




Unlocking the Hybrid Cloud


An Open Source Approach

 FOSDEM – 02/02/2025

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 Madrid (Spain)



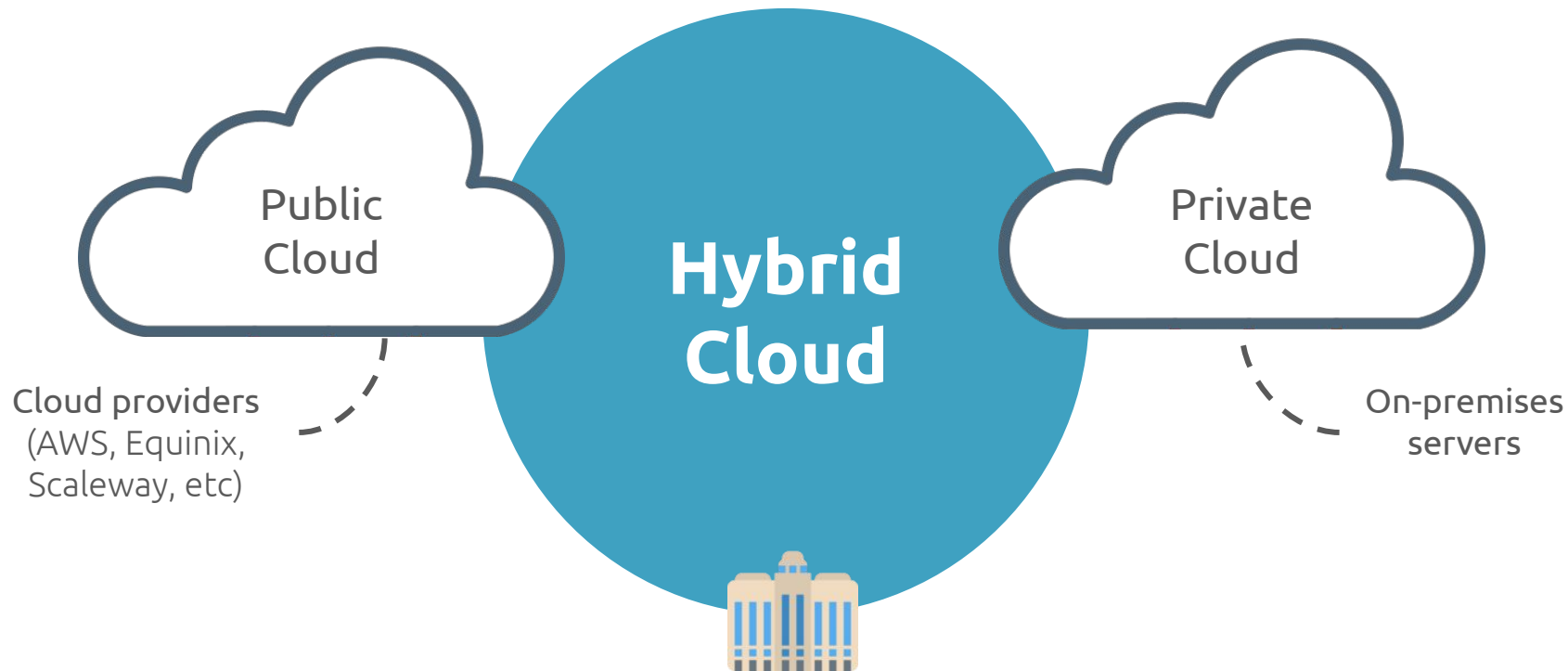
A Quick Overview of the Current Hybrid Cloud Scenario



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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





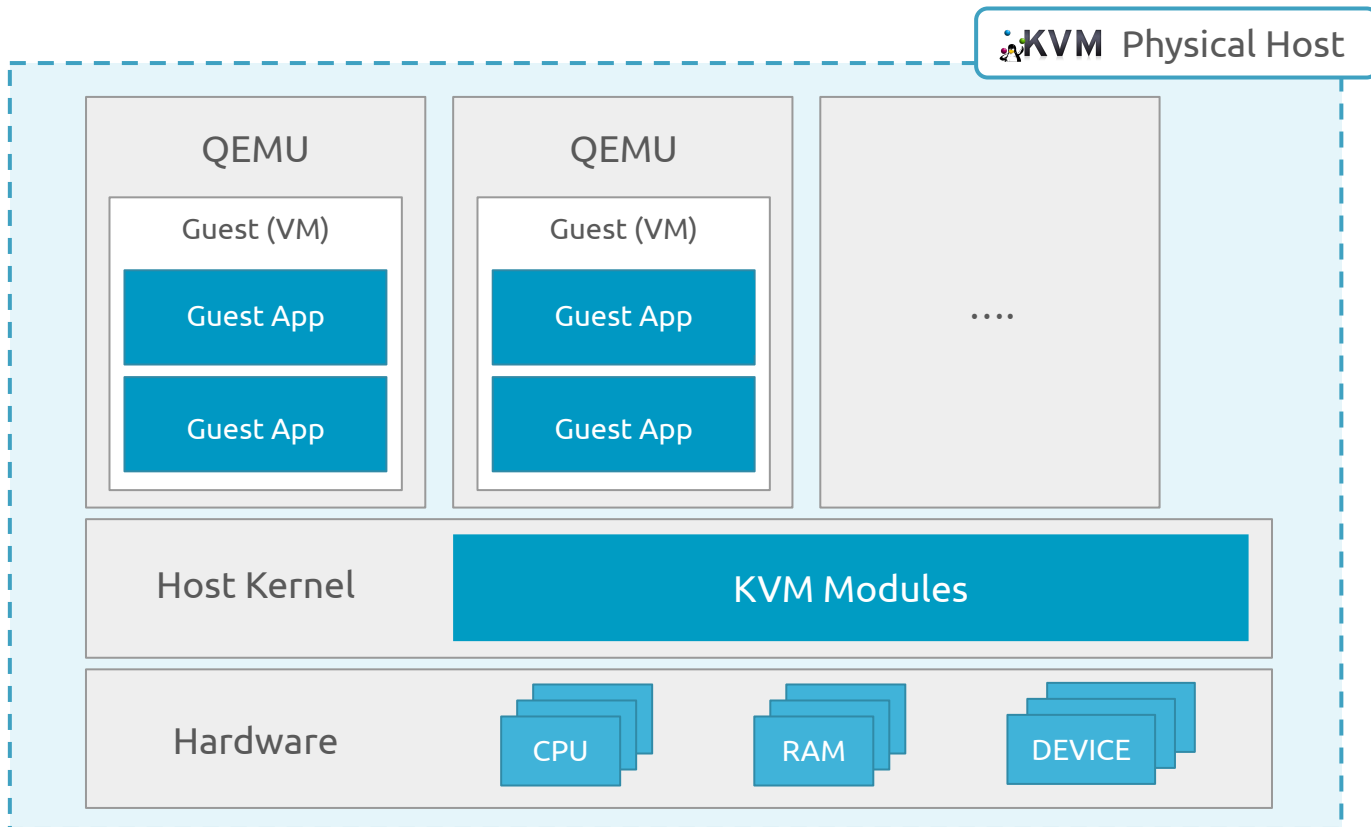
Introducing a Technology Stack for Hybrid Cloud: An Open Source Approach



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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

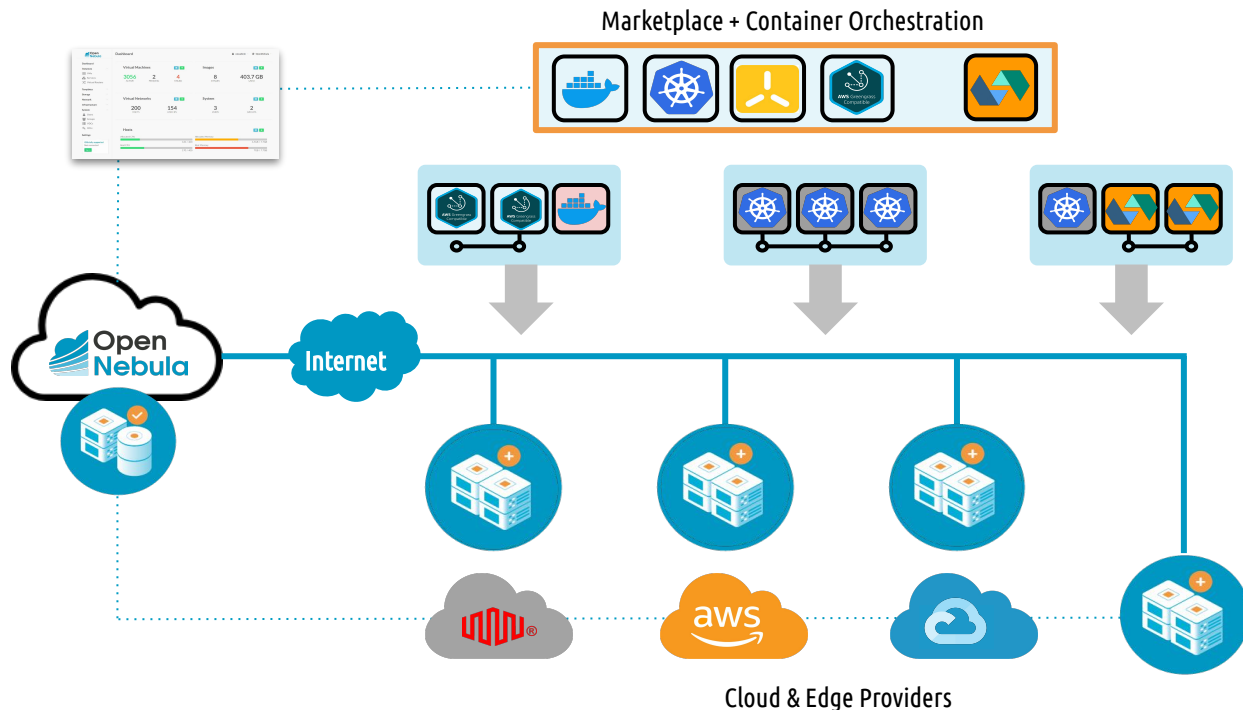
OpenNebula as Multi-Cloud Orchestrator

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



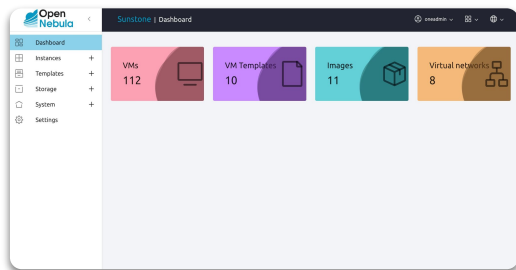
<https://opennebula.io/multi-cloud/>

OneForm as Multi-Cloud Key Technology



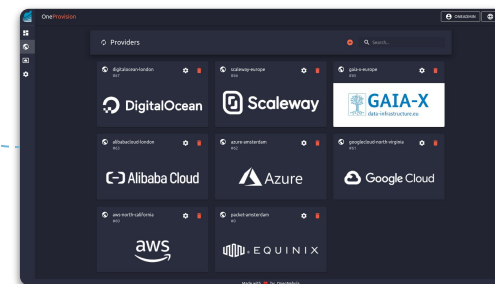
Using OpenNebula Formation Capabilities to Expand Your OpenNebula Hybrid Cloud 🚀

One platform to rule them all 🚀

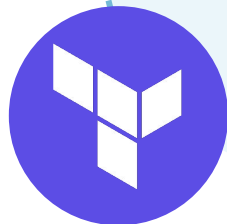


Open Nebula + OneForm

Cloud-Edge Deployment in an Instant ⚡



Automated Resources
Deployment



HashiCorp
Terraform



Cloud-Edge Deployment



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?

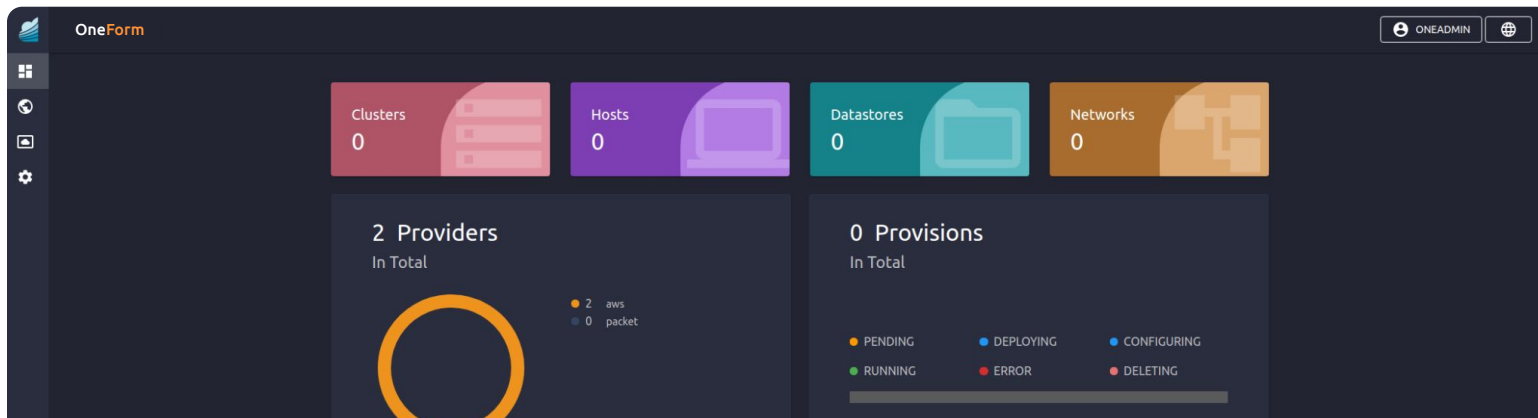
Provider

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)



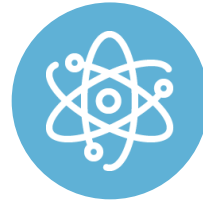
OneForm features

Build and Deploy Your Hybrid Cloud in Less Than 15 Minutes



Template System

Enables automation and definition of cloud providers and provisions



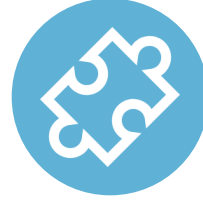
Lifecycle Management

Supports updates and automatic scaling based on predefined rules



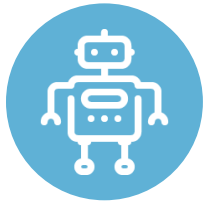
Multi-Provider Support

Allows registration of multiple cloud providers



Extensible & Customizable

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



Automated Cluster Deployment

Automates cluster configuration in OpenNebula



API & Automations

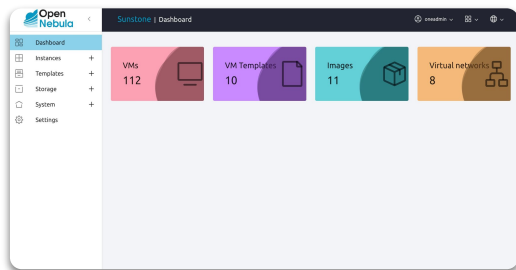
Provides an API that enables the creation of custom automation workflows.

OneForm as Multi-Cloud Key Technology



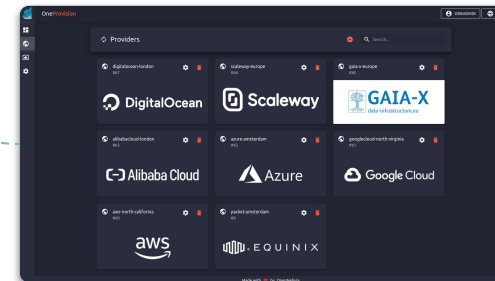
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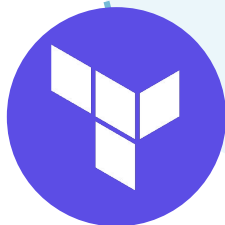


Open Nebula + OneForm

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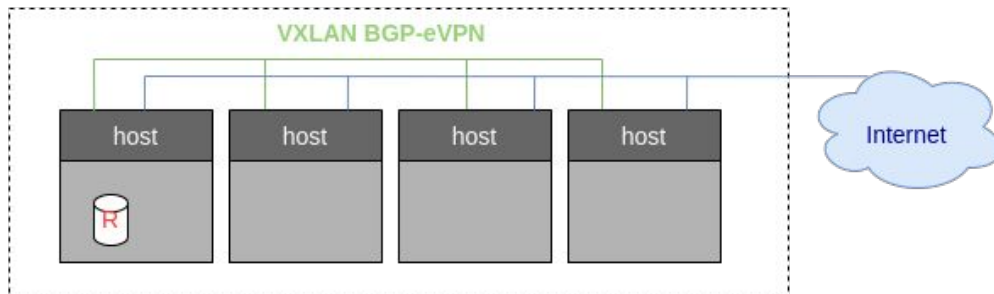
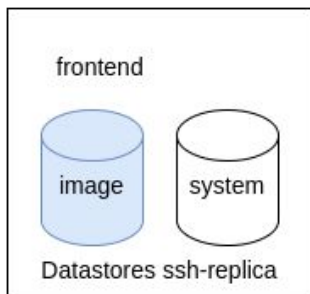
ANSIBLE

OneForm from an Infrastructure Perspective



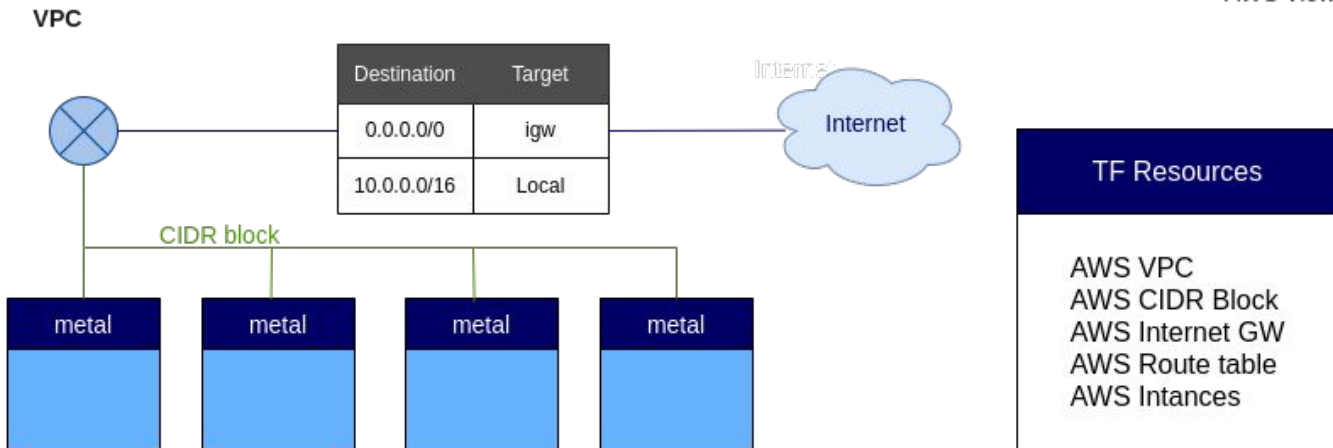
Build and Deploy Your Hybrid Cloud in Less Than 15 Minutes

OpenNebula point of view



OpenNebula View
AWS View

Provider point of view (AWS example)

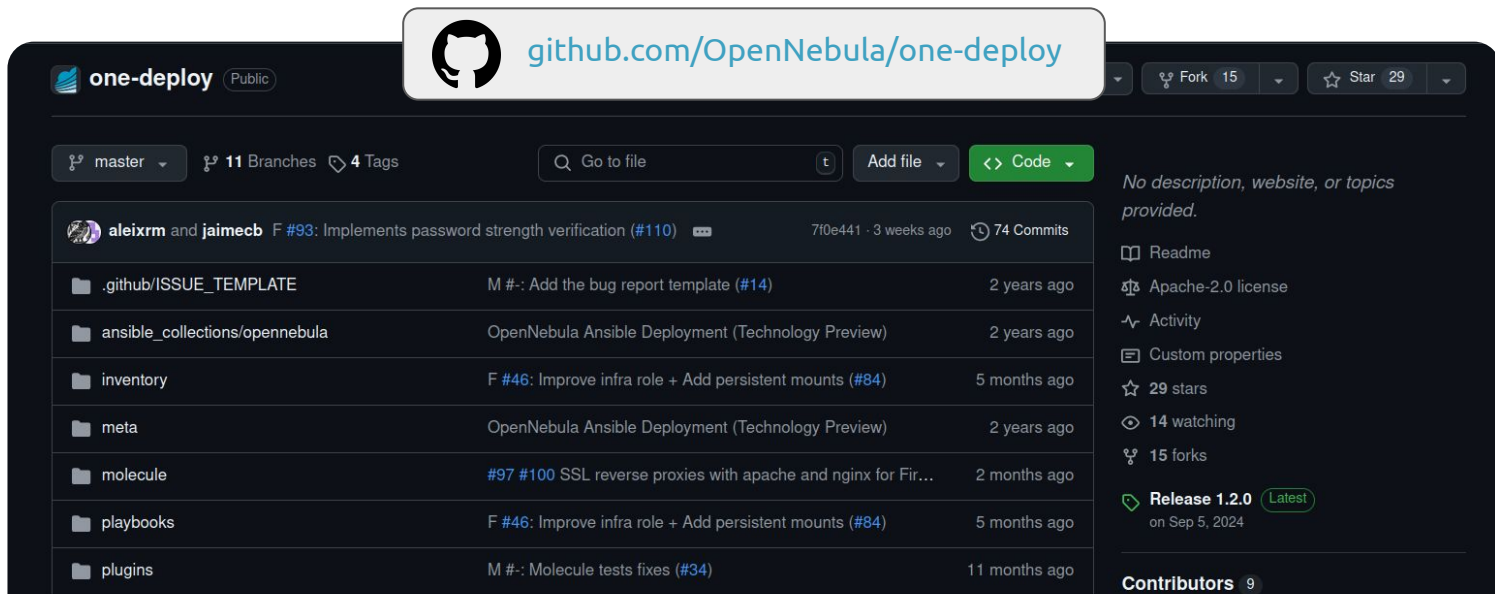


OneForm Hosts Configuration

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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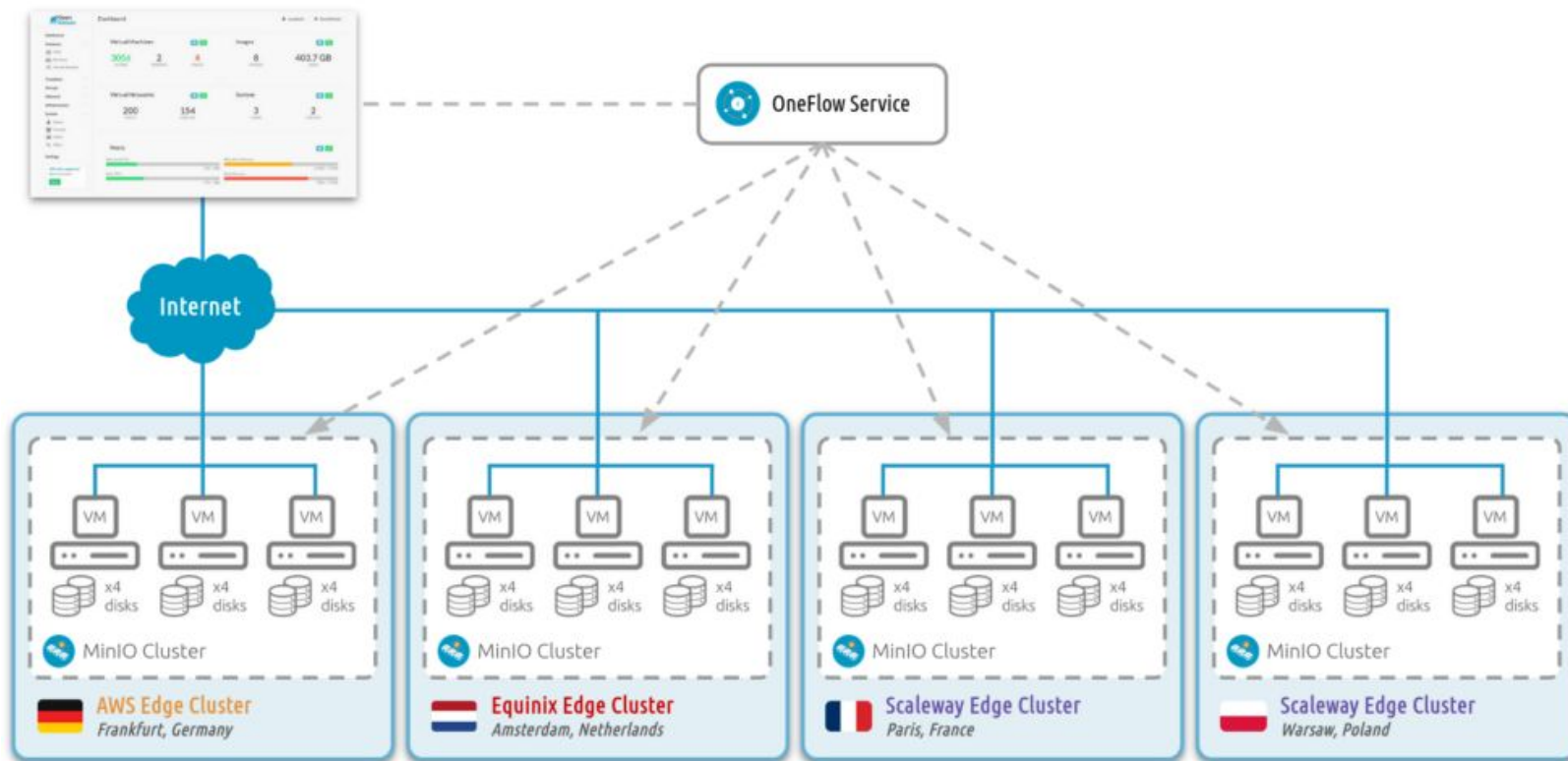
A Distributed Object Store Application

An Overview of the Architecture and Functionality in Action



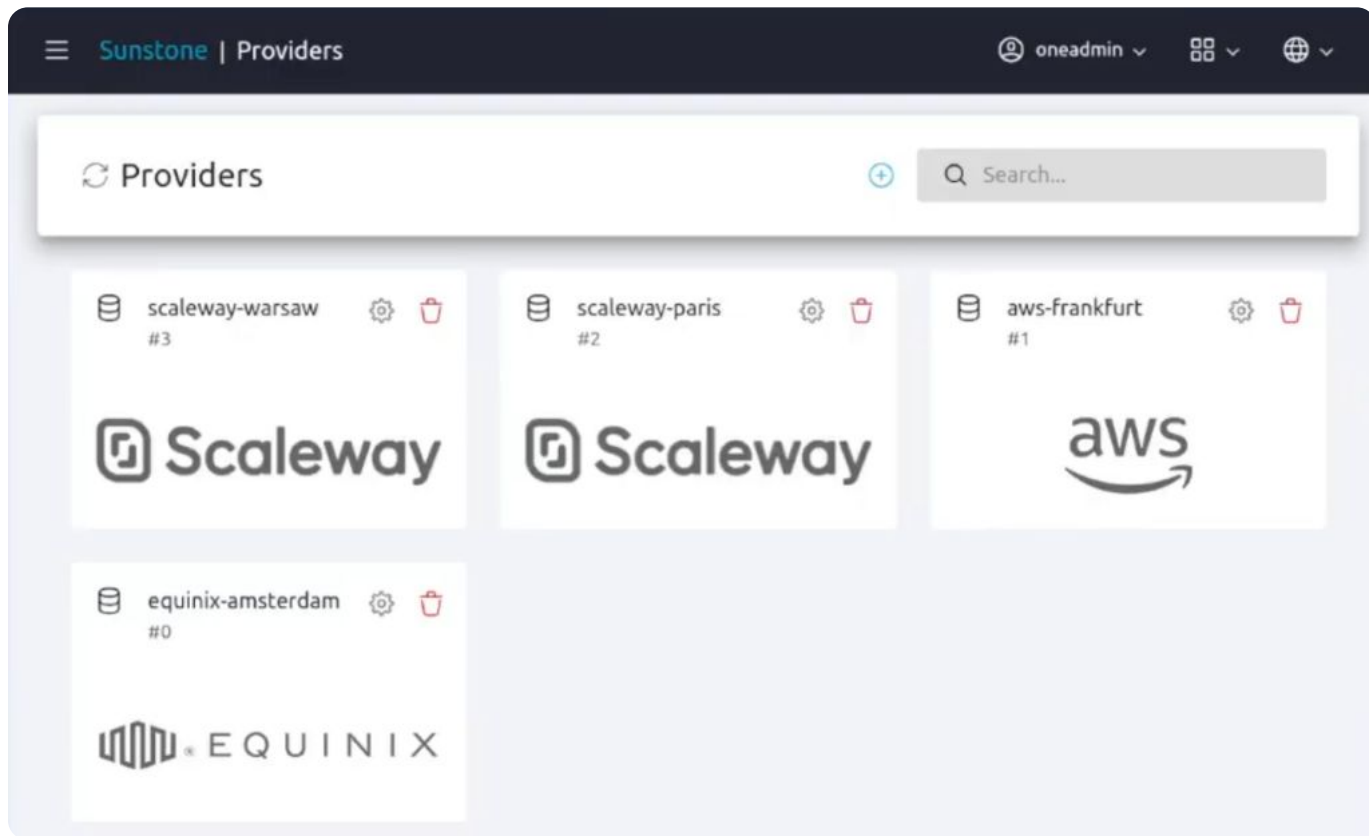
A Distributed Object Store Application

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 shows the Sunstone Provisions interface. A modal window titled "#30 Frankfurt" is open, displaying the "Hosts" tab. The interface includes a search bar, a list of hosts, and navigation controls. The host list shows two entries:

Host ID	IP Address	Architecture	CPUs	RAM	Storage	Usage	Actions
#35	3.120.153.37	kvm	0 / 0	0 / 0	0 KB / 189 GB	0%	Settings, Delete
#34	18.195.64.224	kvm	0 / 0	0 / 0	0 KB / 189 GB	0%	Settings, Delete

A Distributed Object Store Application

An Overview of the Architecture and Functionality in Action



`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

The image displays two overlapping screenshots from the Sunstone management interface. The background screenshot shows the 'Service Templates' page for a 'MiniO Multi-Cloud Cluster'. The foreground screenshot shows the 'Metrics' page for the 'MiniO Object Store'.

Sunstone | Service Templates

#4 | MiniO Multi-Cloud Cluster

Info	Roles	Template
Information		
ID	4	
Name	MiniO Multi-Cloud Clus...	
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	

OBJECT STORE LICENSE

Metrics

Info Usage Traffic Resources

Server Information

Buckets	Objects	Reported Usage
0	0	0 B
Servers	Drives	Time since last Heal Activity
8 Online 0 Offline	32 Online 0 Offline	n/a
Time since last Scan Activity	Backend type	Standard storage class parity
n/a	Erasure	4
Uptime	Reduced redundancy storage class parity	1
n/a		

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




OpenNebula.io/IPCEI-CIS

OpenNebula Community Forum



Join the OpenNebula Community where Exploration and Collaboration Unite! 🚀




🔗 forum.opennebula.io

Sign Up Log In 🔍 ☰

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

all categories ▾ all tags ▾ **Categories** Latest Top

Category	Topics	Latest
Development Any aspect related to development and integration of OpenNebula and its add-ons and ecosystem:	363	 Sinatra doesn't know this ditty trying to access OneFlow 4 1h ■ Development
Community Support 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: ■ Network ■ General ■ Upgrade ■ GUI - Sunstone ■ CLI / API ■ VM Configuration / Contextualization ■ Storage ■ HA / Federation ■ vCenter	4.1k	 <input type="checkbox"/> Change user password in Fireedge 1 1h ■ Community Support  Not able to attach Network as an alias to existing private network attached to Virtual Machine 0 5h ■ Development



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