Considerations for Benchmarking VNFs and their Infrastructure

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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

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.

Current Ver 03 Additions

- Section 3.4 Considerations for inter-actions/ dependencies within resource domains (placement, HA, VM or Bare Metal)
- Section 4.3 Consider new metrics for characterization: PDV, reordering, mean delay, etc.
- Section 4.4 Resolved the question of capacity and the 3x3 Matrix (proposed)

Assess Benchmark Coverage & Report Results at Capacity = N units

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

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

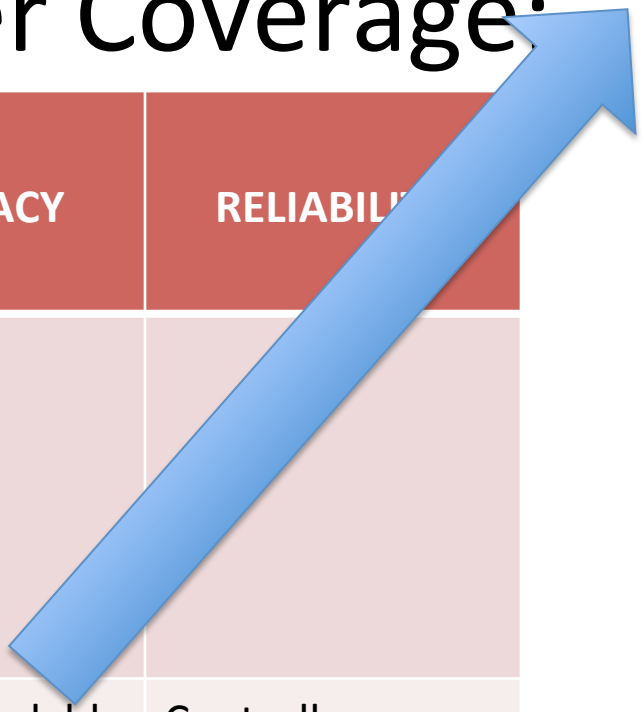
Next steps

- Further Refinements?
- Adopt as WG item?

Backup

SDN Controller Coverage:

	SPEED	ACCURACY	RELIABILI
Activation/ Creation/Setup	Forwarding entry and Path: programming rate programming delay		
Operation	Node discovery rate	Network scalable limit (?) Max forwarding 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	**Successful Activation Time**	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.

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

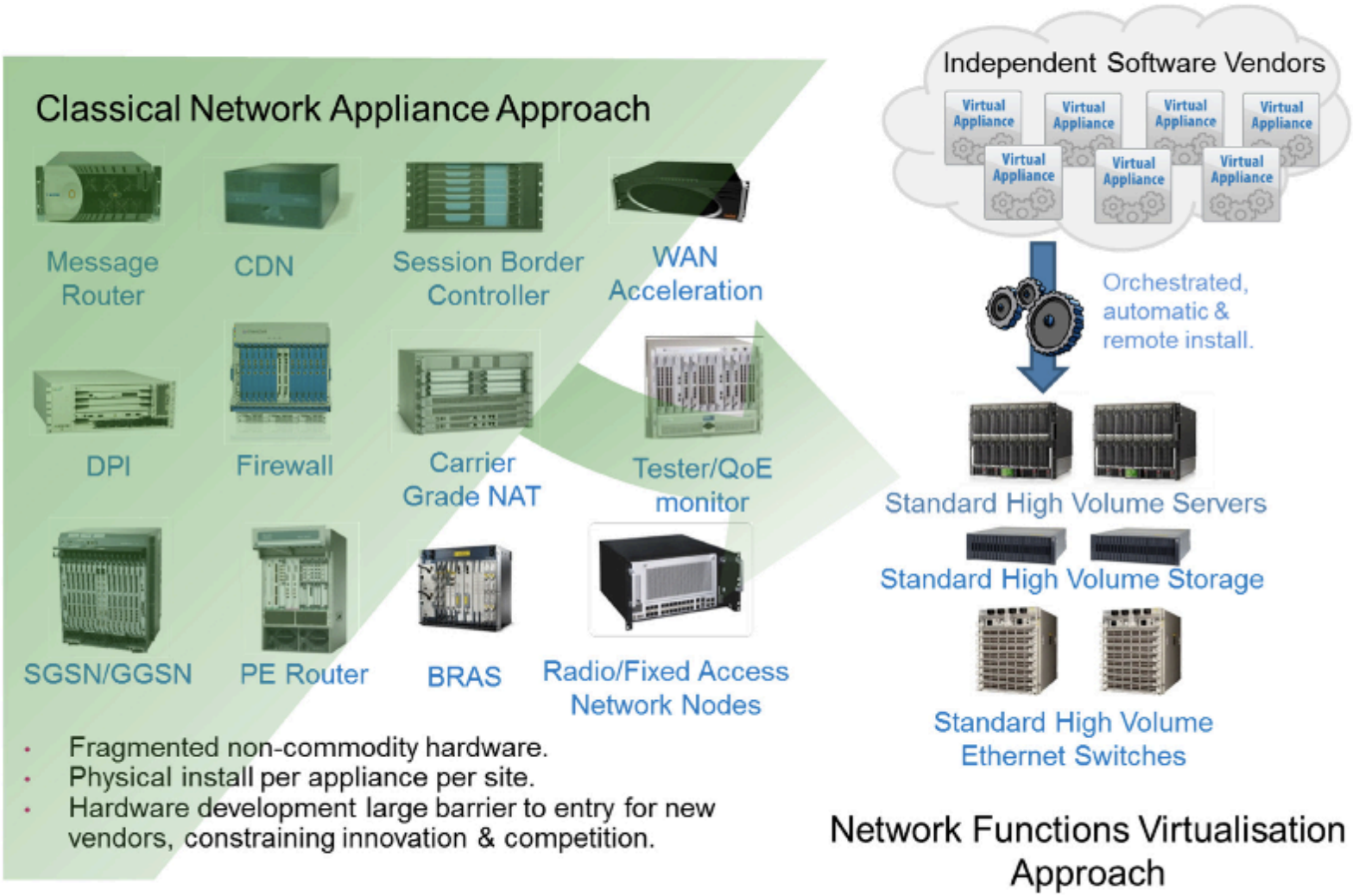


Figure 1: Vision for Network Functions Virtualisation

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