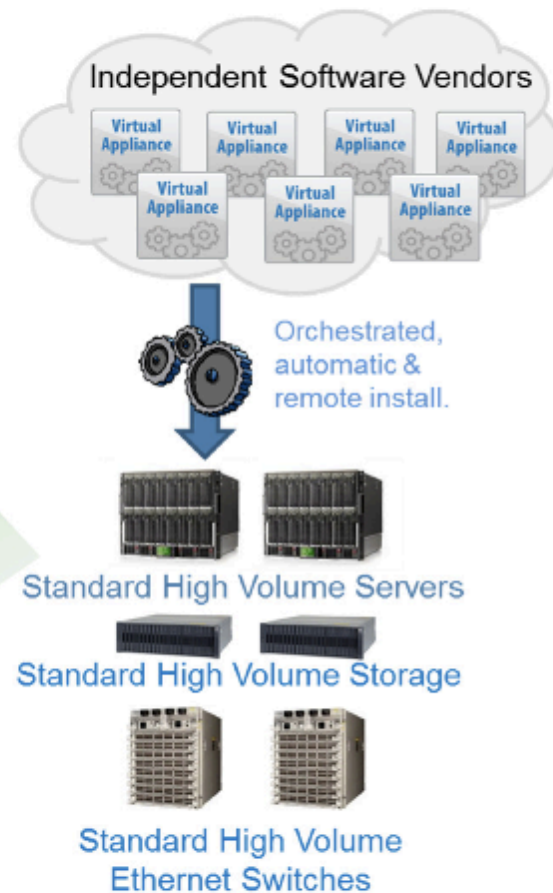
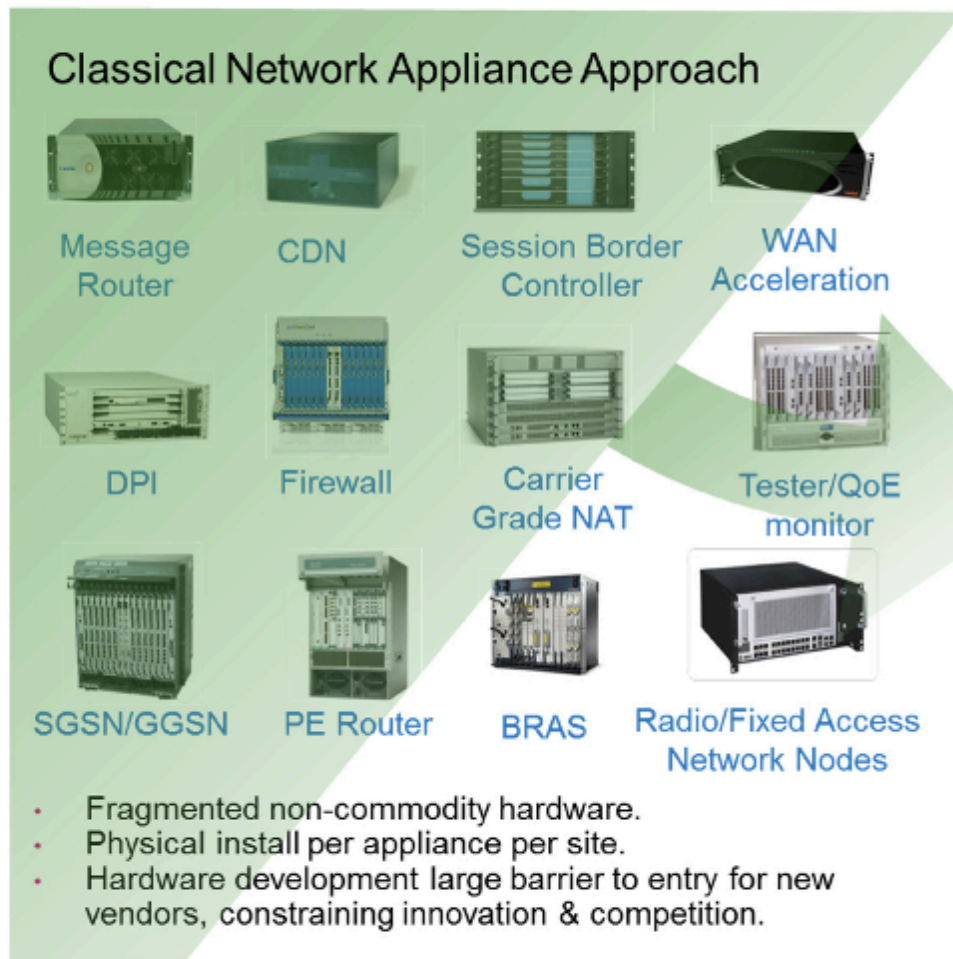


# Considerations for Benchmarking VNFs and their Infrastructure

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

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

# First Draft, HW & Test Considerations

Sections 1-3: updated and enhanced

- New Hardware on the bench
- Test Configurations expand
- Characterizing performance at capacity limits may change

Re-Charter comments – Considerations Doc became an explicit deliverable.

NEW Section 4

- Benchmarking Considerations

# Vesrion 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

# Assess Benchmark Coverage: 3 x 3 Matrix

	SPEED	ACCURACY	RELIABILITY
Activation/ Creation/Setup			
Operation			
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.

# 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			

# Next steps

- This draft provides motivation and lists considerations
- Need to refine Scope, Terms, and Methods



# Backup

# Test Configuration

- 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?

- 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