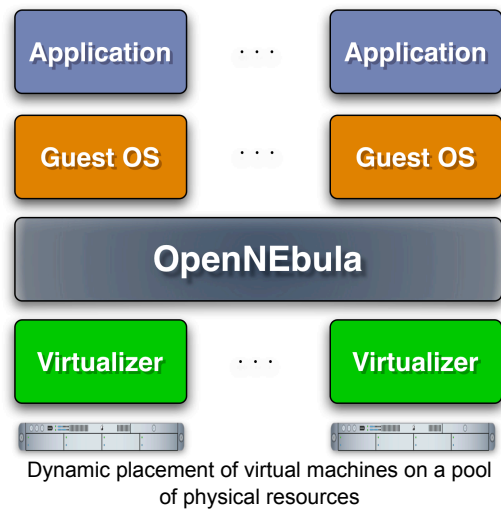


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Virtual Infrastructure Engine

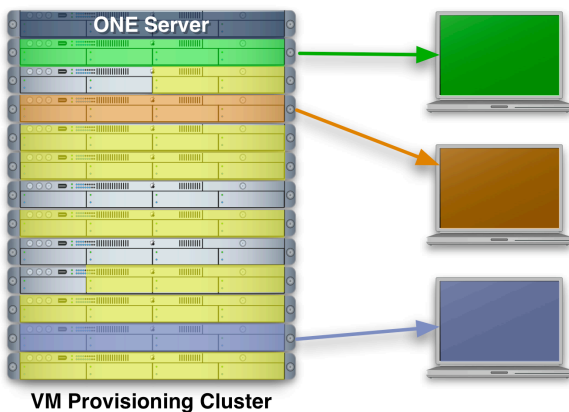
Overview

OpenNebula is a virtual infrastructure engine that enables the dynamic allocation of virtual machines on a pool of physical resources. **The OpenNebula engine extends the benefits of virtualization platforms from a single physical resource to a pool of resources, decoupling the server not only from the physical infrastructure but also from the physical location.** OpenNebula transforms a physical cluster into a flexible virtual infrastructure which dynamically adapts to the changing demands of a service workload. OpenNebula leverages existing virtualization platforms to create a new virtualization layer between the service and the physical infrastructure.



Benefits

OpenNebula leverages the functionality provided by the underlying virtualization platforms to provide the following **benefits on a multi-host environment**:



On-demand provision of Virtual Machines

For the Infrastructure Owner (System Manager)

- **Centralized management** of a pool of VMs and physical resources
- **Balance of workload** to improve efficiency and utilization
- **Server consolidation** to a reduced number of physical systems, so reducing space, administration effort, power and cooling requirements or supporting the shutdown of systems without interfering workload
- **Dynamic resizing of the physical infrastructure** by adding new hosts
- **Dynamic cluster partitioning** to execute different services
- **Support for heterogeneous workloads** with multiple (even conflicting) software requirements

For the User (Service Manager)

- **On-demand provision of VMs** to meet the demands of the service end-users.

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Features

The OpenNebula Virtual Infrastructure Engine differentiates from existing VM managers in its highly modular and open architecture designed to meet the requirements of cluster administrators. **The last version supports Xen and KVM virtualization platforms to provide the following features and capabilities:**

- **Efficient Resource Management.** The scheduling module provides a generic framework to build any capacity provision policy. The default scheduling policy determines the best host to start a VM according to requirement and rank expressions consisting on infrastructure parameters. Support for advance reservation of capacity is provided through the **Haizea VM-based lease manager**.
- **Powerful Interface.** The OpenNebula Engine provides a powerful API and CLI for monitoring and controlling VMs and physical resources.
- **3rd Party Software Integration.** OpenNebula interface allows its integration with third-party tools, such as job managers, service adapters, VM image managers...; so providing a complete solution for the deployment of flexible and efficient virtual infrastructures.
- **Failure Tolerance.** OpenNebula uses a persistent database backend to store host and VM information. In case of a local failure, the daemon can be restarted and all the running VMs recovered. All the OpenNebula components have been designed to be independent so a failure of one of them does not put the system at risk.
- **Open and Flexible Architecture.** Hypervisor access is performed through customizable programs, thus enabling administrators to tailor OpenNebula's behavior by adding new infrastructure metrics and parameters or even supporting new Hypervisors.
- **On-demand Scale out of Service Workloads.** OpenNebula provides plugins to access Amazon EC2 resources to supplement local resources with cloud resources to satisfy peak or fluctuating demands.
- **Ease of Installation and Administration.** OpenNebula is installed on a UNIX cluster front-end without requiring the installation of new services in the remote resources, apart from the VM monitor.
- **Open Source Software.** OpenNebula is open source software released under Apache license v2.0 and support is provided through a mailing list.
- **OpenNebula is an Active Project.** As engine for the dynamic management of VMs, OpenNebula is being enhanced in the context of the **RESERVOIR project** (EU grant agreement 215605) to address the requirements of several business use cases.



Dynamic cluster partitioning to execute different service workloads