

PERFORMANCE AND RESILIENCY CONSIDERATIONS IN VNF SOFTWARE EFFICIENCY

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VNF Software Efficiency

Objective

VNF Software Efficiency is a relative metric to gauge optimal resource consumption in a virtualized environment for a specified workload

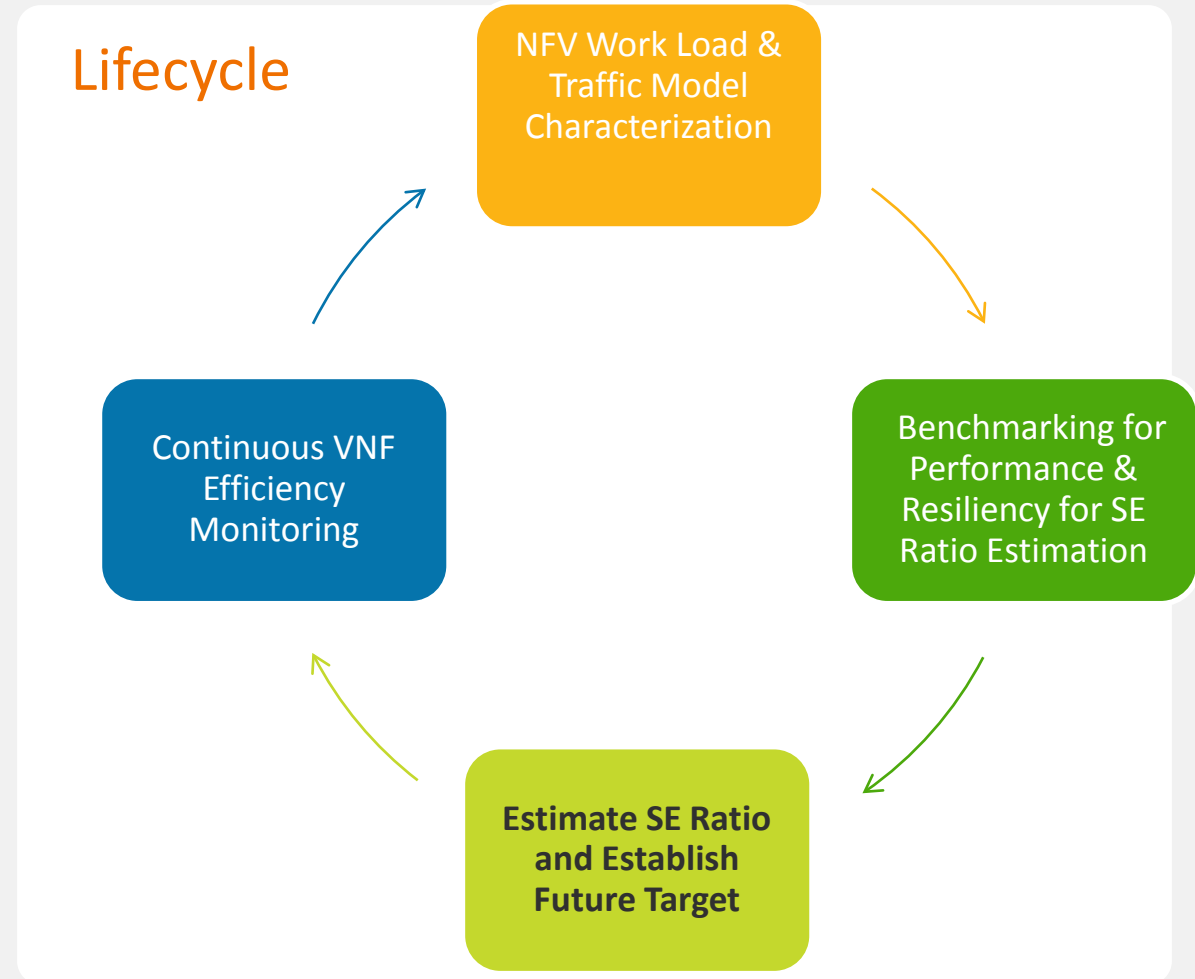
Variables Correlated to SE

- Decomposition of the VNF by Workload
- Workload performance
- Resiliency
- Cost efficiency



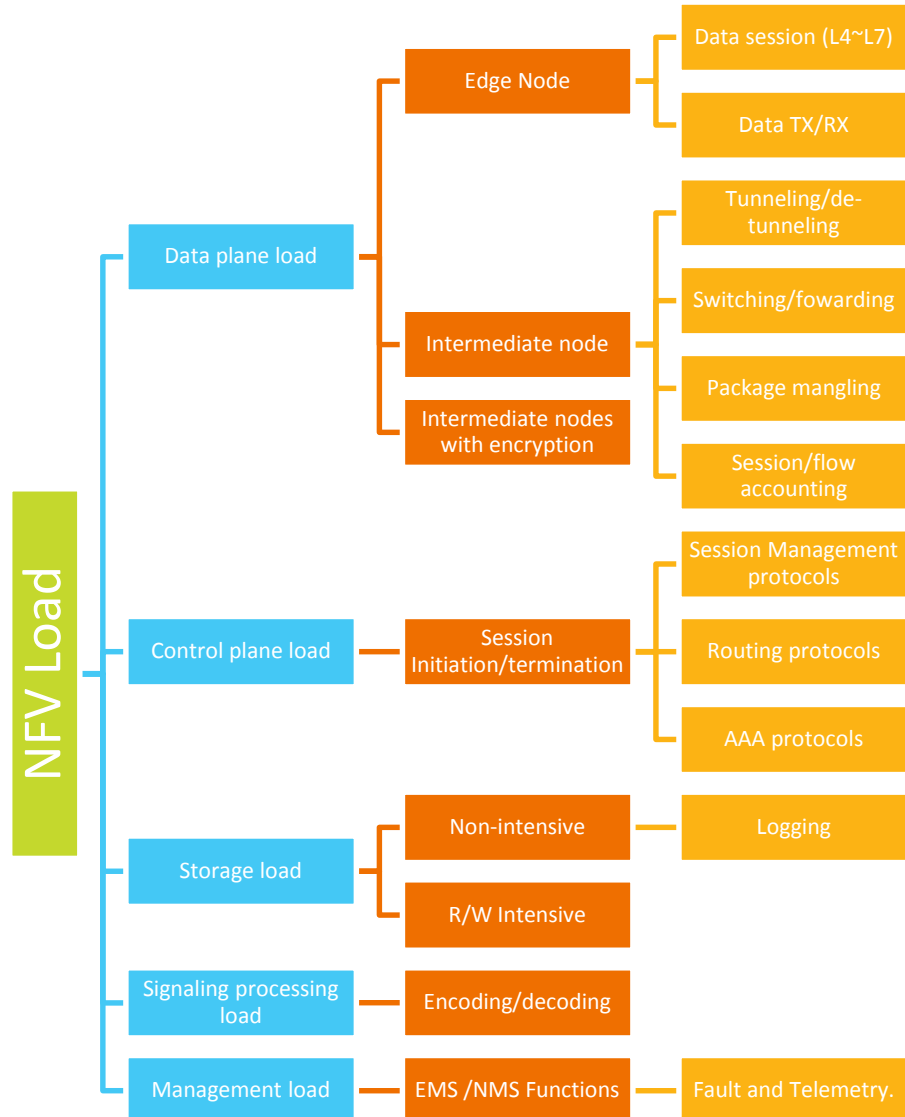
Lifecycle of VNF Software Efficiency

- Workload Characterization and Traffic Model Determination
- Benchmark Performance & Resiliency
- Estimate Software Efficiency as ratio of Performance/Resiliency on Target Platform to Reference Platform
- Continuous Monitoring of Efficiency and Adjusting Traffic Model



NFV Workload Characterization and Relationship to NFV Use Cases

Sample NFV Use Case Load Characterization:



		Mobile core & IMS		Network	CDN
		SBC	SGW	L3 PE	Cache
Data plane	Edge NF			X	X
	Intermediate	X	X		
Control plane	Routing		X	X	
	Authentication				
	Session Management	X			
Signal Processing	Transcoding	X			
Storage	Non-intensive	X	X		
	Intensive				X
Management Plane	Fault and Telemetry	X	X	X	X



Variables Contributing to VNF Performance & Resiliency

Architecture Components

- CPU
- Memory Access (e.g., NUMA)
- Data Path (e.g., PCIe)
- Virtualization Layer
- Operating System Kernel
- NIC Driver
- I/O Virtualization
- SDN Controller Global/Local/Nodal Design
- Overlay Network / Underlay Network Design

VNF Packet Flow Design

- Virtualization Overhead
- Hypervisor Overhead
- Process Management
- Scheduling / Queuing
- Context Switching between User/Kernel Space
- Data Copy vs. DMA
- Fine Grain Security Checks at every Stage
- Polling versus Interrupt

System State / Arch Optimization

- Stateful or Stateless Implementation
- Recovery Design
- VM Placement
- Over-subscription
- Scaling In/Out Triggers during Overload/Underload

