects
- [OPEN DAYLIGHT:](#)
  - Wrapped Cbench – [WCBENCH](#) – [Daniel Farrell](#)



# SDN Controller Coverage:

	SPEED	ACCURACY	RELIABILITY
Activation/ Creation/Setup	<b>Forwarding entry and Path:</b> programming rate programming delay		
Operation	<b>Node discovery</b> rate	<b>Network</b> scalable limit (?) <b>Max forwarding</b> entries (?)	Controller failover time Data path re- convergence time
De-Activation/ Deletion/Take- Down			



# Example: Quality Metric Coverage for Virtual Machines

	SPEED	ACCURACY	RELIABILITY
Activation/ Creation/Setup	<b><u>Successful Activation Time</u></b>	Incorrect Activations per total attempts	Failed/DOA Activations per total attempts
Operation	I/O Capacity Benchmarks on CPU, Memory, Storage	Incorrect outcomes per Operation attempts	Error/Stall outcomes per Operation attempts
De-Activation/ Deletion/Take- Down	Successful De- Activation Time	Incorrect De-Activations per total att.	Failed/no-resp. De-Activations per total att.

# Version 01, Benchmarking Considerations

- Comparison with Physical Network Functions
  - Re-use of existing benchmarks, with review
- Continued Emphasis on Black-Box Benchmarks
  - Internal Metrics from Open Source are tempting
  - Supply both, may provide useful OPS insight
- New Benchmarks for a Dynamic World
  - Time to deploy VNFs, Time to Migrate,
- Assessment of Benchmark Coverage

# Ver 02, HW & Test Considerations

## Section 4.4

- How do we reflect Scale/Capacity Benchmarks in the 3x3 Matrix? Alternatives:
  - Add a new column
  - Include Scaleability under Reliability
  - Keep Size, Capacity, and Scale separate from the matrix and present results (using the matrix) with titles that give details of configuration and scale.
- Yes, results could be organized by Matrix, too.

# Test Configuration (ver 00)

- o number of server blades (shelf occupation)
- o CPUs
- o caches
- o storage system
- o I/O

configurations that support the VNF:

- Hypervisor
- o Virtual Machine
- o Infrastructure Virtual Network

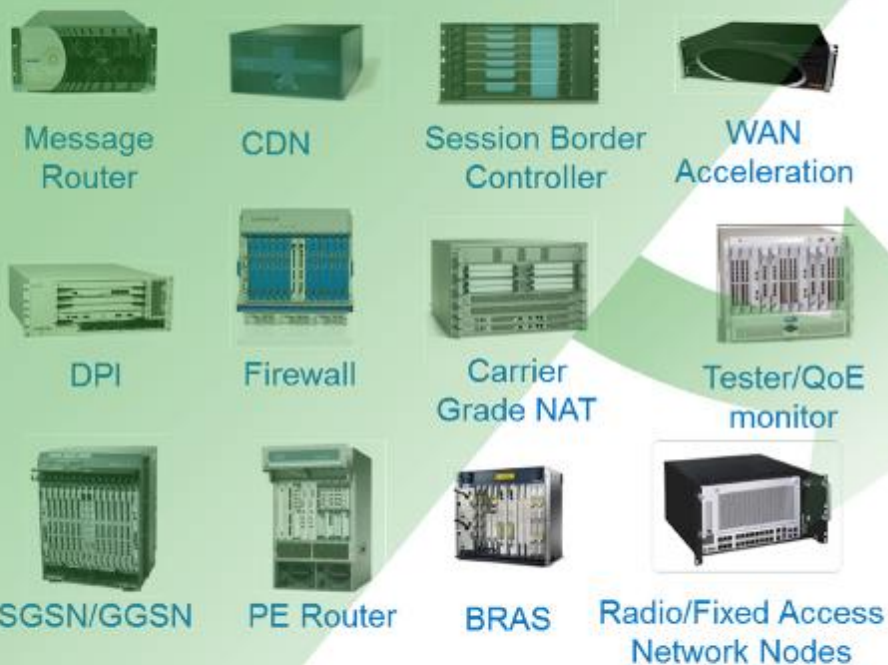
the VNF itself:

- specific function being implemented in VNF
- o number of VNF components in the service function chain
- o number of physical interfaces and links transited in the service function chain

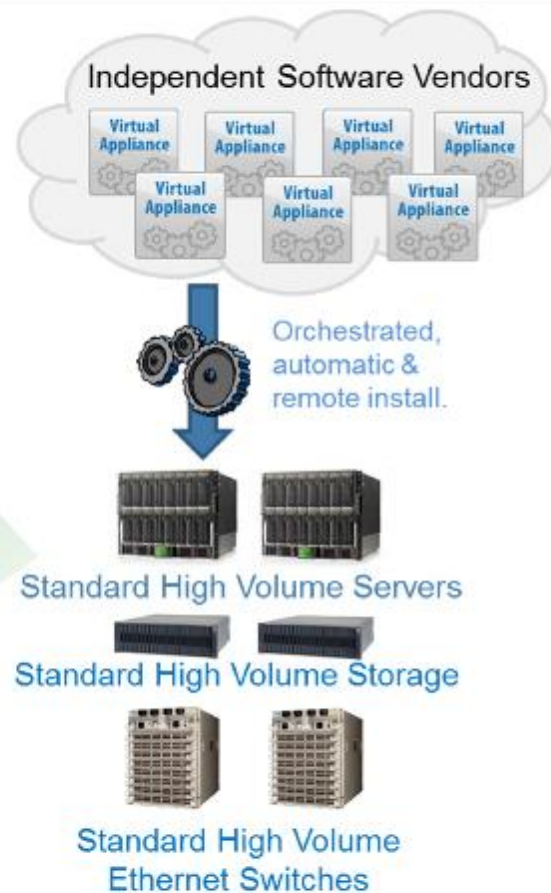
# characterizing perf at capacity limits may change? (ver 00)

- Charac. Infrastructure support of #? VMs:
  - N when all VM at 100% Util
  - $2*N$  when all VM at 50% Util ??
- #? VNF profile A, VNF profile B
  - Profiles may include I/O, storage, CPU demands
- Partition VNF performance
  - from single VNF in infinite I/O loop
- System errors occur as transients (longer dur.)
- VM and VNF flux: constant change in population while characterizing performance

## Classical Network Appliance Approach



- Fragmented non-commodity hardware.
- Physical install per appliance per site.
- Hardware development large barrier to entry for new vendors, constraining innovation & competition.



## Network Functions Virtualisation Approach

**Figure 1: Vision for Network Functions Virtualisation**

<http://www.etsi.org/technologies-clusters/technologies/nfv>