



# Unlocking the Hybrid Cloud


## An Open Source Approach




FOSDEM – 02/02/2025

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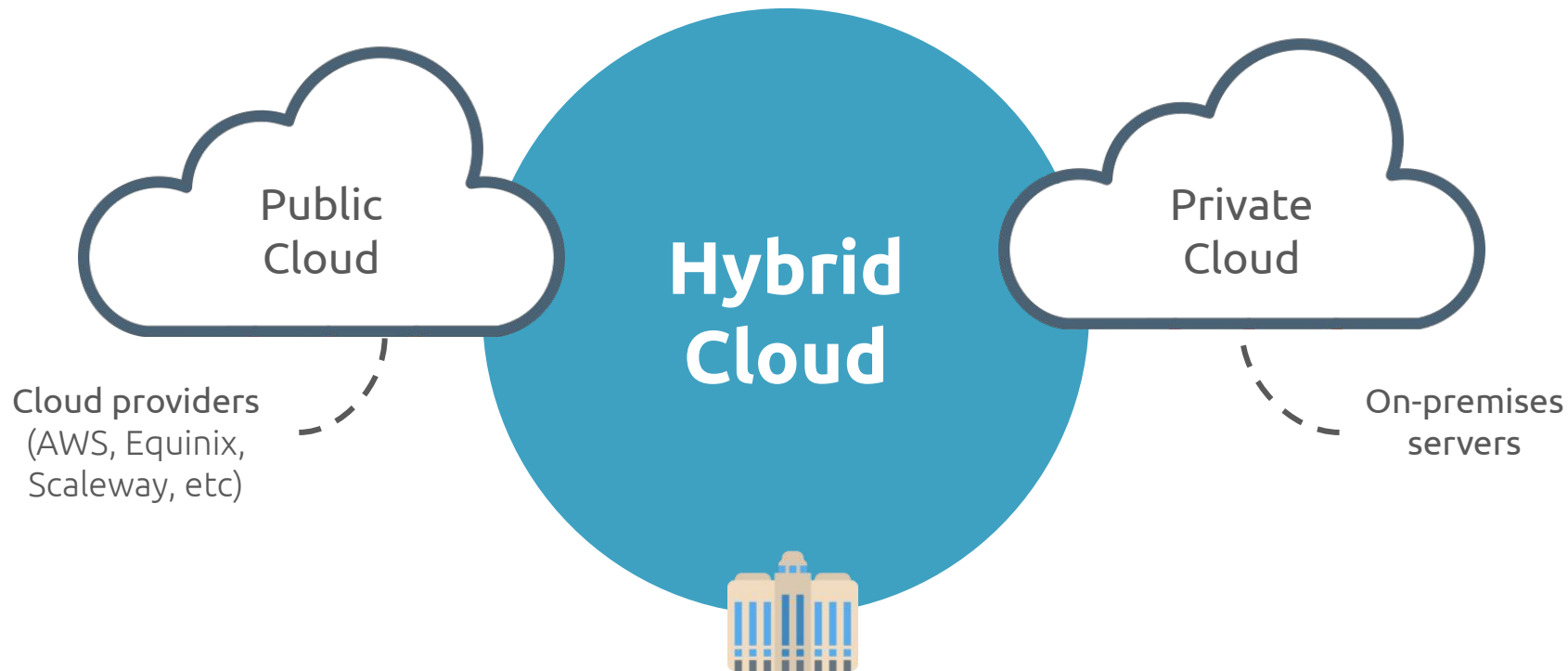
# A Quick Overview of the Current Hybrid Cloud Scenario



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# What's the Hybrid Cloud?

Bridging On-Premises and Public Infrastructure for Optimal Performance



# The Relevance of the Hybrid Cloud

Why is the hybrid cloud so relevant in our current context?

## **Flexibility & Scalability**

Adapt to changing workloads by combining on-premises and public cloud resources

## **Disaster Recovery**

Ensure HA with Hybrid DR strategies, allowing quick failover to the cloud in case of disruptions

## **Security & Compliance**

Maintain control over sensitive data to meet regulatory requirements

## **Cost Optimization**

Reduce IT expenses by keeping predictable workloads in the private cloud while leveraging public cloud for on-demand

## **Edge Computing**

Process data closer to the source for real-time applications, enhancing performance for IoT, AI, 5G connectivity or games



# Challenges of the Hybrid Cloud

What makes managing a hybrid cloud environment so challenging?



## ⚙️ Complexity in Management

Managing multiple environments requires specialized skills, robust orchestration, and automation to ensure seamless operations

## 🔗 Integration & Interoperability

Ensuring compatibility between legacy systems, cloud-native applications, and multiple cloud providers can be challenging.

## 💰 Cost & Resource Management

Uncontrolled resource usage can lead to unexpected expenses, requiring careful cost tracking and optimization strategies



# Introducing a Technology Stack for Hybrid Cloud:

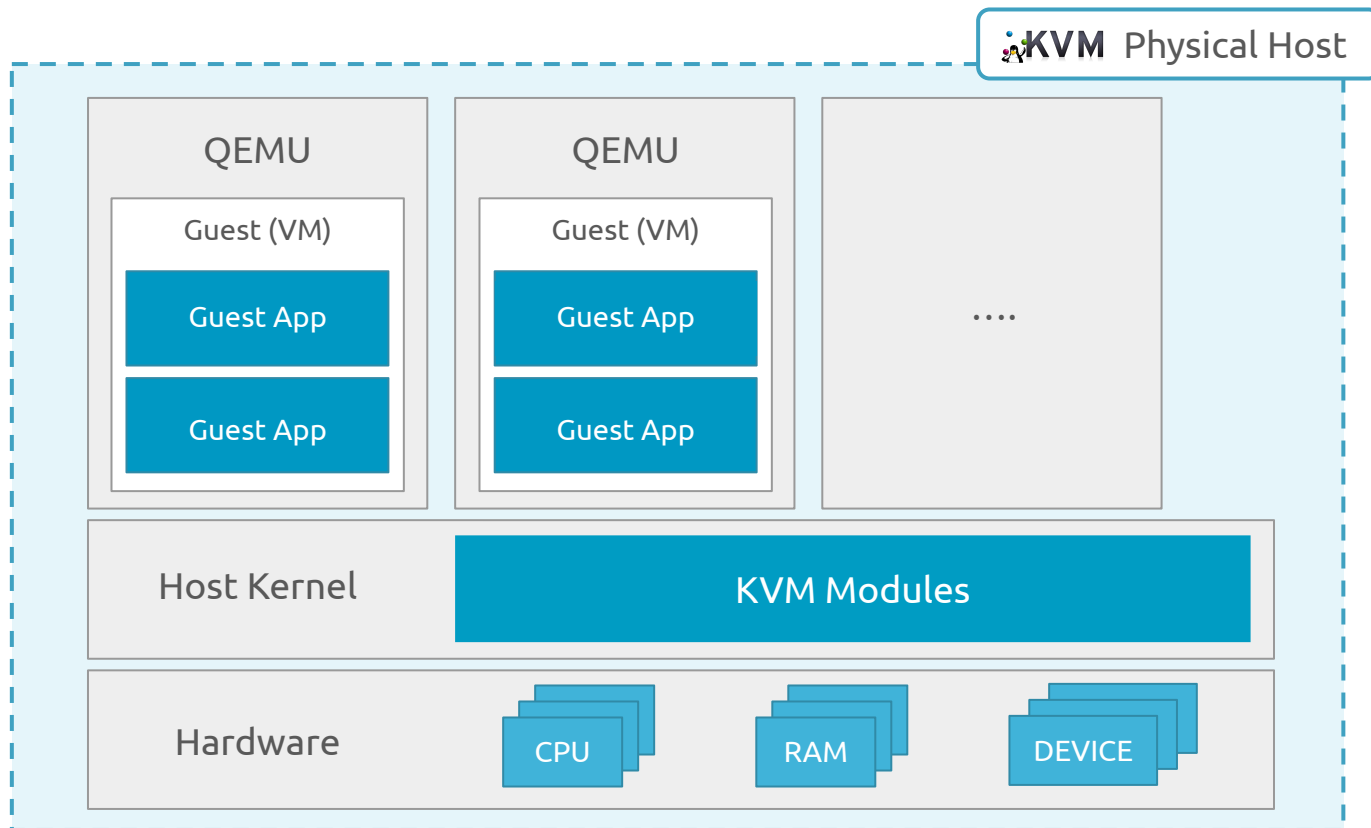
## An Open Source Approach



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# KVM as Hypervisor

Utilizing KVM for Efficient and Scalable Hybrid Cloud Virtualization





# OpenNebula Capabilities



The Open Source Cloud & Edge Platform bringing real freedom to your Enterprise Cloud 🚀

Virtual Machines



Application Containers



Kubernetes Clusters



Virtual Infrastructure Management, Cloud Management Provisioning & Cloud Federation



CORE DATA CENTER



PUBLIC CLOUD



EDGE

- ✓ Avoids “Vendor Lock-in”
- ✓ Minimizes complexity

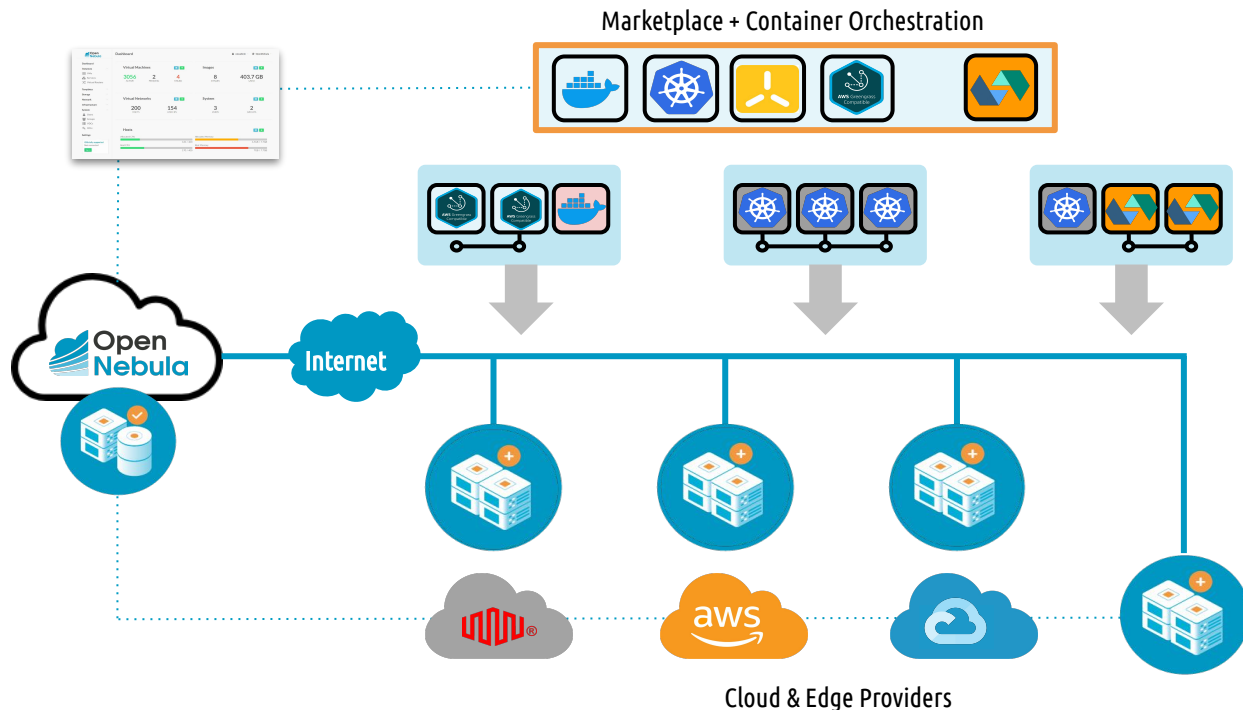
- ✓ Reduces resource consumption
- ✓ Slashes operating costs

# OpenNebula as Multi-Cloud Orchestrator



Single control panel to avoid vendor lock-in, reduce costs, and ensure workload portability

- 1 Any Application**  
VMs, multi-VM services, containers, and k8s clusters on a shared environment
- 2 Uniform Management**  
Homogeneous layer for user and workload management and operation
- 3 Any Infrastructure**  
Automatic provision of resources from cloud providers



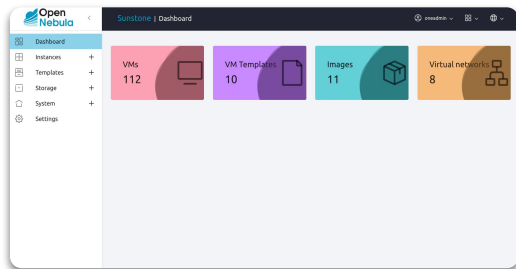
<https://opennebula.io/multi-cloud/>

# OneForm as Multi-Cloud Key Technology



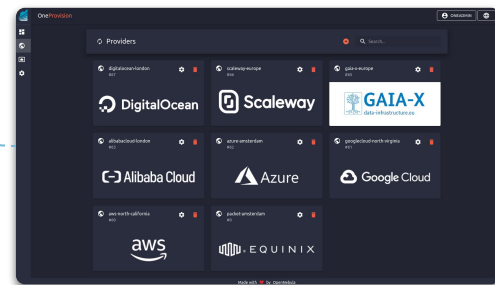
Using OpenNebula Formation Capabilities to Expand Your OpenNebula Hybrid Cloud 🚀

One platform to rule them all 🚀

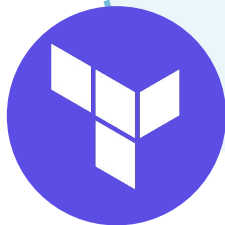


Open Nebula + OneForm

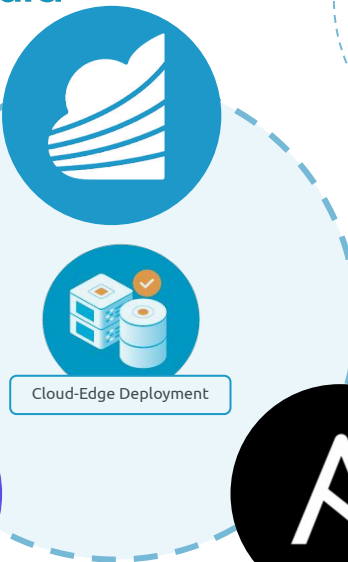
Cloud-Edge Deployment in an Instant ⚡



Automated Resources  
Deployment



HashiCorp  
**Terraform**



Automated Host  
Configuration



ANSIBLE

OneForm is able to deploy  
a full **multi-cloud**  
**infrastructure** in  
**under 15 minutes!**

# OneForm as Key tool for the Hybrid Cloud Management



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# An Introduction to OneForm

Build and Deploy Your Hybrid Cloud in Less Than 15 Minutes



**OneForm is a new tool** that allows you to **automatically deploy** and **configure** new Clusters in the Public cloud into your OpenNebula cloud.

**OneForm** enables us to expand our cloud by seamlessly adding dynamically all the essential components for daily operations:



Clusters



Hosts



Networks



Datastores



Virtual Routers



VMs & Multi-VMs  
applications



All seamlessly supported by  
OpenNebula multi-tenancy  
capabilities from a single portal.

# OneForm concepts

Build and Deploy Your Hybrid Cloud in Less Than 15 Minutes



## WHERE?

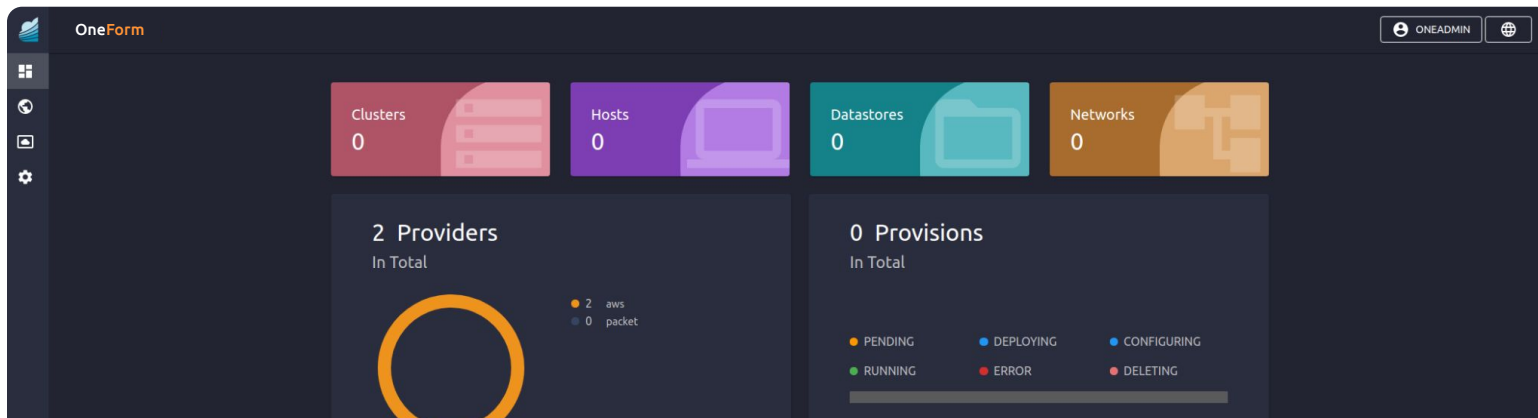
### Provider

It represents a Cloud where resources (Hosts, Networks or Storage) are allocated to implement a Provision.

## WHAT?

### Provision

It represents the physical resources deployed in a given provider (e.g. a specific hosts in AWS)



# OneForm features

Build and Deploy Your Hybrid Cloud in Less Than 15 Minutes



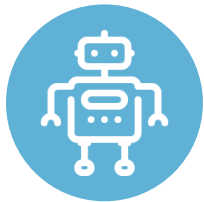
## Template System

Enables automation and definition of cloud providers and provisions



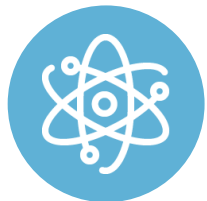
## Multi-Provider Support

Allows registration of multiple cloud providers



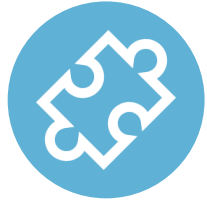
## Automated Cluster Deployment

Automates cluster configuration in OpenNebula



## Lifecycle Management

Supports updates and automatic scaling based on predefined rules



## Extensible & Customizable

Allows cloud administrators to create their own custom cloud providers in OneForm



## API & Automations

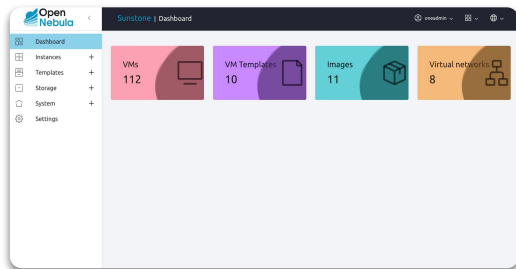
Provides an API that enables the creation of custom automation workflows.

# OneForm as Multi-Cloud Key Technology



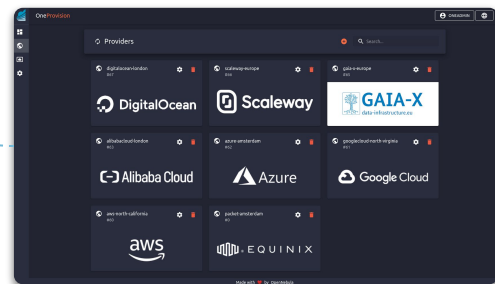
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One platform to rule them all 🚀



Open Nebula + OneForm

Cloud-Edge Deployment in an Instant ⚡



Automated Resources  
Deployment



HashiCorp  
**Terraform**

Cloud-Edge Deployment



ANSIBLE

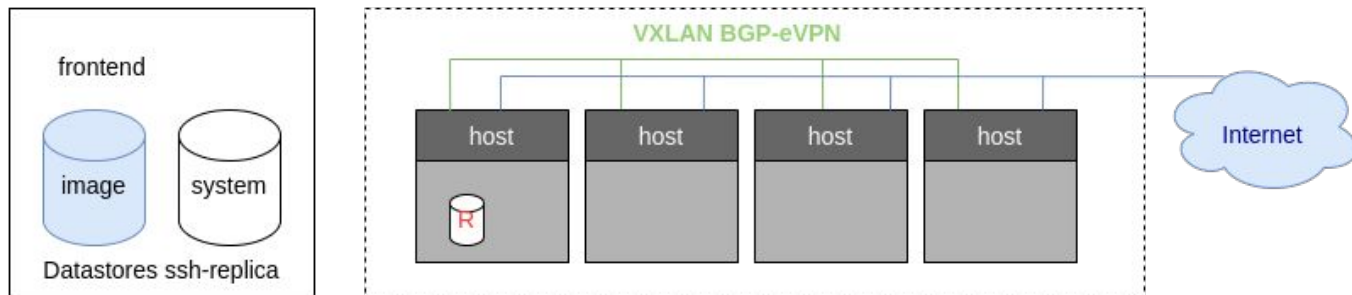
Automated Host  
Configuration

# OneForm from an Infrastructure Perspective



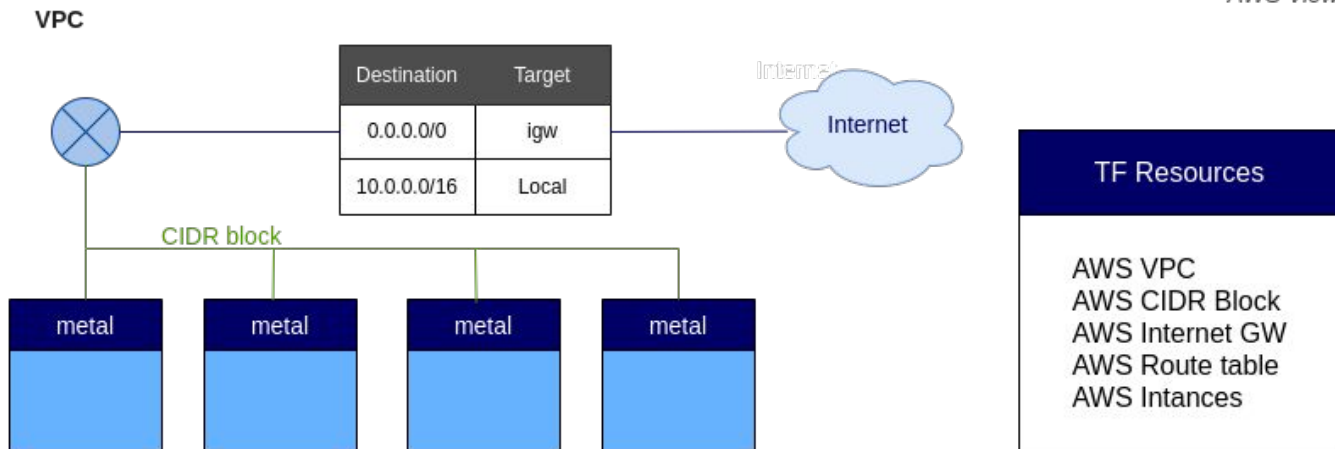
Build and Deploy Your Hybrid Cloud in Less Than 15 Minutes

## OpenNebula point of view



OpenNebula View  
AWS View

## Provider point of view (AWS example)





# OneForm Hosts Configuration

Build and Deploy Your Hybrid Cloud in Less Than 15 Minutes



OneForm leverages the power of **OneDeploy** — an OpenNebula tool based on Ansible Playbooks designed for seamless configuration. With its incredible flexibility, it empowers users to fully customize their OpenNebula instances to fit any scenario.



# OneForm Uses Cases

Build and Deploy Your Hybrid Cloud in Less Than 15 Minutes



## **Automated Edge Cluster Provisioning**

Seamlessly integrates with OpenNebula to deploy edge applications, such as 5G networks, with full automation

## **Multi-Cloud Distributed Applications**

Enables the provisioning of applications across multiple cloud providers, ensuring scalability and flexibility

## **Hybrid Cloud Expansion**

Extends on-premises private clouds by provisioning hybrid cloud infrastructures, unlocking new capabilities and resource elasticity



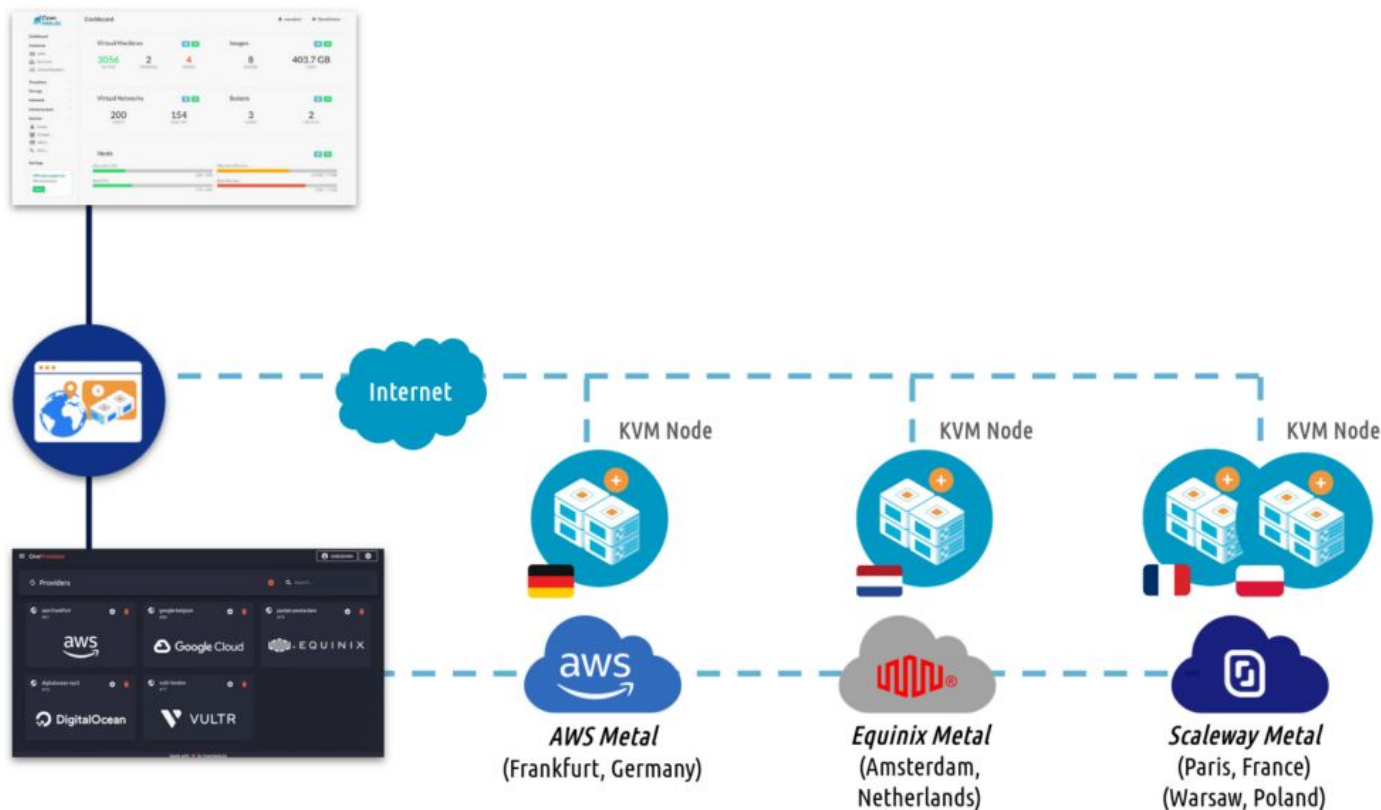
# Show Time! 🚀



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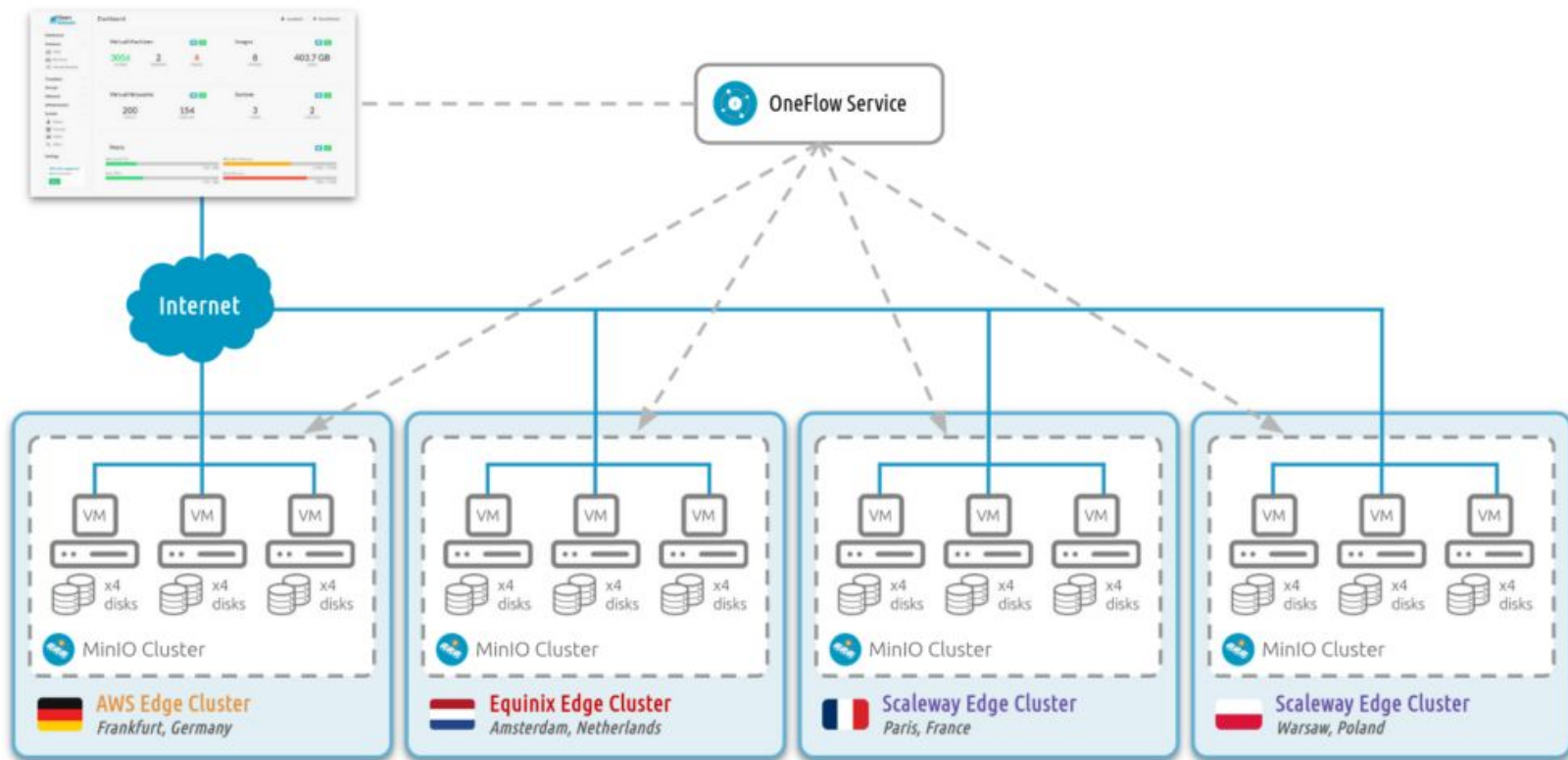
# A Distributed Object Store Application

An Overview of the Architecture and Functionality in Action



# A Distributed Object Store Application

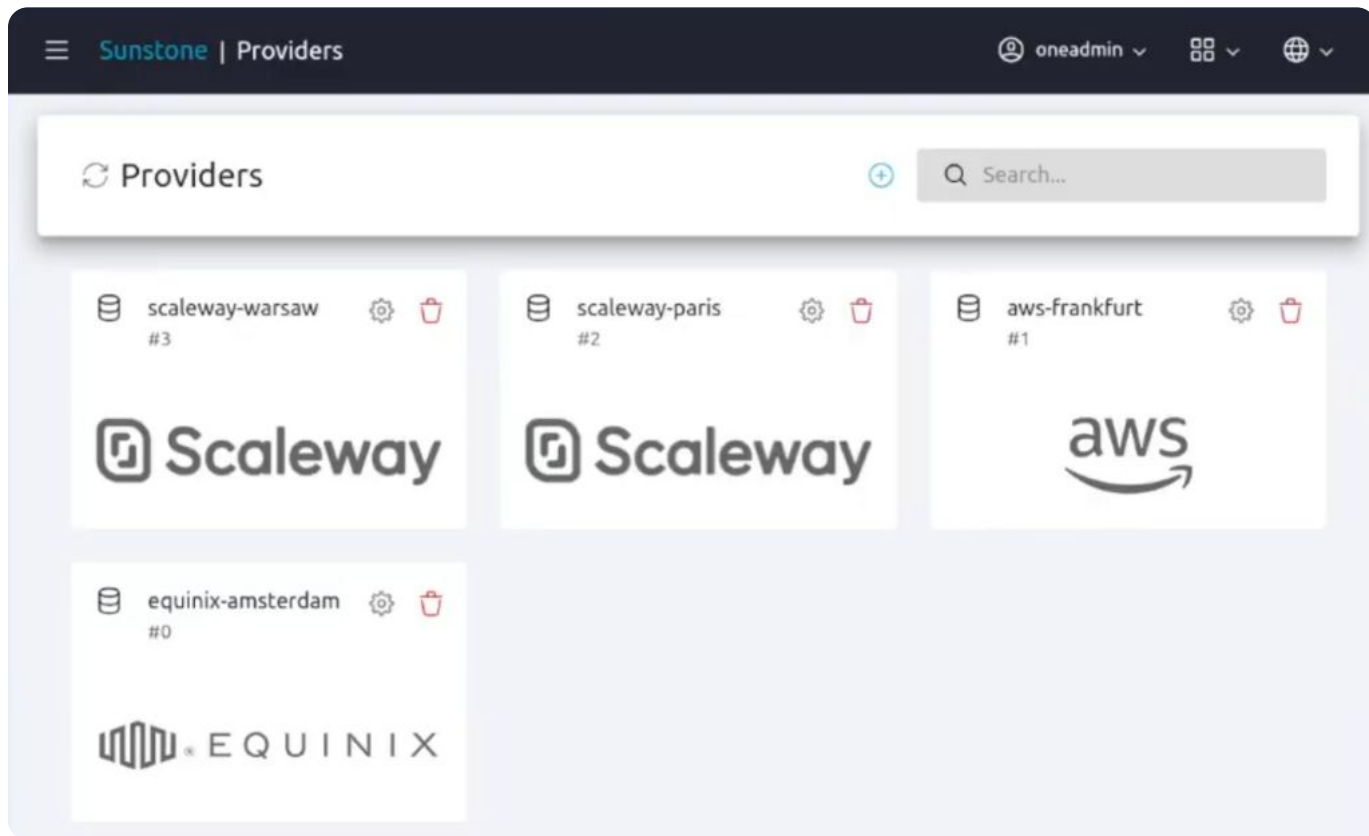
An Overview of the Architecture and Functionality in Action





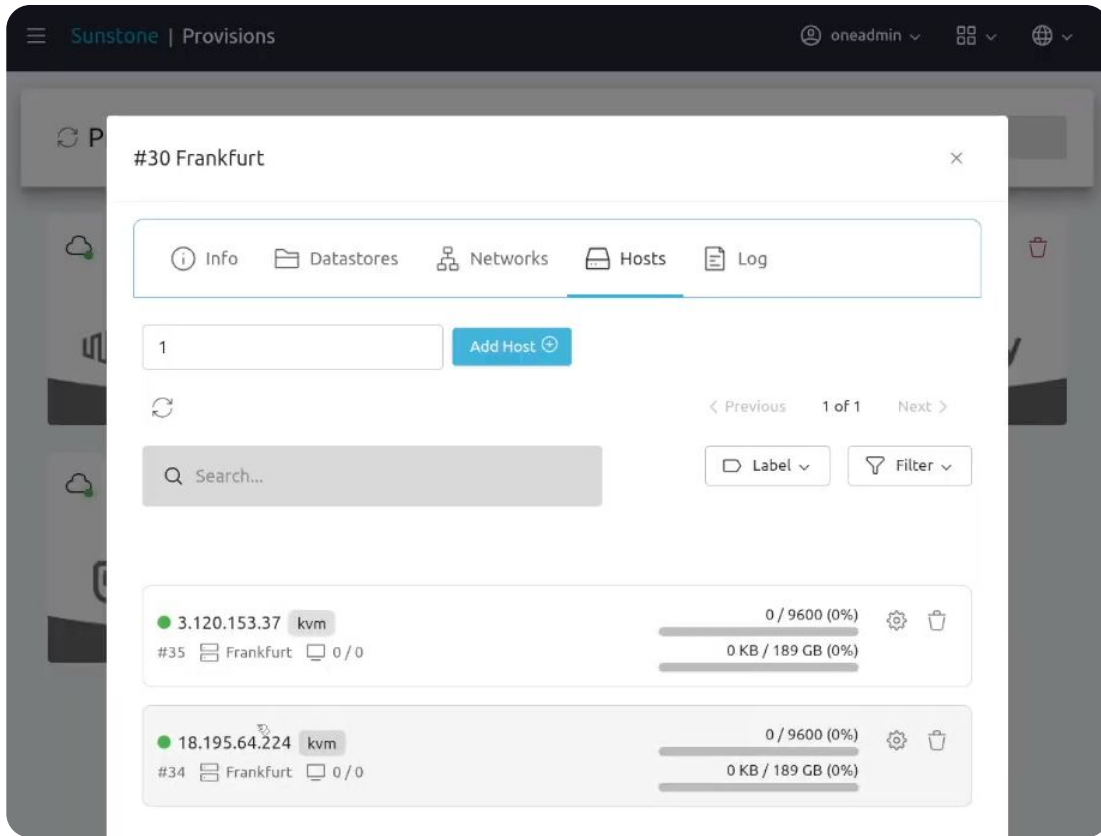
# A Distributed Object Store Application

An Overview of the Architecture and Functionality in Action



# A Distributed Object Store Application

An Overview of the Architecture and Functionality in Action



The screenshot displays the Sunstone Provisions interface. A modal window titled "#30 Frankfurt" is open, showing a list of hosts. The modal has a close button (X) in the top right corner. Below the title bar, there are tabs for "Info", "Datastores", "Networks", "Hosts", and "Log". The "Hosts" tab is currently selected. In the top left of the modal, there is a text input field containing the number "1" and a blue "Add Host" button with a plus icon. Below this, there are navigation controls: a refresh icon, a "Search..." input field, and buttons for "< Previous", "1 of 1", and "Next >". To the right of these are "Label" and "Filter" dropdown menus. The main content area shows a list of hosts. Each host entry includes a green status dot, an IP address, a label (kvm), a progress bar, and icons for settings and deletion. The first host is #35 with IP 3.120.153.37, and the second is #34 with IP 18.195.64.224. Both are located in Frankfurt and have 0/0 resources used.

Host ID	IP Address	Label	Progress	Location	Resources
#35	3.120.153.37	kvm	0 / 9600 (0%)	Frankfurt	0 KB / 189 GB (0%)
#34	18.195.64.224	kvm	0 / 9600 (0%)	Frankfurt	0 KB / 189 GB (0%)

# A Distributed Object Store Application

An Overview of the Architecture and Functionality in Action



Search by title



Documentation

MINIO

minio storage ubuntu service

#### PUBLISHER

OpenNebula Systems

#### HYPERVISOR

KVM

#### ARCHITECTURE

x86\_64

#### FORMAT

#### CREATED

2024-10-11 15:06:32

#### VERSION

6.10.0-2-20241018

#### OS

Ubuntu 22.04 LTS

## Service MinIO Multi-Node

Info

Template

MinIO Multi-Node deployment orchestrated by [OneFlow](#)

Requires [OneFlow](#) and [OneGate](#) OpenNebula components.

See the dedicated [documentation](#).

Based on VM templates

- [MinIO Multi-Node](#)
- [MinIO Virtual Router](#)

#### ID

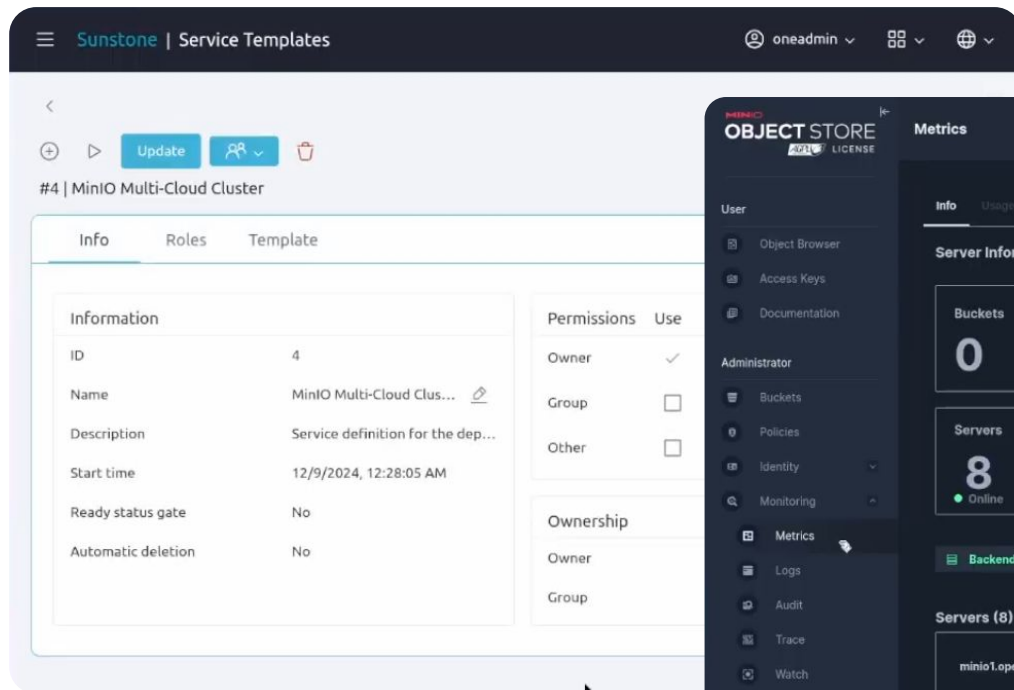
54e46892-6315-456b-9bfe-5ebd7cff2662

#### OPENNEBULA VERSIONS

6.8, 6.10

# A Distributed Object Store Application

An Overview of the Architecture and Functionality in Action



Sunstone | Service Templates

oneadmin

#4 | MinIO Multi-Cloud Cluster

Info Roles Template

Information

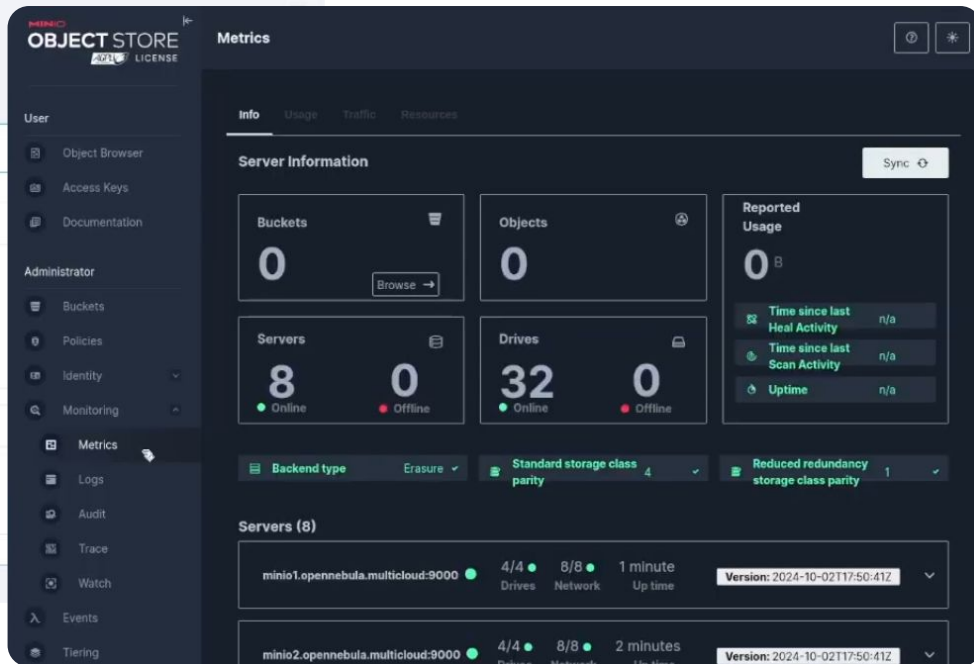
ID	4
Name	MinIO Multi-Cloud Clus... <a href="#">✎</a>
Description	Service definition for the dep...
Start time	12/9/2024, 12:28:05 AM
Ready status gate	No
Automatic deletion	No

Permissions Use

Owner	<input checked="" type="checkbox"/>
Group	<input type="checkbox"/>
Other	<input type="checkbox"/>

Ownership

Owner	
Group	



MINIO OBJECT STORE LICENSE

Metrics

User

- Object Browser
- Access Keys
- Documentation

Administrator

- Buckets
- Policies
- Identity
- Monitoring

Metrics

- Logs
- Audit
- Trace
- Watch
- Events
- Tiering

Info Usage Traffic Resources

Server Information

Buckets: 0

Objects: 0

Reported Usage: 0 B

Servers: 8 Online, 0 Offline

Drives: 32 Online, 0 Offline

Backend type: Erasure

Standard storage class parity: 4

Reduced redundancy storage class parity: 1

Servers (8)

minio1.opennebula.multicloud:9000	4/4 Drives	8/8 Network	1 minute Up time	Version: 2024-10-02T17:50:41Z
minio2.opennebula.multicloud:9000	4/4 Drives	8/8 Network	2 minutes Up time	Version: 2024-10-02T17:50:41Z

# Closing Thoughts and Next Steps



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# Next Steps & Challenges

Future Directions and Key Challenges Ahead



## Launch with OpenNebula 7.0

OneForm will be officially introduced alongside OpenNebula 7.0.



### Replacing OneProvision

OneForm will take over from the existing OneProvision, incorporating a lot of enhancements and new features



### Continuous Development

We will keep expanding OneForm with new capabilities, including the ability to provision OpenNebula resources directly from OneForm



### Broader Cloud Ecosystem Integration

Future updates will enhance compatibility with more cloud providers, making hybrid and multi-cloud deployments even more seamless



### Optimized Performance & Automation

Ongoing improvements will focus on reducing provisioning times (even more!), increasing automation, and enhancing user experience

# IPCEI-CIS

## *Next-Generation European Platform for the Datacenter-Cloud-Edge Continuum*

Initiative supported by the Spanish Ministry for Digital Transformation and Civil Service through the **ONEnextgen Project**: **Next-Generation European Platform for the Datacenter-Cloud-Edge Continuum** (UNICO IPCEI-2023-003) and co-funded by the European Union's NextGenerationEU instrument through the Recovery and Resilience Facility (RRF).



Financiado por  
la Unión Europea  
NextGenerationEU



Plan de Recuperación,  
Transformación  
y Resiliencia



GOBIERNO  
DE ESPAÑA

MINISTERIO  
PARA LA TRANSFORMACIÓN DIGITAL  
Y DE LA FUNCIÓN PÚBLICA

SECRETARÍA DE ESTADO  
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E INFRAESTRUCTURAS DIGITALES




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IPCEI

# OpenNebula Community Forum



Join the OpenNebula Community where Exploration and Collaboration Unite! 🚀

[forum.opennebula.io](https://forum.opennebula.io)



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SearchMenu

Welcome to the OpenNebula Community Forum! 🚀

✕

This is the **Community Forum** of the **OpenNebula Project**, the open source enterprise-ready platform for building elastic Private Clouds and managing Data Center virtualization. This is the best place to join general discussions about the project, keep an eye on new features and public announcements, and ask for **community support**. For general information about OpenNebula, please visit [www.opennebula.io](https://www.opennebula.io)

all categories ▾all tags ▾CategoriesLatestTop

Category

Development363


Any aspect related to development and integration of OpenNebula and its add-ons and ecosystem:

Community Support4.1k

This is the place for OpenNebula users to seek and provide support on a best-effort basis. In addition to the discussions here, there are other ways to get in touch:

NetworkGeneralUpgradeGUI - SunstoneCLI / APIVM Configuration / ContextualizationStorageHA / FederationvCenter


TopicsLatest



Sinatra doesn't know this ditty trying to access OneFlow

41h


Development



Change user password in Fireedge

11h

Community Support



Not able to attach Network as an alias to existing private network attached to Virtual Machine

05h

Development



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