Serverless Computing with OpenNebula
Running containers as Firecracker microVMs at the Edge
About Me

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What is OpenNebula?

The open source Cloud Management Platform developed for the Enterprise

- **Third-party Tools**
  - Terraform
  - Kubernetes
  - Ansible
  - Docker

- **Built-in Tools**
  - Sunstone

- **Virtual Machines**
  - vmware
  - KVM

- **System Containers**
  - LXD

- **Micro-VMs**
  - Firecracker

**Shared Networking and Storage Resources**
How is OpenNebula Being Used?

Say hello to our new True Hybrid Cloud Architecture

https://opennebula.io/true-hybrid
The OpenNebula Way

Getting the most out of Public Cloud & Bare-Metal Providers at the Edge

Edge
Easy and quickly cloud provision on the edge with main bare metal cloud providers.

+ Serverless
Fast and secure serverless load execution with Firecracker microVMs based on Docker images.
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ONEedge.io
Expanding Open Source Cloud Computing to the Edge

Innovative Cloud Disaggregation
Emergence of Bare-metal Cloud Infra Providers
Automation

EdgeMarket
Edge Apps Marketplace

GAIA-X

EdgeCatalog
Edge Provider Selection
AWS Firecracker
Secure and Fast MicroVMs for Container Orchestration

Orchestration Layer
- Storage Drivers
- Network Drivers
- Monitor Drivers
- VMM Drivers

OpenNebula

File-based Storage
Linux Bridge Networking
VNC Terminal Server
Health & Monitoring

VMM - Firecracker
OS - KVM

Data Center

VMM - Qemu
OS - KVM

Edge Location

Monitors

Networking

File-based Storage

Monitor Drivers

VMM Drivers
Today’s Demo
A View From the Eagle’s Eye

Provision Edge Resources

Deploy Serverless Load

Internet

“Central Location”

APPLICATION

Equinix Metal
Amsterdam (NL)

CHRISTIAN
Provisioning **Edge Resources**

At the Edge

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**01**

**YAML**

*Define provision*

Define the infrastructure to be allocated and the virtual resources

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**02**

**Validate provision**

Validate YAML file

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**03**

**Provision resources**

Run the provision to allocate every resource defined in the YAML file
Deploying **Serverless Loads**
Run Any Application, Anywhere

**Step 1**
Import an official image from Docker Hub

**Step 2**
Customize your microVM template

**Step 3**
Run it wherever and whenever you need!
**Future Improvements in OpenNebula 6.0**

- **Improve UX** for application deployment.
- Make it easier to incorporate **new infrastructure providers**.
- Add **user-friendly WebUI** for provisioning tool.
- Quick deployment of lightweight **K8s clusters at the Edge**.

![K3S](image1.png) ![MicroK8s](image2.png)
**Low-latency Gaming**

Fully automated deployment of gaming servers on 17 edge locations in 25 minutes


**OTT & Live Broadcasting**

Build live and on-demand video workflows on a geo-distributed cloud to meet latency, bandwidth and regulatory requirements

https://opennebula.io/an-elastic-private-cloud-opennebulas-solution-for-media-services/
Internet of Things

Leverage the IoT features of “AWS IoT Greengrass” to create a distributed Greengrass Edge Cloud

[Diagram]


Telecom Edge Cloud

OneEdge as a core component of edge computing CORD (Central Office Re-architected as a Data center)

[Diagram]

**Desktop Virtualization**

Deploy a pay-as-you-go VDI solution that is compliant with local data protection regulations

https://opennebula.io/opennebula-for-vdi-at-the-edge/

**Kubernetes Deployment**

Configure and manage multiple Kubernetes clusters on the edge for the orchestration of containers

Give it a try!

Get Started with OpenNebula for Edge Computing with miniONE

A Practical Introduction to OpenNebula on the Edge with Docker

Accelerate Edge Cloud Computing with OpenNebula

miniONE

Install a single-node LXD/KVM/FC Cloud

minione.opennebula.io

OpenNebula 5.12

Try “Firework”, our latest release!

opennebula.io/firework