OpenNebula
for the Telco Cloud

Agenda

1. Introduction
2. Features for Telco Cloud
3. Architecture for Telco Cloud
4. Other Telco Cloud Use Cases
5. Enterprise Support

Introduction

Enterprise Hybrid OpenNebula Benefits

The Simplicity and Agility of the **Public Cloud** + The Performance and Security of the **Private Cloud**

Why?

Power of Simplicity
A **single control panel** that unifies management across the hybrid multi-cloud continuum

Elastic and Fully Automated
Automated operations with deployment of clusters on-prem and on-cloud in **< 5 minutes**

Vendor Neutral
Grow **data center infrastructure with bare-metal** cloud providers

Unmatched Flexibility
Infrastructure agnostic to build an enterprise cloud that meets your needs

Scalable
Efficient operation of **tens of thousands of distributed nodes**

Cost-effective
In 10-node cloud, **reduce TCO by up to 75%** compared to VMware and Red Hat OpenStack

Open Nebula

Who is Using OpenNebula?

Well Established with **Big Names** in **Several Industries, Worldwide**

Who?

>5K active clouds

2K evaluations per month

16 DCs with 300K cores

Vendor	Telco	IT Services	Gaming	Fintech	SaaS	Public	Academia
Microsoft	Telefónica	namecheap	Nintendo	MX	cewe	U.S.ARMY	HARVARD UNIVERSITY
HITACHI DATA SYSTEMS	BlackBerry	Dustin	ACTIVISION	WELLS FARGO	softline	E-POST	USC
AlmaLinux	CISCO	iguane solutions	King	deluxe	precisely	rinis	Tufts UNIVERSITY
SIEMENS	T··Systems·	ProcoliX	ludia	Nasdaq Dubai	runtastic	DEPARTEMENT OMGEVING	UC SANTA BARBARA
Qt	Akamai	bit internet technology	Every Matrix	AXCESS FINANCIAL	SS&C ADVENT	MINISTÈRE DE L'ÉDUCATION NATIONALE	RI SE Research Institutes of Sweden

Features for the Telco Cloud

Main Features for Telco Cloud

A comprehensive Solution Offering **Flexibility, Scalability, Simplicity,** and **Vendor Independence**

Cloud Provisioning

- Multi-tenancy
- Multi-VM management
- Kubernetes
- Web UI
- Monitor & Alerting
- Integration APIs

Infrastructure Management

- SR-IOV & PCI-passthrough
- NUMA and CPU pinning
- Multiple Locations
- SDN features
- Capacity Management
- Backups & Storage

Bare Metal Servers

Open vSwitch - DPDK

KVM

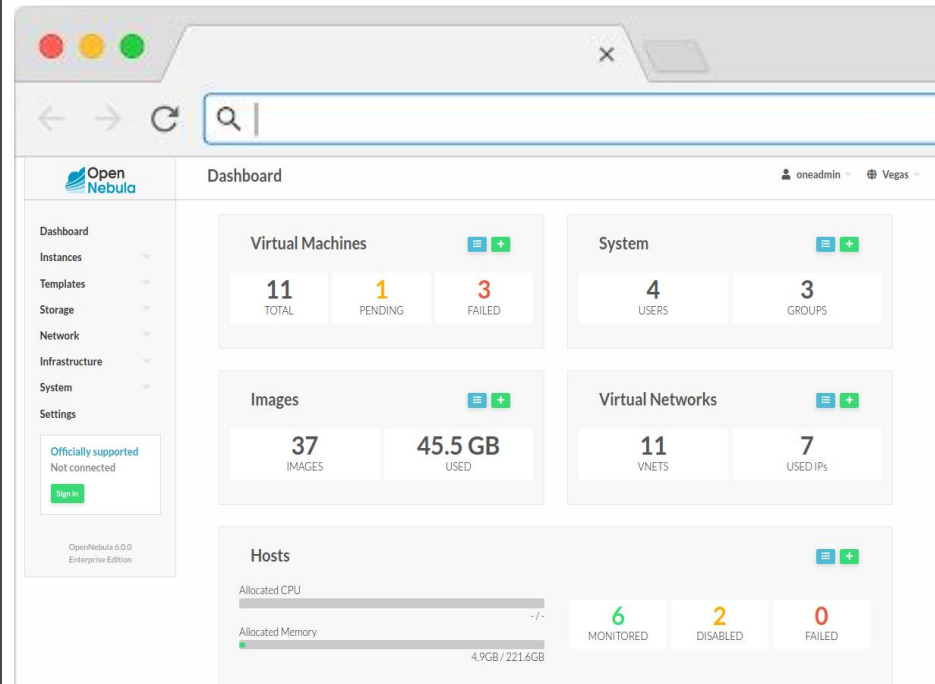GNU Linux OS

Cloud **Provisioning**

Multi-tenancy, Web UI & Interfaces

Operated by the IT staff, not directly by the end-user

- Multi-tenancy to isolate admin groups
- Administration roles:
  - User, groups & permissions
  - Rich ACL system
  - Quota
- VDC, Logical partitions of the cloud

- Sunstone Web User Interface
- Extensive integration API & CLI

Cloud Provisioning

Multi-VM Services, Kubernetes

Kubernetes is not a priority but actively being explored

- Simple KaaS offering
- Integrated, certified and maintained by OpenNebula Systems (CNF cert)
- Selected add-ons
  - CNI and ingress controllers
  - Storage

ALL

Service OneKE 1.24 CE

Multi-master Kubernetes 1.24 cluster for KVM and vCenter hosts, orchestrated by OneFlow

- Based on **OpenNebula Flow**
  - Service roles
  - Elasticity rules
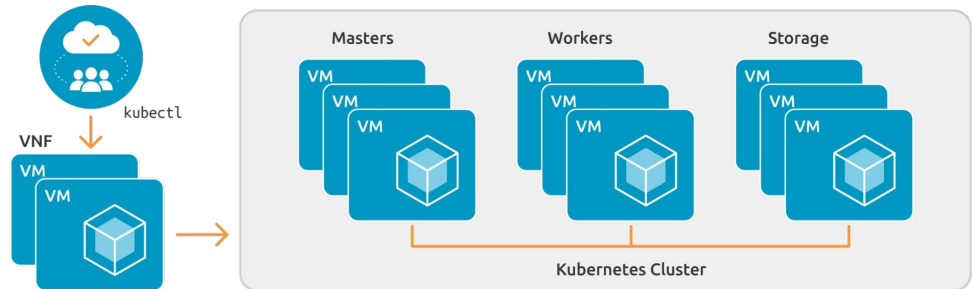
Cloud **Provisioning**

Monitor & Alerting

Monitor Virtual and Physical Infrastructure

- OpenNebula built-in monitor system
- Prometheus integration (custom exporters):
  - Custom exporters
  - Grafana dashboards
- Relate Virtual - Physical - OpenNebula entities
- Define custom alert rules
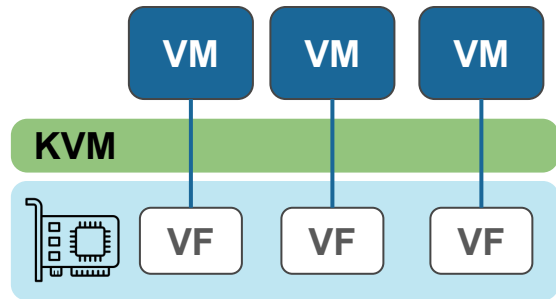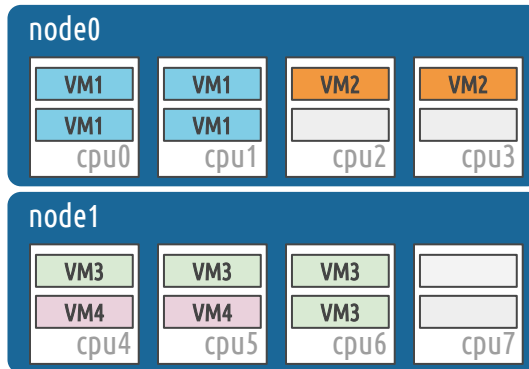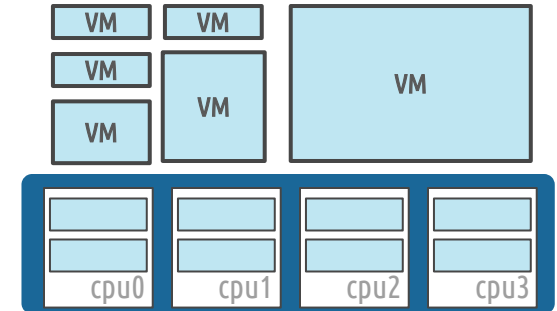
Infrastructure Management

Network & Storage

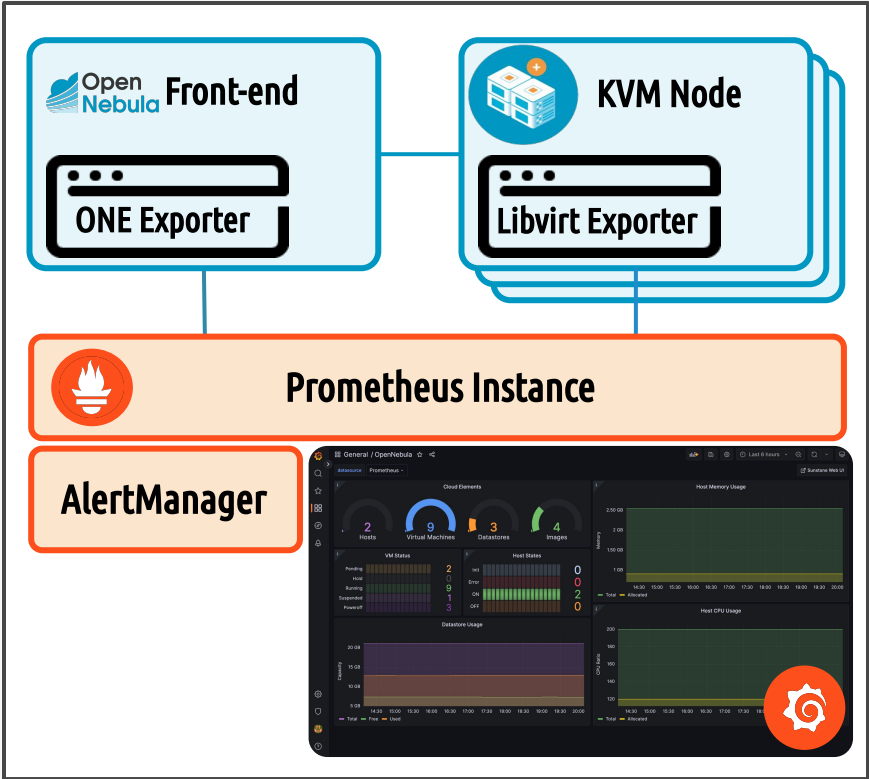## Provide SDN-like functionality

- Configure distributed vSwitch

- Define virtual networks (overlays, addresses)

- Integrate with DC network

Datacenter Network

Virtual Network

vSwitch	vSwitch	vSwitch
VM VM	VM VM	VM VM
Host	**Host**	**Host**
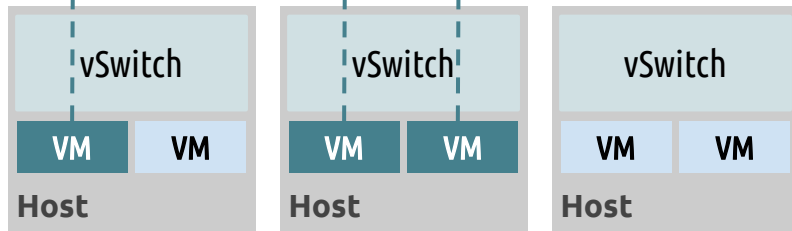
- Support multiple storage solutions

  - local server storage

  - Ceph

- Backup

  - Full and Incremental

  - Job definition

  - Restic and rsync backends

- Tolerate high-latencies

Bare Metal Servers

Features for the Telco Cloud

Bare Metal Servers

Open vSwitch - DPDK

KVM

GNU Linux OS

- Multiple locations
  - Light-weight stack
  - Centralized management
  - Location-based operations
- Automatic provisioning & configuration
- *Interest in using Cloud Providers (e.g. AWS)*

NEW WHITE PAPER

OpenNebula Enhanced Platform Awareness

WHITE PAPER

OpenNebula Enhanced Platform Awareness

DOWNLOAD NOW

OpenNebula.io

https://support.opennebula.pro/hc/en-us/articles/6265169735185

Architecture **Telco Cloud**

Main Components

Users & Operators

Central Management Services

- Sunstone Web-UI
- oned & scheduler
- Monitor & Alerts

NFS

OpenNebula HA cluster
(Frontends as VM)

NFS Server
(Image Datastore Repository)

Backup Server
(restic based)

Admin Network

Virtual Machines

- Open vSwtich
- KVM

Local Storage

PoP Server

PoP Server

Point-of-Presence

PoP Server

PoP Server

Point-of-Presence
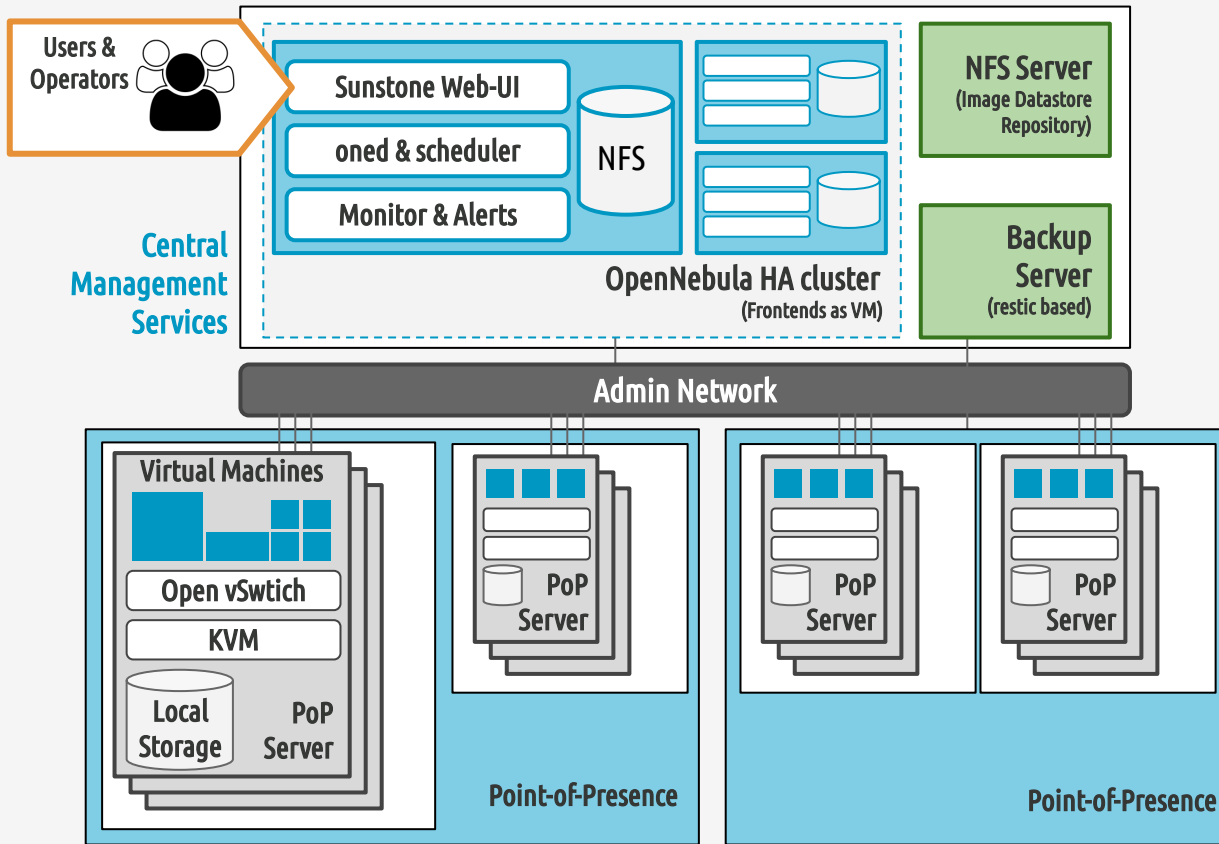
- Front-ends in HA
- Central image repository
- VM run from local storage
- PoP interconnected high latency network
- PoP automated configured
- KVM, Open vSwitch & DPDK

Telco Cloud Use Cases

Telco Edge **NFV**

Highly Distributed NFV Deployments

- Clusters (PoPs) of **bare-metal servers running KVM hypervisor** in various locations.

- **Single front-end** to manage multiple clusters.

- All edge nodes with minimal hardware infrastructure.

- Interconnected through high latency links

- **VNFs** (firewalls, load balancers and other non-generic-compute services) on a **multi-tenancy** environment.
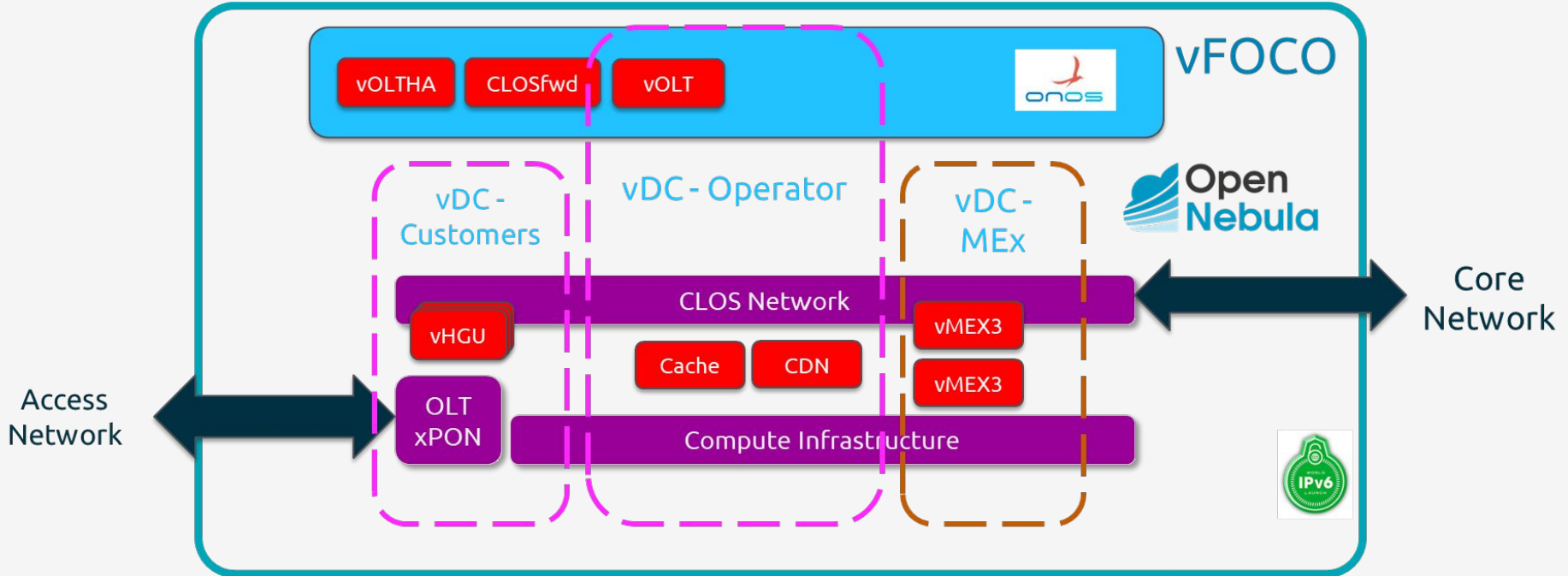
Telco Edge 5G RAN

5G Edge Telco Cloud

Open Nebula

5G RAN

Switch

5G Core

Open5GS

Kubernetes

Virtual Machine

Linux - KVM

Server

Server

Edge µDC

Switch

Internet

Video Signal

VM - vGPU

vRouter

Linux - KVM

Server

Server

Open Nebula

Edge µDC
Third-party
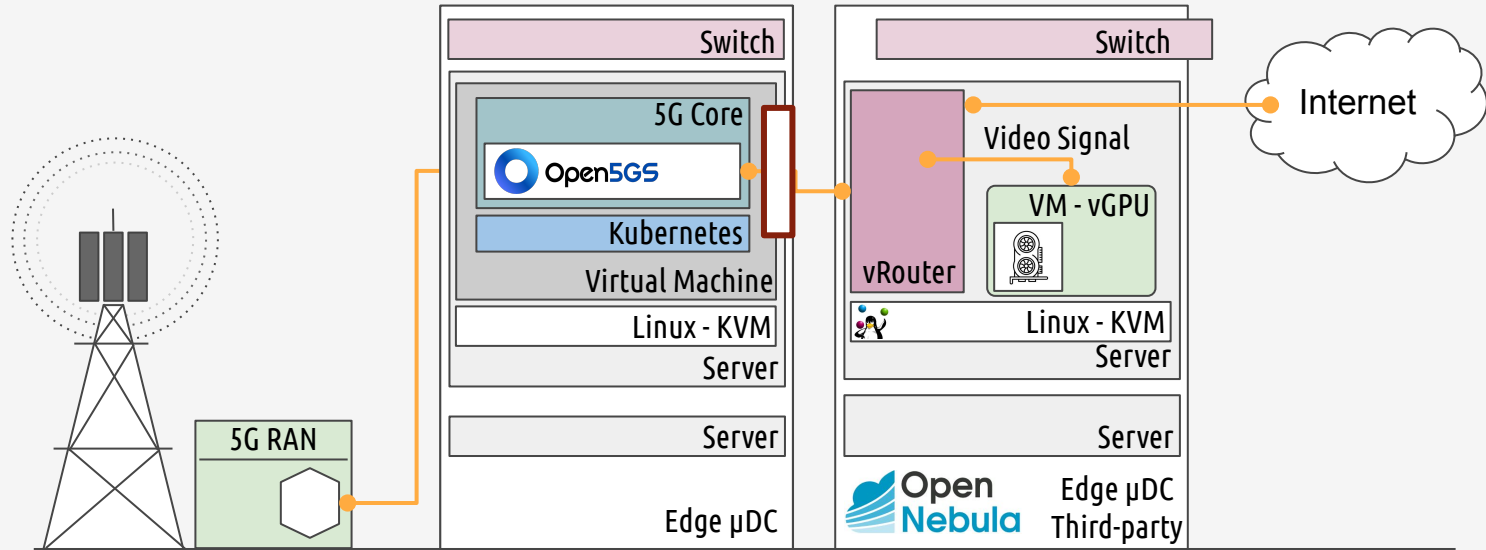
Telco Edge Use Cases

Other Examples of the Power of OpenNebula

Apoyo a la gestión de la movilidad urbana

- 5G
- MEC (Multi-Acces Edge Computing).
- uMBB
- URRLC
- Slice

Pista de pruebas para coche conectado 5G

- 5G
- Edge Computing.
- Coche conectado C-V2X

Conectividad inalámbirca 5G en el puerto de Málaga

- 5G
- MEC (Multi-Acces Edge Computing).
- uMBB
- AI Video
- Slice

Conectividad inalámbrica 5G en entorno industrial 4.0

- 5G
- mMTC

Distribuición de contenido educativo con 5G

- 5G
- URRLC

Gestión municipal remota de espacios públicos

- 5G
- URRLC

OpenNebulaCon2022

SPEAKER

David Artuñedo
CEO of OnLife Networks
Telefónica

May 31 – June 2, 2022
Virtual Event

https://www.youtube.com/watch?v=qM0G_RZj0Ds

https://www.telefonica.es/es/servicios/casos-de-uso-5g/

Innovation Projects

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Commercial Offering

OpenNebula **Subscription**

Unlock the Full Power of Your **OpenNebula Cloud**

Enterprise Edition

Access to our Enterprise Edition packages and Enterprise Tools

SLA-based Support

Secure and private support options under a commercial SLA

Professional Services

Access to OpenNebula Systems engineering & consulting services

Knowledge Base

Access to exclusive contents, tutorials, and critical notifications

- **Enterprise Edition** with upgrades, maintenance releases, security patches and minor enhancements.

- **Long-Term Supported (LTS)** versions for flexibility and stability in the upgrade strategy.

- **Enterprise tools** for automation and simplification of upgrades, maintenance and management activities

- **Enterprise Support** provided through a private and secure support portal → 9x5 or 24x7 with supervised upgrade assistance

- **Knowledge Base** with Best Practices, Step-by-Step Guides, and Use Cases.

- **Announcements & Alerts** with new releases, and alerts for critical issue notification (Fix Advisories).

https://opennebula.io/subscriptions/

NFV/Edge Integrated Platform Add-on

Support and Maintenance End-to-End for the **Complete Integrated Software Stack**

ONE NFV/Edge 6.6.1 (7 March 2023)

Management Cluster

	Description
Operating System	RHEL 9.1
Cloud Manager	OpenNebula 6.6.1
Monitoring/Alert	Prometheus 2.37.6
Backup	Restic 0.14.0
Authentication	Builtin (alternatively LDAP/AD can be used)

Virtualization Hosts

	Description
Operating System	RHEL 9.1
Hypervisor	KVM (version as part of the OS)
Networking - SDN	Open vSwitch / DPDK (version as part of the OS)
Storage - SDS	Local storage datastore using QCOW2 format for Image and System Datastores

- **Single vendor experience** with SLA-based support and maintenance of all integrated software components in the front-end nodes and the edge PoPs to enable the NFV/Edge service.

- **Embedded RHEL** supported in partnership with Red Hat

redhat
READY
ISV PARTNER

[NFV/Edge Integrated Platform Support Guide]

Mission Critical Add-on

Highest Level of Support that Includes Mission-critical SLA with Guaranteed Response Times and Restoration SLA

	Severity 1 (A critical incident with very high impact)	Severity 2 (A major incident with significant impact)	Severity 3 (A minor incident with low impact)	Severity 4 (Technical questions)
Response Time	30 minutes	1 hour	4 hours	8 hours
Restoration Time	4 hours	12 hours	7 days	-
SLA	24/7	24/7	9–to-5	9–to-5

Live Support

✓ Incidents can be managed through a scheduled live chat and screen sharing.

Premium Upgrade Assistance

✓ Verification of the software upgrade in the staging environment.

✓ Dedicated guidance and assistance through a live session.

Testing and Staging Environments

✓ Support and software licensing for testing and staging (pre-production) environment.

Extended Life Support

✓ Longer term support of LTS versions of up to 5 years.

[Mission Critical Support Guide]

Professional Services

Enterprise Services to **Help You Build and Operate your Cloud**

OpenNebula

Deployment
Focus on your business and let us take care of setting up your OpenNebula cloud infrastructure.

Read More

Upgrade
Stay always up to date with the expert upgrade of your OpenNebula cloud, from start to finish.

Read More

Training
Learn from the OpenNebula experts and get squared away to get your solution running in high gear.

Read More

Consulting & Engineering
You want the best possible help with design, deployment, optimization, or overall operation? Here we are!

Read More

Development
Fund a feature to speed up the development and release of critical elements in the OpenNebula roadmap.

Read More

Technical Account Management
Technical advisors to help you plan, deploy, and support your cloud successfully.

Read More

TAM Service

- A single point of contact and technical advocate

- Effective and dedicated oversight

- Proactive planning

- Customized operational and business reviews

- Professional services overview

https://opennebula.io/subscriptions/

[TAM Service Guide]

OpenNebula vs VMware

OpenNebula Main Competitors

A Single **Unified Platform** that Brings the **Power of Simplicity** and **Flexibility** to your Enterprise Cloud

Competitive Advantages

✓ Single management platform

✓ Lower TCO and maintenance

✓ Lower HW resource consumption

✓ Open, customizable and modular

✓ Vendor neutral

✓ Minimizes complexity

Unique Features

✓ Multi-tenancy native

✓ Self-service

✓ Automation and elasticity

✓ Scalability and datacenter federation

✓ Multi-provider cloud-edge

OpenNebula vs VMware

Reduce Costs and **Increase the Efficiency** of Your Cloud Infrastructure by Using **Solid Open Source Technologies**

Powerful

Multi-tenancy, self-service portal, data center federation, and hybrid cloud features.

Cost Effective

Lower total cost of ownership and a simple subscription-based pricing model.

Flexible

Completely open, customizable and modular, so it can be adapted to your needs.

No Lock-in

An independent platform that helps you migrate to open source virtualization solutions.

Simple

Very easy to install, upgrade, and maintain, with easy-to-use graphical interfaces.

Enterprise-ready

Certified, production-ready software with commercial SLAs and professional services.

OpenNebula vs VMware

Download our **Competitive Pricing Review** and Discover the Many Benefits of Migrating to OpenNebula!

Download