Cisco Virtual Infrastructure Manager

Updates on Deployment Models, Monitoring and Lifecycle Management

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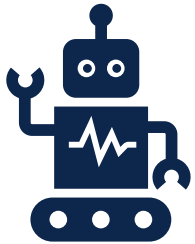
CVIM at-a-glance

Telco cloud platform that can be used to ...

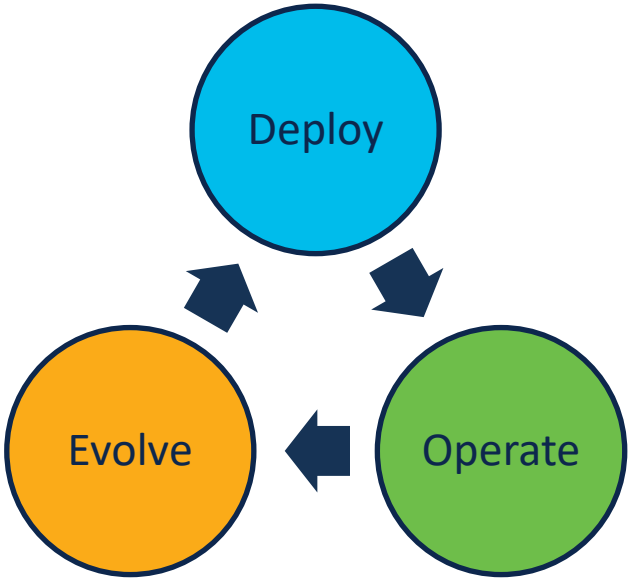
Grow Revenue

Reduce Costs

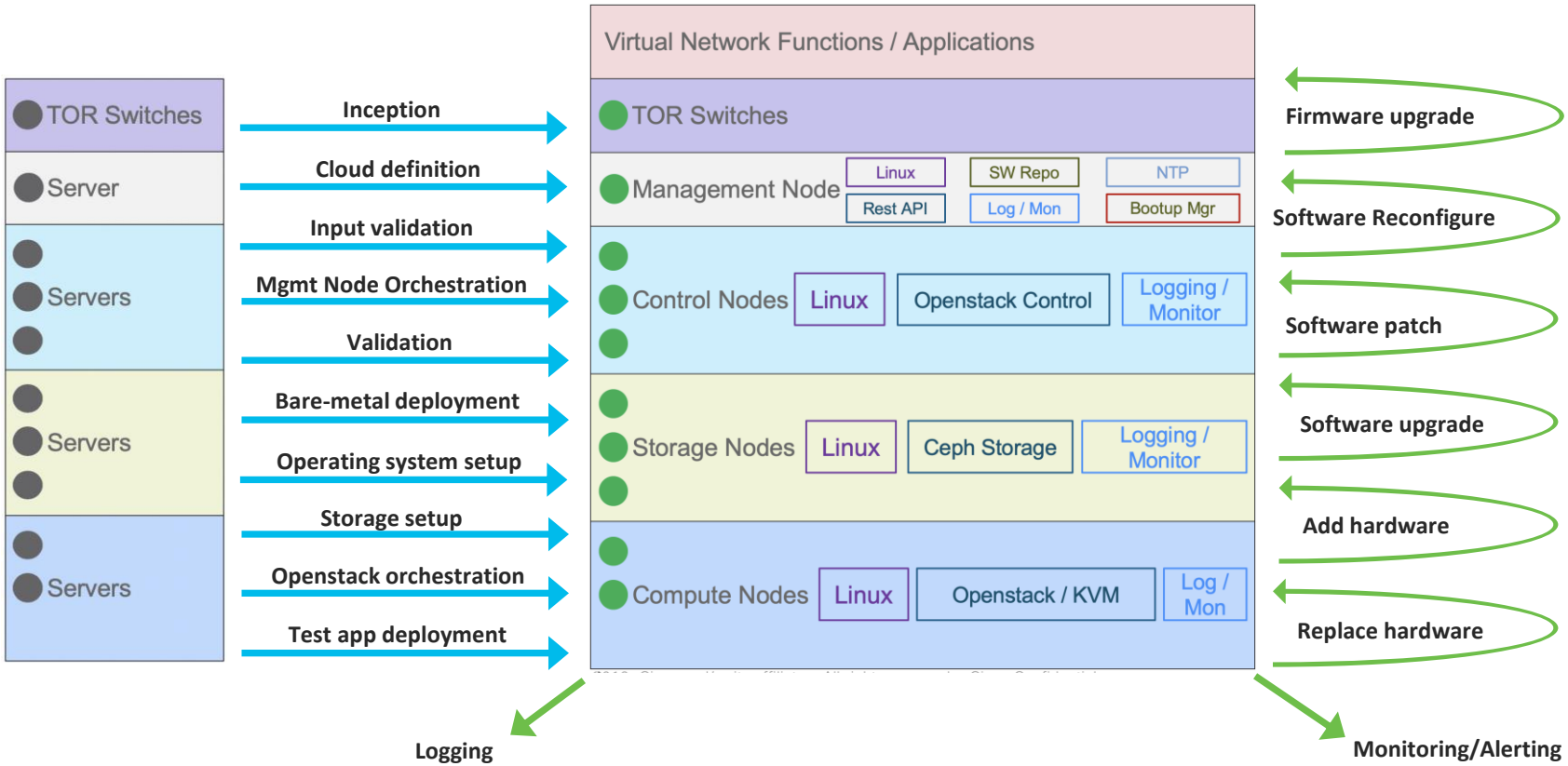
Mitigate Risk



... through automation and focus on lifecycle



CVIM : Deploy → Operate → Evolve

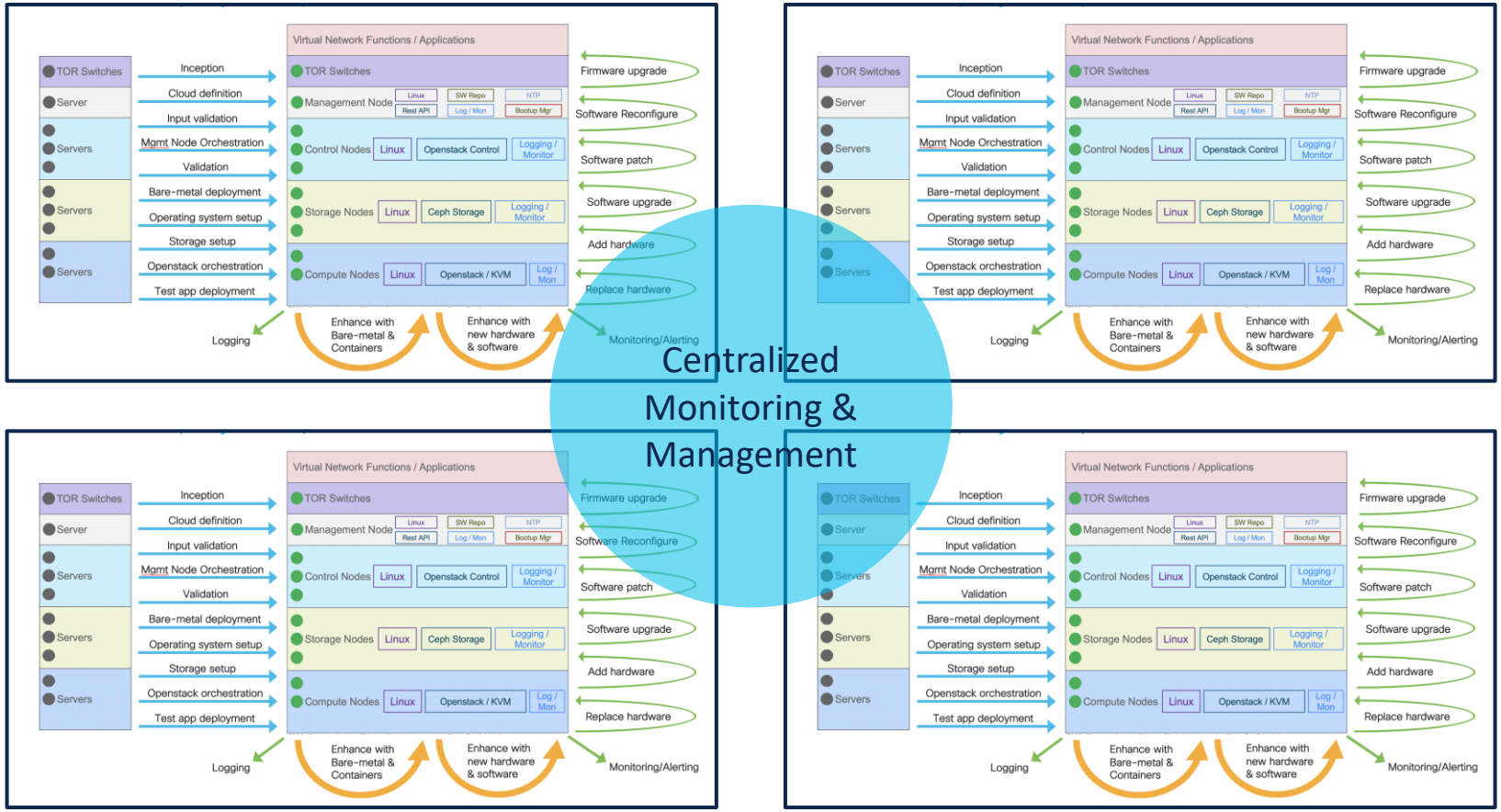


Grow Revenue

Reduce Costs

Mitigate Risk

CVIM : Deploy → Operate → Evolve



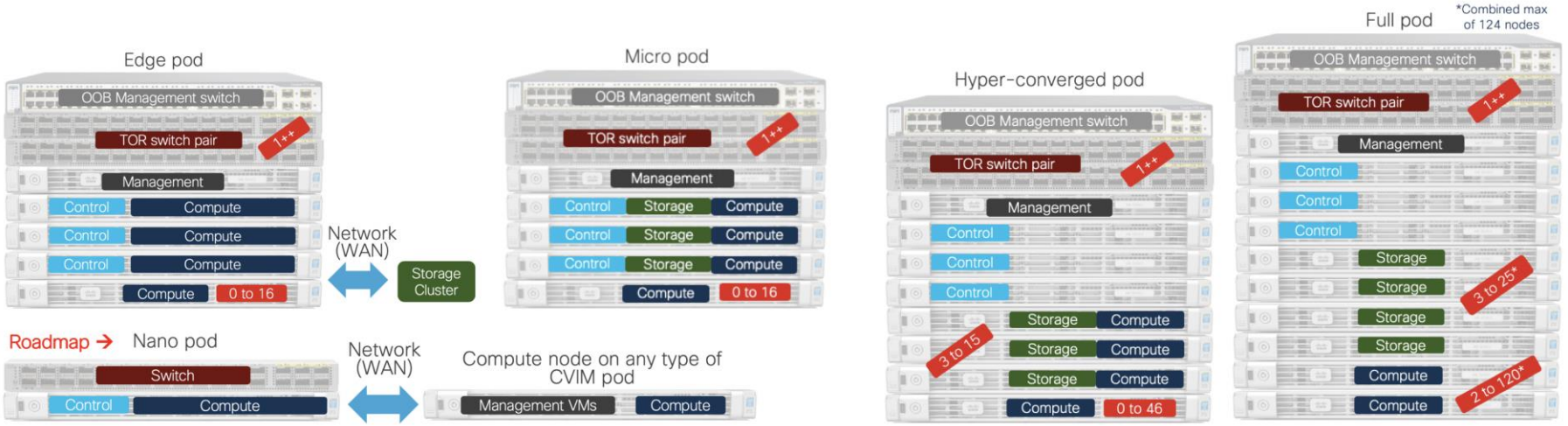
Grow Revenue

Reduce Costs

Mitigate Risk

Deployment Models

CVIM Pod Types



← Small optimized form factor with specialized hardware ... Large form factor with standard hardware →

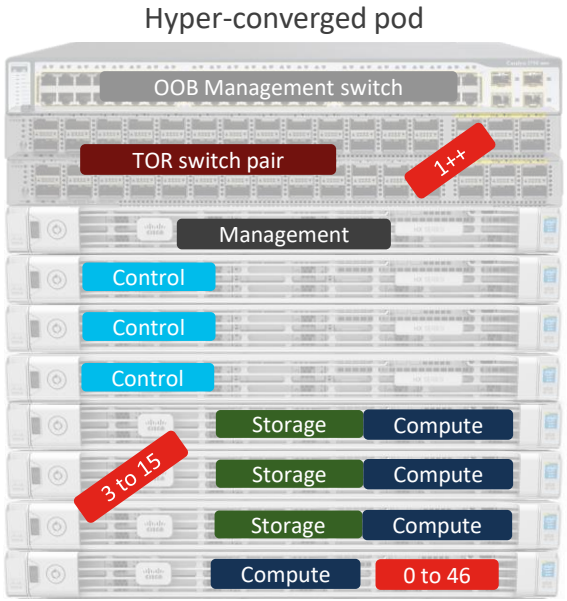
CVIM For Core Cloud

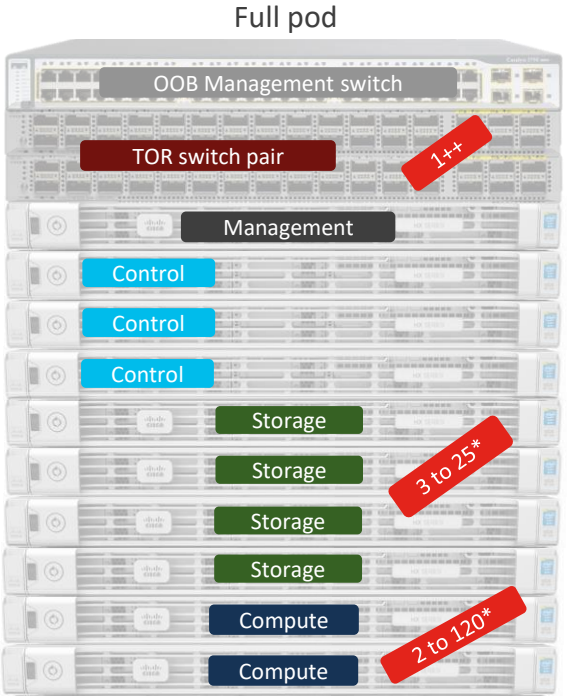
Full pod

- Largest form factor
- Typically used for VNFs like vEPC, and other general IT applications

Hyper-converged pod

- Second largest form factor
- Storage co-located with compute
- Suitable for use cases with moderate storage needs

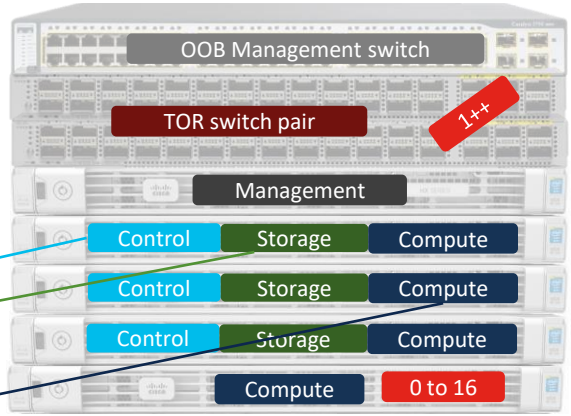




CVIM for edge cloud

Micro pod

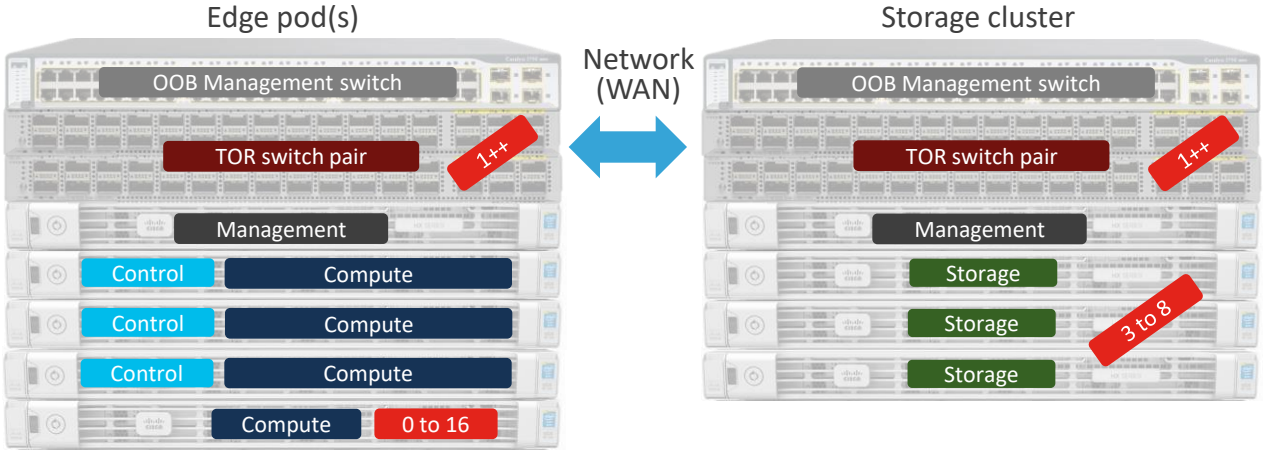
- Smallest form factor for independent cloud
- Control and Storage co-located with compute
- Typically used for small scale deployments, vRAN vCU, and Multi-access Edge Computing use cases
- Also useful for small managed network services or SD-WAN type use cases
- Configurable minimal overhead for Linux, Control and Storage, all remaining resources available for workloads



CVIM for far-edge cloud

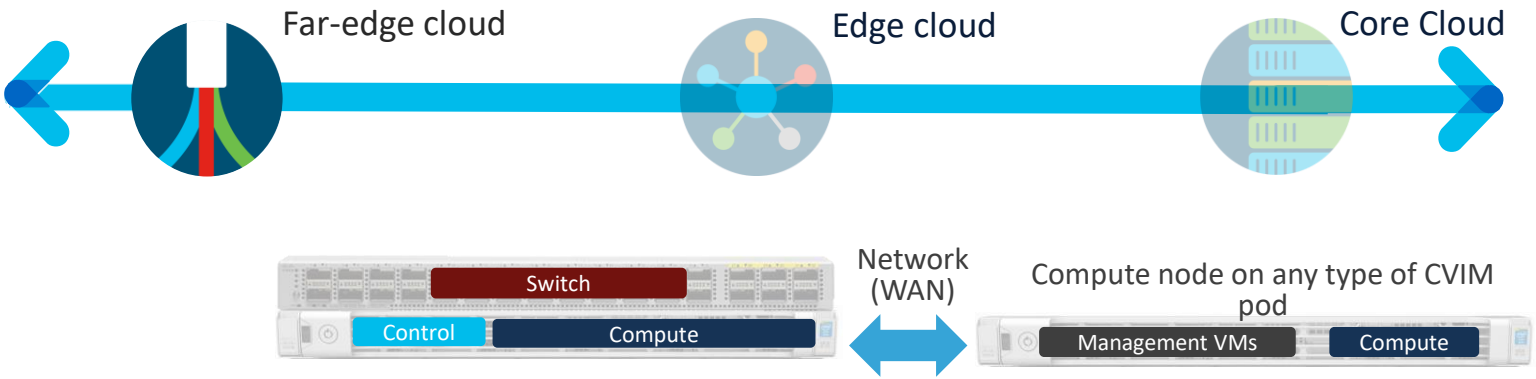
Edge pod

- Smallest form factor, with no volume storage, and image storage in shared storage cluster
- Control co-located with compute
- Configurable minimal overhead for Linux & Control



- Supports specialized FPGA NICs and Real-time kernel for time sensitive VNFs like vRAN vDU
- Typically used for remote deployments at small central offices that have limited power & space

CVIM for far-edge cloud



Nano pod

- Single server form factor, with no volume storage, and image storage in local drive
- Management node functionality in a VM running on some other cloud
- Similar to Edge pod, control co-located with compute
- Configurable minimal overhead for Linux & Control
- Supports specialized FPGA NICs and Real-time kernel for time sensitive VNFs like vRAN vDU
- Typically used for sparsely populated remote deployments and/or cloud-on-wheels

Monitoring NFV Infrastructure

Cisco VIM Monitor

Monitoring

- Health and Performance monitoring of NFVI
- POD level view of components
- More accurate Data Analysis with Smart Metrics

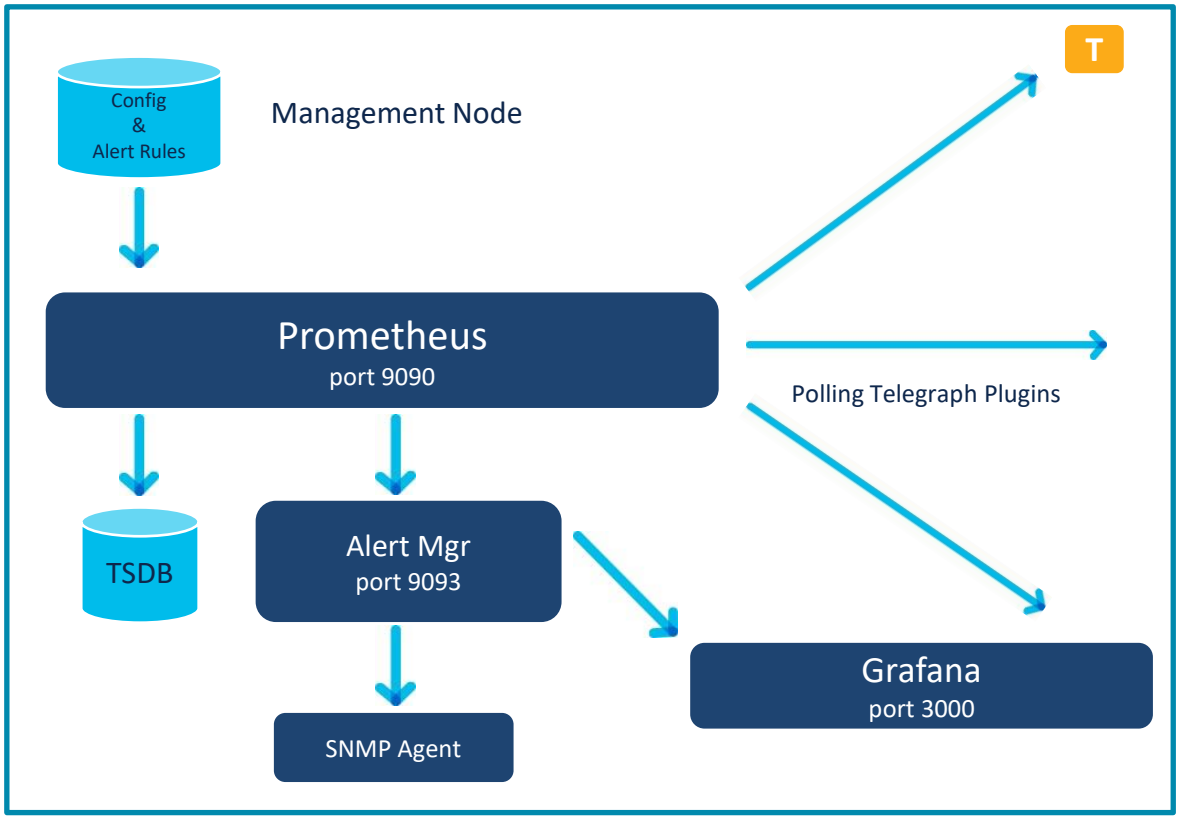
Alerting and Reporting

- Rule-based Alerting – SNMP Traps
- Smart Metrics
- Intuitive GUI with Pre-defined Dashboards to view Stats and Alerts

Automation

- Automated and Fully Integrated Installation with NFVI Deployment
- REST API support
- Easily Customizable and Extensible

CVIM Monitor Architecture



T Control Node

T Control Node

T Control Node

T Storage Node

T Storage Node

T Storage Node

T Compute Node

T Compute Node

T Compute Node

CVIM Monitor Metrics

System Metrics
- CPU Disk Interface

Linux Kernel
- processes, context switches, interrupts, conntrack…

Infrastructure Services
- NTP, RabbitMQ, HAPROXY

Openstack
- OpenStack Services, Hypervisor,CEPH, VMs

Management Services
- ELK, Prometheus

Libvirt
- Vswitch(VPP), VM vcpu, memory, disk

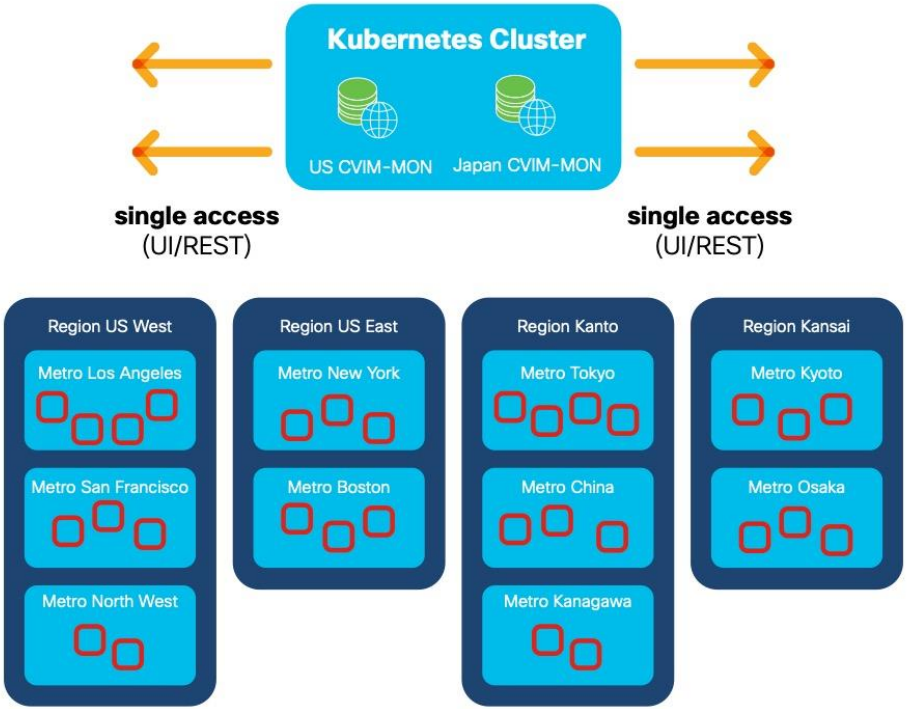
CVIM-MON HA **Overview**

Cisco VIM can monitor the cloud infrastructure

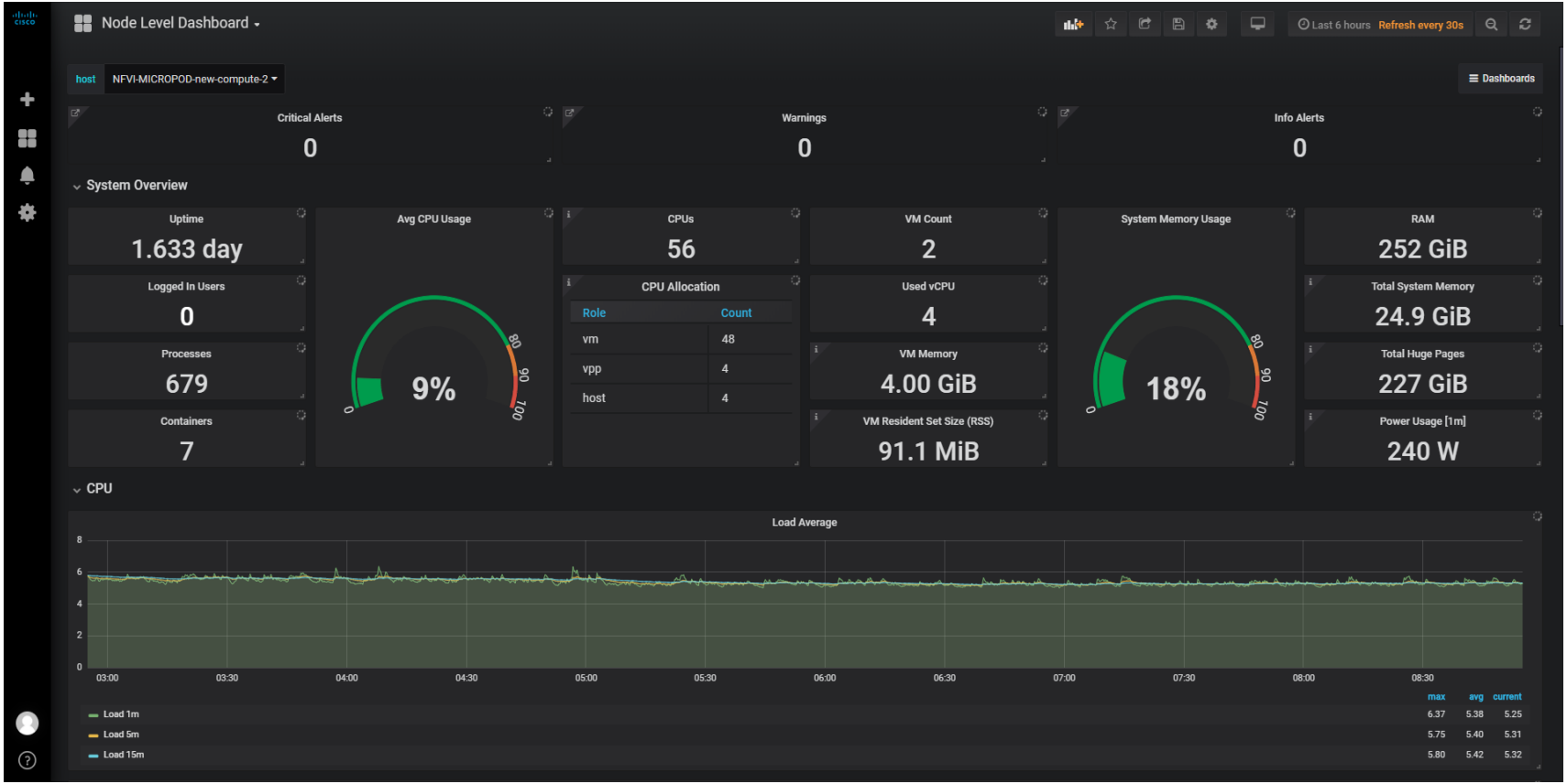
- Individually using the local CVIM Monitor
- Centrally using the new HA CVIM Monitor

Cisco VIM can monitor the cloud infrastructure

- Integrated and highly-available monitoring of multiple Cisco VIM pods
- Centralized database, alarm and web-based GUI dashboards
- Scales to hundreds of Cisco VIM pods and thousands of nodes
- Provides a longer retention time for collected metrics

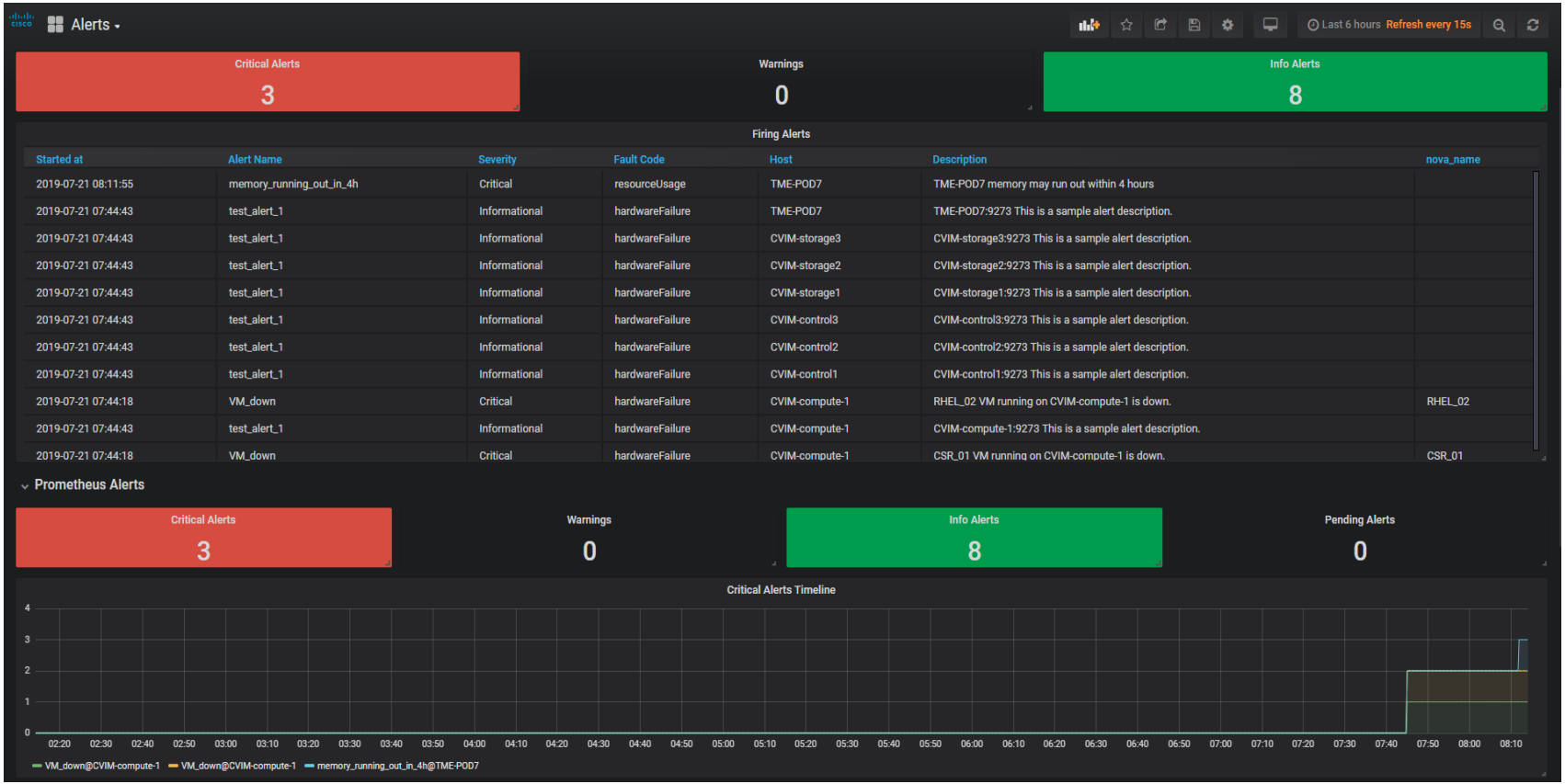


CVIM Node Level Metrics

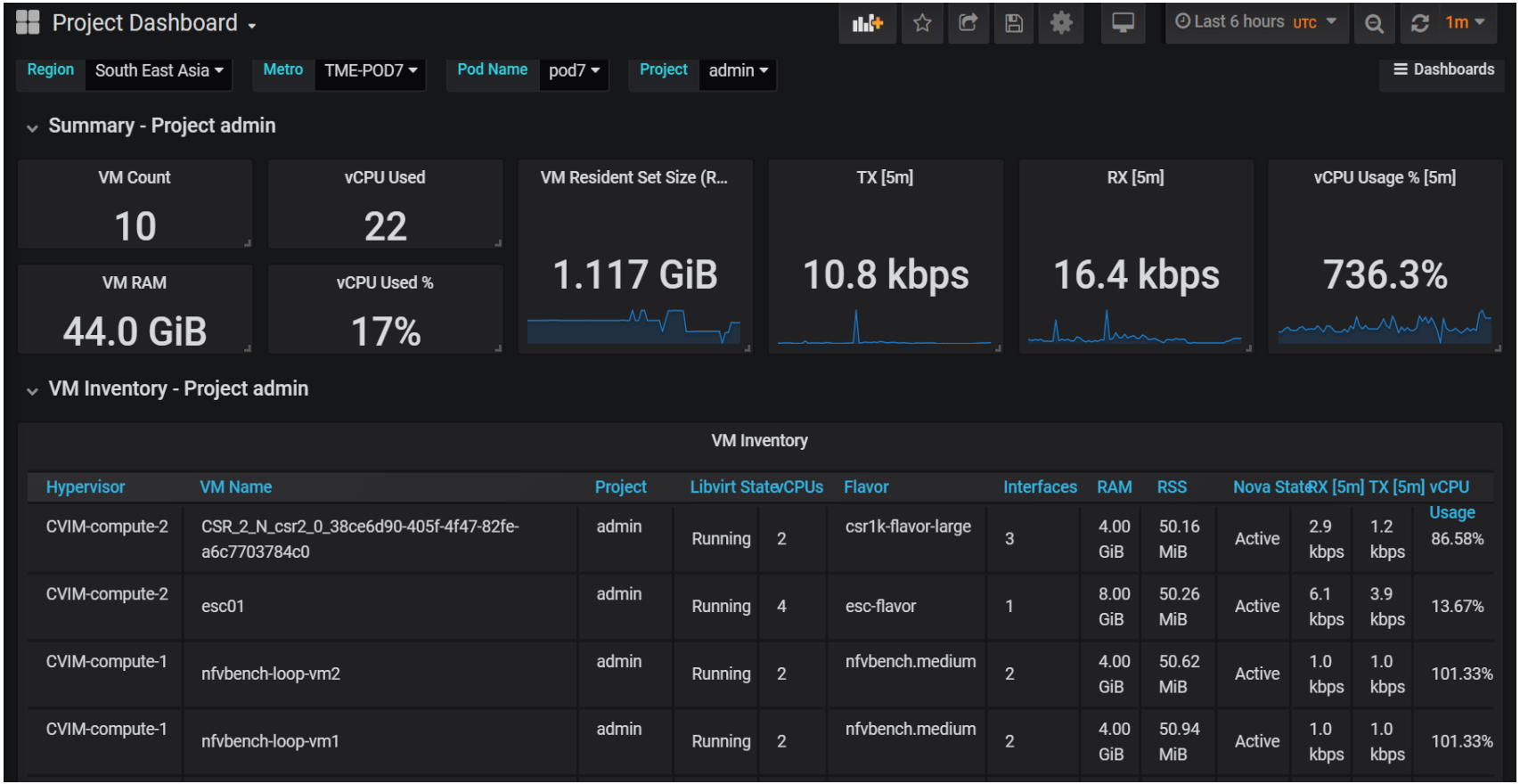


OpenStack Metrics

Critical and Informational Alerts

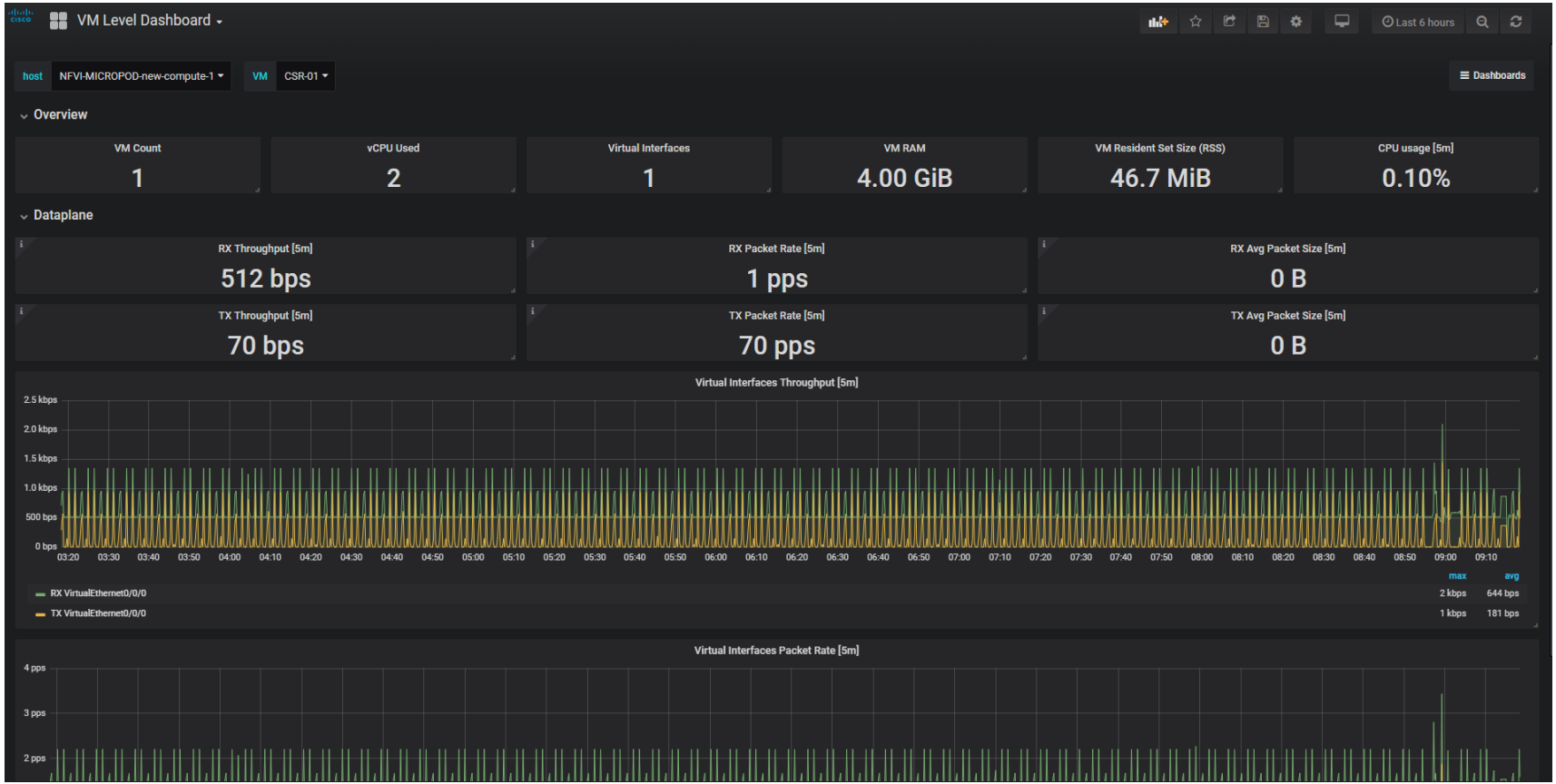


OpenStack Multi-Project Dashboards

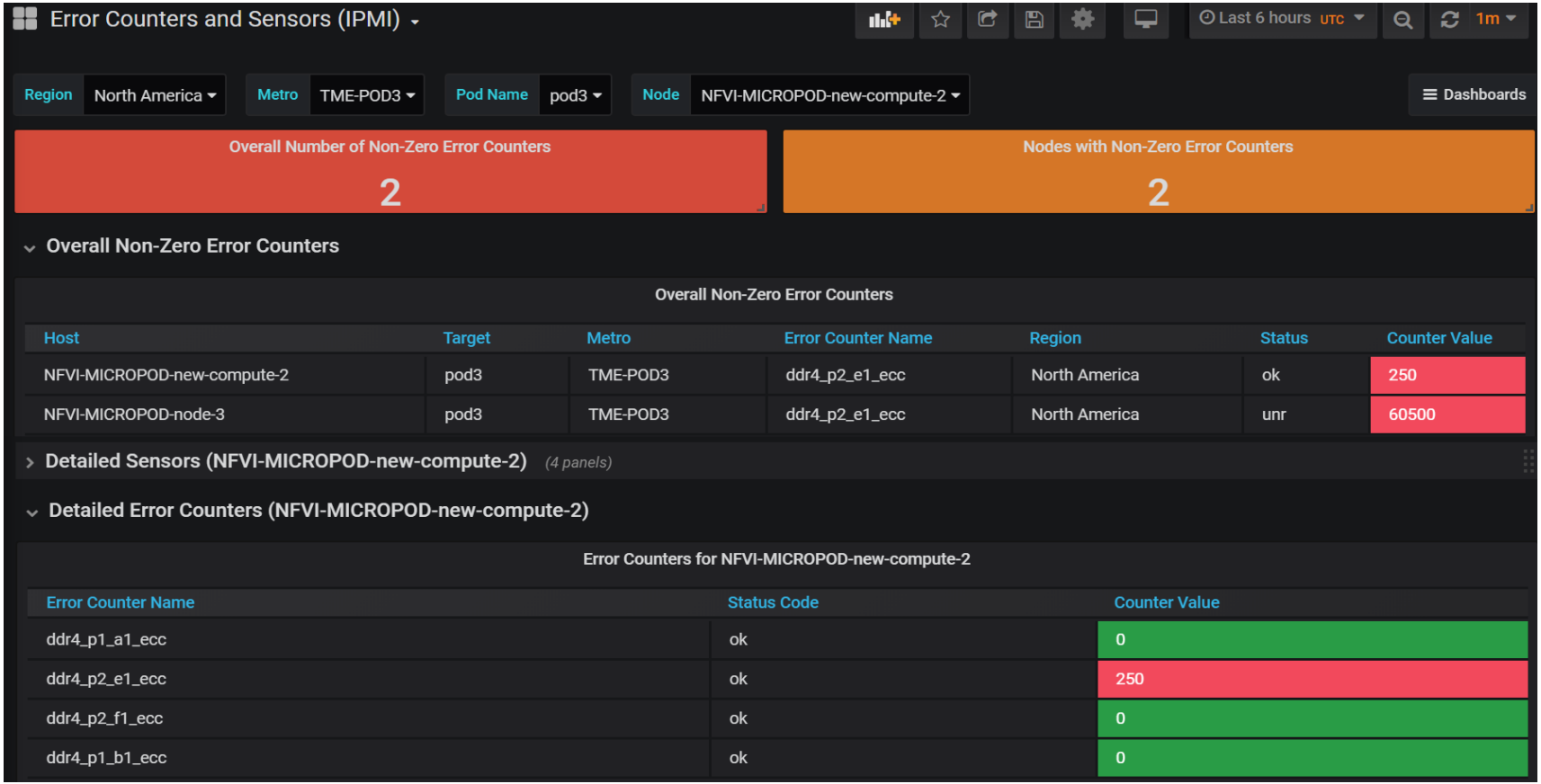


Hypervisor	VM Name	Project	Libvirt State	vCPUs	Flavor	Interfaces	RAM	RSS	Nova State	RX [5m]	TX [5m]	vCPU Usage
CVIM-compute-2	CSR_2_N_csr2_0_38ce6d90-405f-4f47-82fe-a6c7703784c0	admin	Running	2	csr1k-flavor-large	3	4.00 GiB	50.16 MiB	Active	2.9 kbps	1.2 kbps	86.58%
CVIM-compute-2	esc01	admin	Running	4	esc-flavor	1	8.00 GiB	50.26 MiB	Active	6.1 kbps	3.9 kbps	13.67%
CVIM-compute-1	nfvbench-loop-vm2	admin	Running	2	nfvbench.medium	2	4.00 GiB	50.62 MiB	Active	1.0 kbps	1.0 kbps	101.33%
CVIM-compute-1	nfvbench-loop-vm1	admin	Running	2	nfvbench.medium	2	4.00 GiB	50.94 MiB	Active	1.0 kbps	1.0 kbps	101.33%

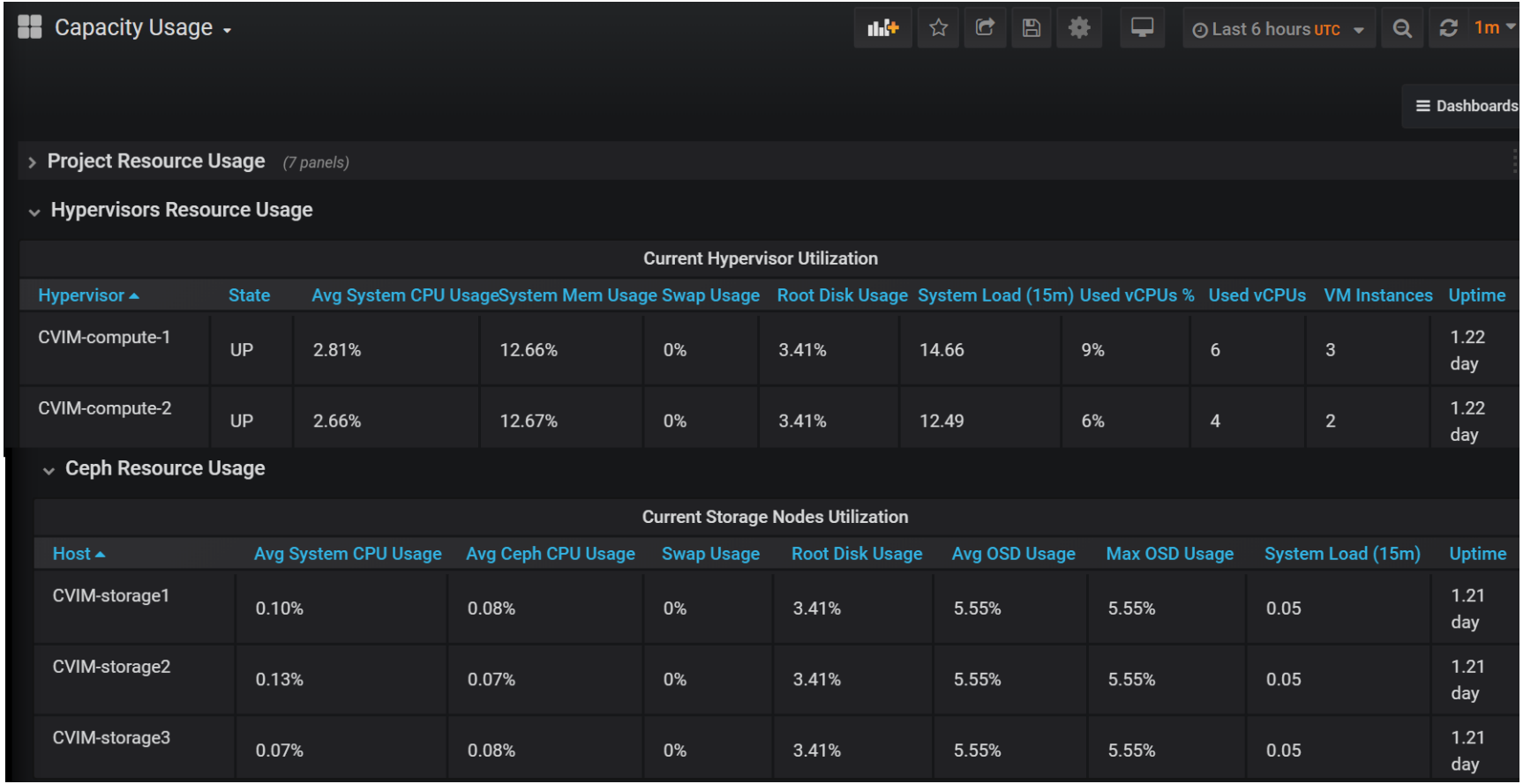
Virtual Machines – Application Level Metrics



Enhanced IPMI stats



Cloud Resource Usage



Cisco VIM Unified Management

Operational Tools & Lifecycle management

Integrated Operational & Validation Tools

EFK Stack – Centralized logging for hosts and OpenStack services

Cloud Pulse – NFVI control plane and API endpoint health check

VMTP – Full virtual topology bring up and throughput tests

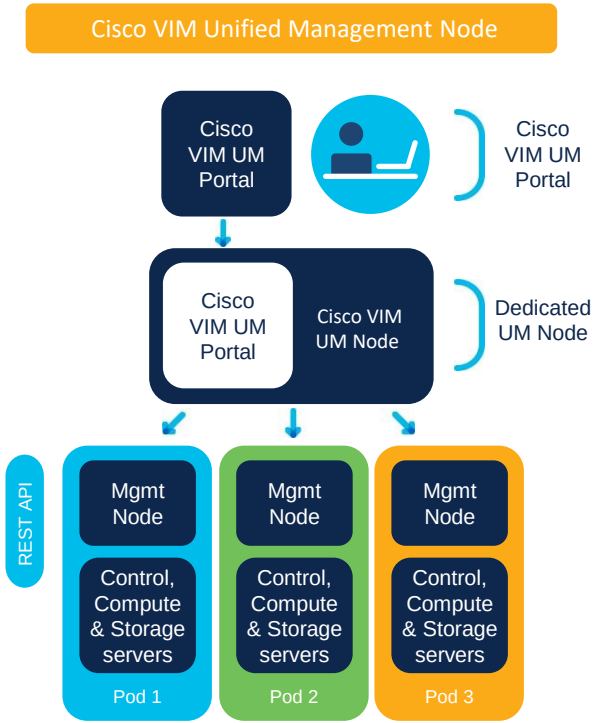
Cloud-sanity – POD level Health check tool

Unified Management – Cisco VIM Graphical user interface

Monitoring – containers, processes, physical & virtual resources

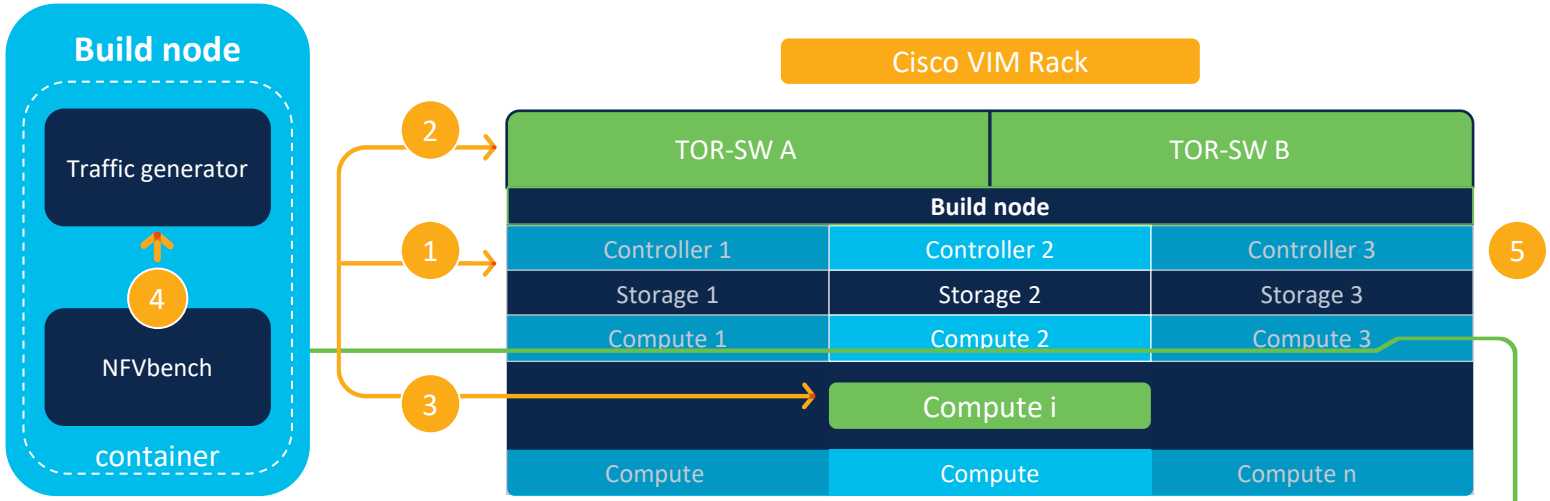
NFV Bench– Benchmarking Performance

Cisco VIM (GUI)
Unified Management



Cisco NFV bench

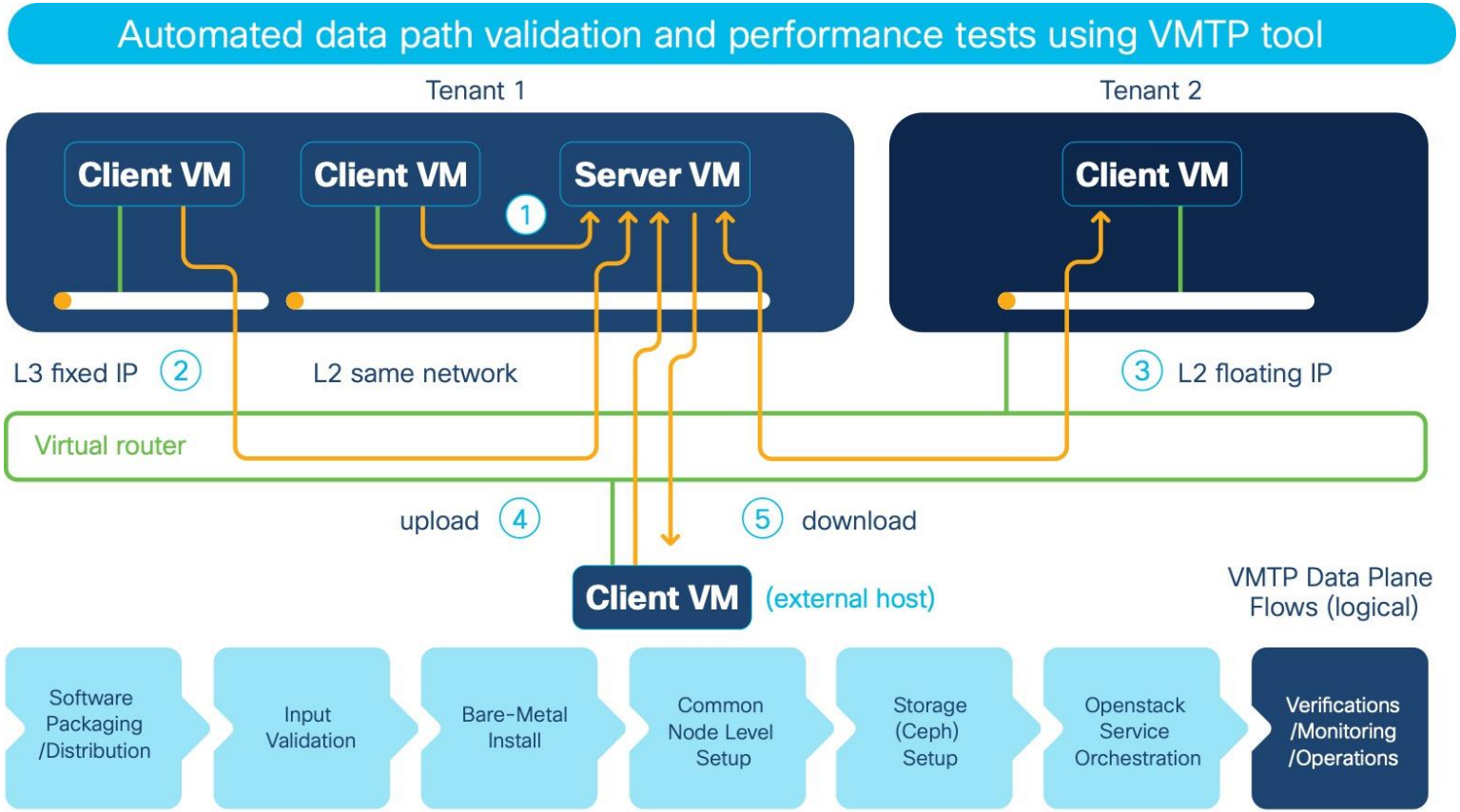
Addressing Network Benchmarking



1 Stage VNF chain (OpenStack API)
2 Stitch traffic generator interfaces to VNF chain
3 Clear counters in vswitch(es)
4 Start traffic
5 Traffic flows to the VNF

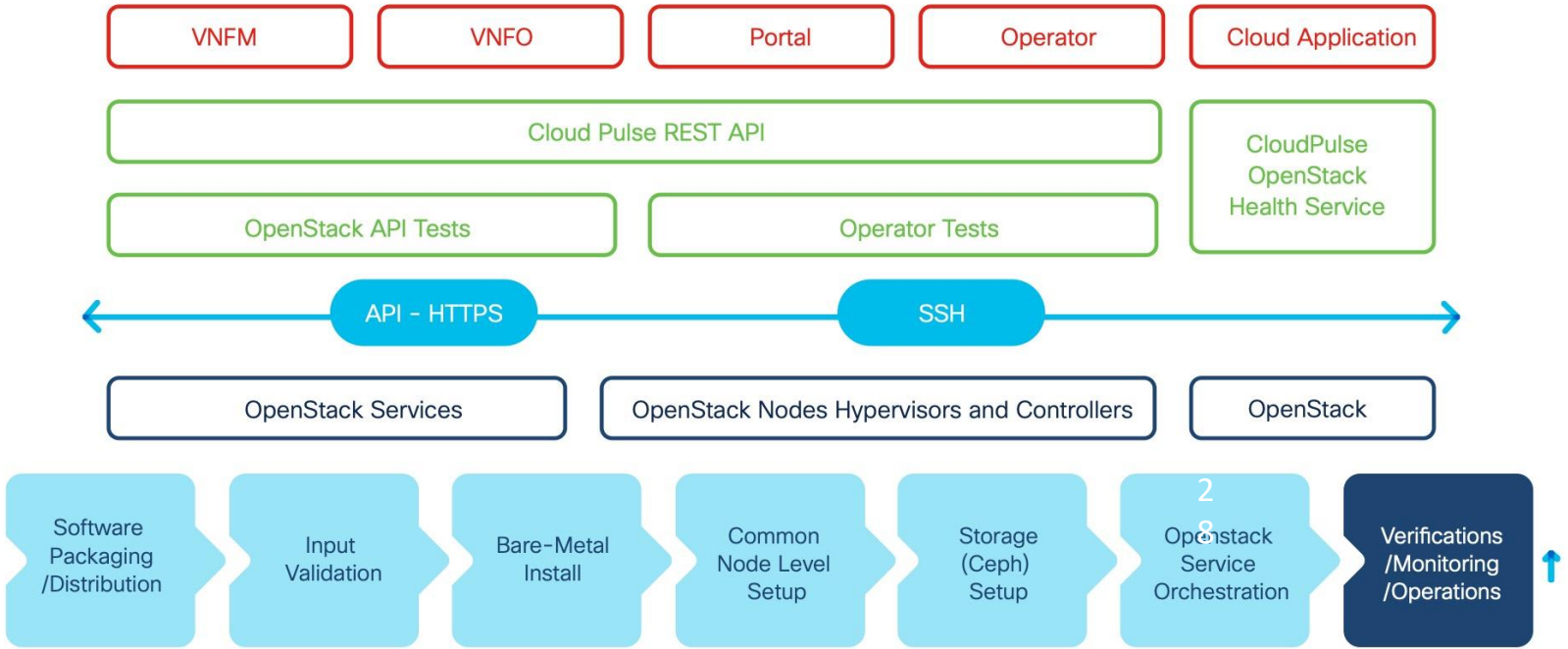
An integrated NFVi network performance benchmarking toolkit, pre-installed on every POD along with a set of best known practices

Validation – VMTP



Health Check – Cloudpulse

Cloud health checks using CloudPulse tool. Operator and application level tests, can be run at periodic intervals or on-demand. Provides REST API for integration with applications/VNFM/NFVO.



Cloud-Sanity

Role	Task	Result
Management	Management - Disk maintenance RAID Health **********	PASSED
Management	Management - Disk maintenance VD Health **********	PASSED
Control	Control - Ping All Controller Nodes **********	PASSED
Control	Control - Check Nova service list **********	PASSED
Control	Control - Disk maintenance RAID Health **********	PASSED
Compute	Compute - Ping All Compute Nodes **********	PASSED
Compute	Compute - Check Nova Hypervisor list **********	PASSED
Compute	Compute - Disk maintenance RAID Health **********	PASSED
CephMon	CephMon - CEPH cluster check **********	PASSED
CephMon	CephMon - Check Ceph Mon status **********	PASSED
CephMon	CephMon - Check Ceph Mon results **********	PASSED
CephOSD	CephOSD - Ping All Storage Nodes **********	PASSED
CephOSD	CephOSD - Check OSD result with osdinfo **********	PASSED
CephOSD	CephOSD - Check OSD result without osdinfo **********	PASSED

Lifecycle Management

- Add and Remove of compute and storage nodes to scale the CVIM pod on demand
- Replacement of control nodes in case of maintenance
- Replacement of storage nodes in case of maintenance

Software Updates and Upgrades: Commonality

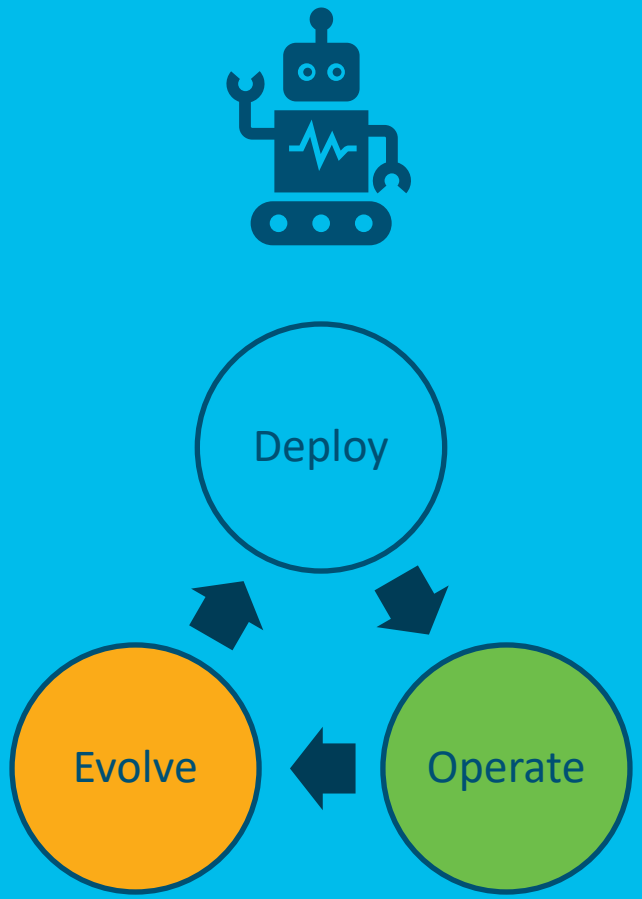
Cisco **NFVI**

Upgrade and Upgrade Host RPMs, Infrastructure & OpenStack services

Vehicle for bug fixes and security updates

Option to rollback to previous version incase of Software Updates

Planned reboot if kernel changed



- Telco cloud platforms need to have special capabilities
- What matters is not just the deployment, but the whole lifecycle
- CVIM is all about automation and completely lifecycle management
- CVIM is evolving to enable “Cloud Native” NFV


CISCO