Operators deploying NFV infrastructure and components are demanding carrier grade performance from their vendors. Traditional definition of carrier grade include high availability, security, high performance and network management. In the context of NFV all these definitions need to be re-addressed with the ETSI NFV architecture in perspective. OPNFV needs to advance on all these items to create a software that is pertinent to the service providers. For NFV, carrier grade involves the hardware infrastructure, software infrastructure and the services and apps. The software infrastructure includes NFV architectures and implementations. This area is relevant to OPNFV. The software infrastructure also includes VNFs and VNF-M as well as OSS/BSS and VNF-O. It is important for OPNFV to have a panel discussion on this topic so that the OPNFV releases pertain to these standards in the future.
Audience

OPNFV community will benefit greatly from discussion on carrier grade functionality demanded by the service providers. Bringing the community together on a common agenda on this terminology will greatly benefit the community as well as all development efforts under OPNFV.
What is Carrier Grade?

Conventional Definition includes the following requirements:

1. High Availability – minimum 99.999%, desired 99.9999%
2. Security – user traffic data encryption & storage, multi-tenancy
3. Performance – low latency and high throughput
4. Network management – Hitless upgrades, patches, no downtime
Carrier Grade Involves

1. Hardware Infrastructure
2. Software Infrastructure
3. Services and Applications
Hardware Infrastructure Includes

1. All Network Devices
2. Compute and Server Entities
3. Storage Units
4. Rack and Power
Software Infrastructure Includes

1. NFVI architectures and implementations – OPNFV
2. VNFs and VNF-M
3. OSS/BSS, Services and VNF-O
Software Performance Examples

CPU/Kernel
• NUMA - Non-Uniform Memory Access.
• CFS - Completely Fair Scheduler.
• RCU - Read Copy Update.

Networking
• vhost-net - a fast, kernel-based VirtIO solution.
• SR-IOV - for near-native networking performance levels.

Memory
• Huge Pages and other optimizations for memory-intensive environments.

Block I/O
• AIO - Support for a thread to overlap other I/O operations.
• MSI - PCI bus device interrupt generation.
• Scatter Gather - An improved I/O mode for data buffer handling.
CPU Performance Examples

• Adjust the amount of virtual CPUs – overcommitting can hurt performance
• CPU features/instructions individually enabled/disabled
• CPU topology: Apply a particular Sockets, Cores, Threads to the virtual CPUs
• CPU Pinning: Large performance improvements by adhering to system's NUMA topology
Other Performance Topics

- NUMA affinity of VNFs
- Live Migration
- Failure and Recovery
- Redundancy
- ……