OpenNebula: Service & Platform

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Introduction:

OpenNebula is a cloud platform which offers infrastructure for virtualization of data centers and cloud computing resources. It manages public, private and hybrid implementations of Data Centers. Primary use of OpenNebula is virtualization of Data Center and cloud infrastructure solutions.

Architecture:

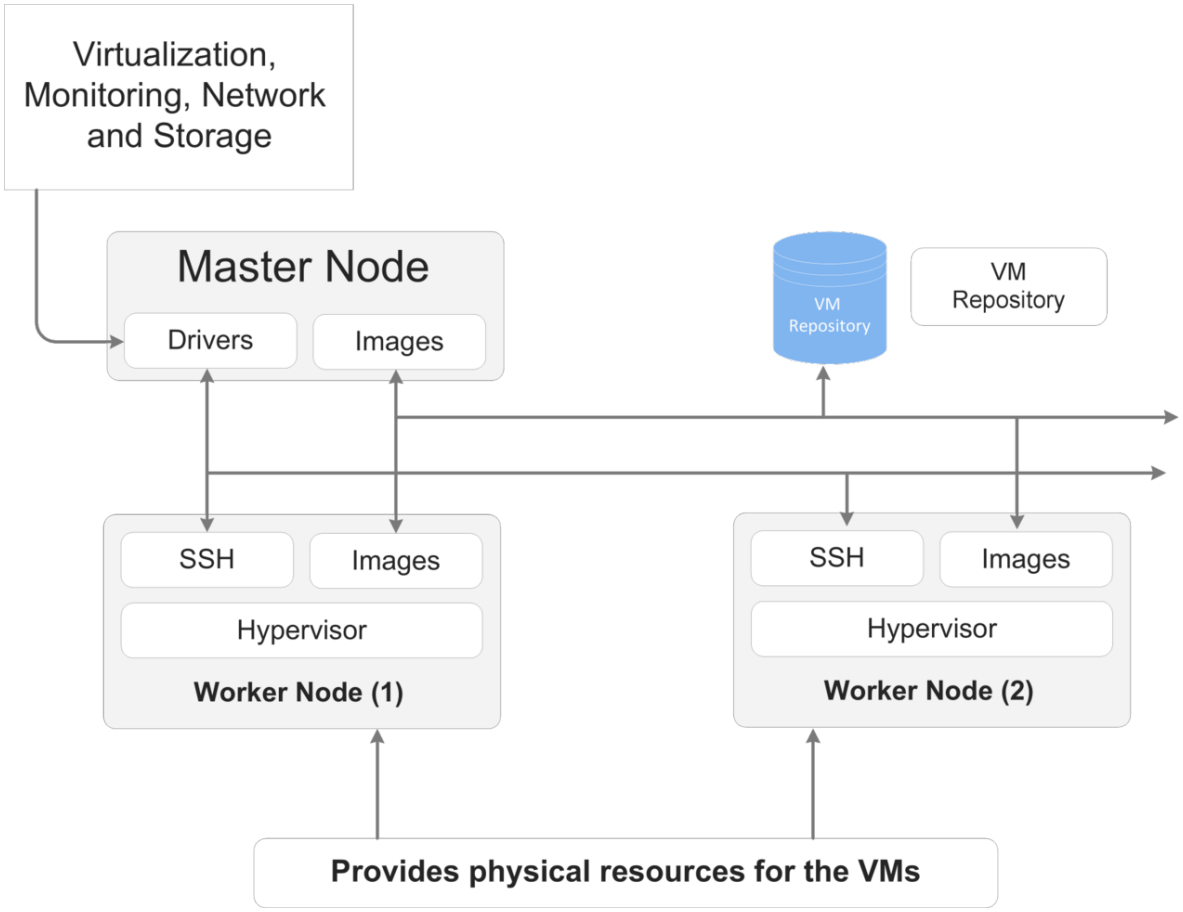


Figure 1: Deployment model of OpenNebula

Components:

1. Front-end machine: There is a master node which is also called front-end machine where the OpenNebula software is installed. It manages the queuing, scheduling and transferring jobs to other clusters. It also provides mechanism to control other host nodes.
2. Hypervisor enabled-hosts: The worker nodes are also called hypervisor hosts. OpenNebula enabled hypervisor uses a Virtualization Vmware or KVM. A virtualization subsystem is responsible for controlling these hosts.
3. Storage: The storage is for loading the image file or drivers for Virtual machine.

Three different datastore classes are included with OpenNebula including system datastores, image datastores, and file datastores. System datastores hold the images used for running the virtual machines. The images can be complete copies of an original image, deltas, or symbolic links depending on the storage technology used. The image datastores are used to store the disk image repository. Images from the image datastores are moved to or from the system datastore when virtual machines are deployed or manipulated. The file datastore is used for regular files and is often used for kernels, ram disks, or context files.

4. Physical network: This network service provides secure connection between hosts and the master nodes. The master node communicates with hosts using these network services.

Features:

1. Flexibility: OpenNebula platform is flexible because any enterprise can use existing data center infrastructure without knowing much detail about the backend services. It offers flexible installation process.
2. Openness: OpenNebula is Free and Open Source Software (FOSS). The software is free to use and the source code is also available in their website (OpenNebula.org).
3. Reliability: This cloud computing platform can be used for several years with little maintenance and error. Sometimes there are some little updates in the infrastructures but to the end users it always flexible.
4. Scalability: The size of the zones can be extended any time for storage or any other purposes.

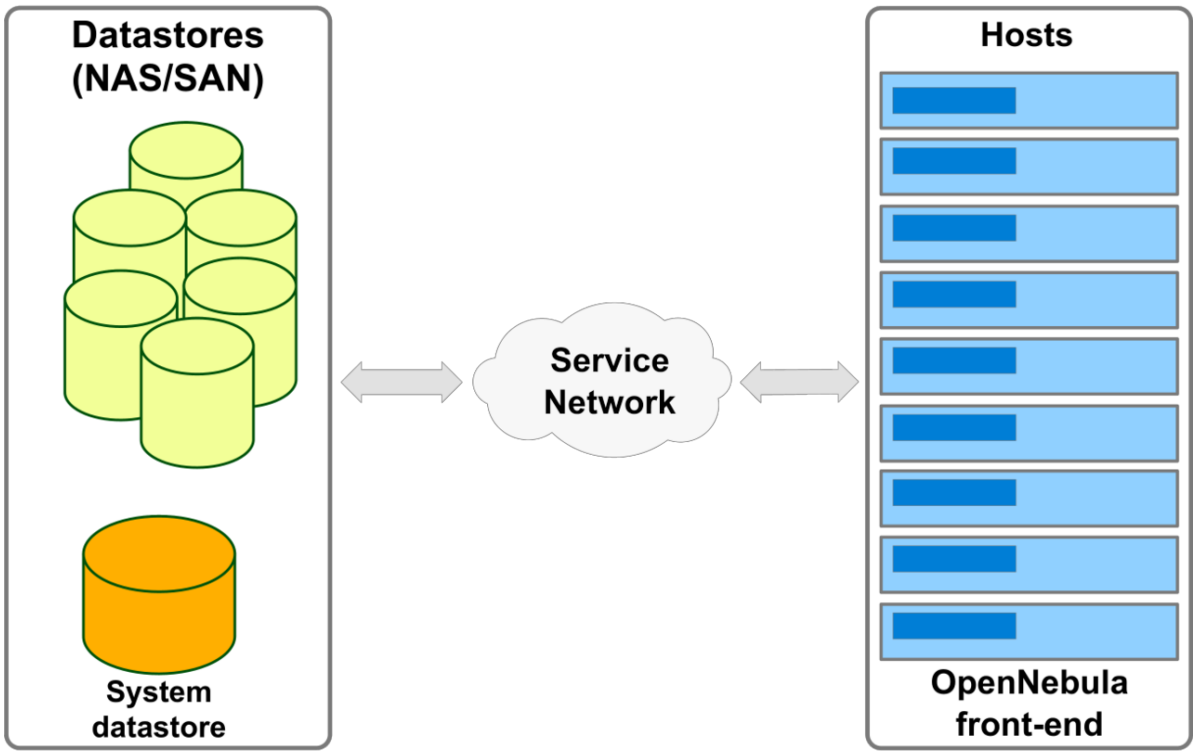


Figure 2: OpenNebula Storage

Benefits:

For the Infrastructure Manager

- **Faster respond to infrastructure needs for services** with dynamic resizing of the physical infrastructure by adding new hosts, and dynamic cluster partitioning to meet capacity requirements of services
- **Centralized management** of all the virtual and physical distributed infrastructure
- **Higher utilization of existing resources** with the creation of a infrastructure incorporating the heterogeneous resources in the data center, and infrastructure sharing between different departments managing their own production clusters, so removing application silos
- **Operational saving** with server consolidation to a reduced number of physical systems, so reducing space, administration effort, power and cooling requirements

- **Lower infrastructure expenses** with the combination of local and remote Cloud resources, so eliminating the over-purchase of systems to meet peaks demands

For the Infrastructure User

- **Faster delivery and scalability of services** to meet dynamic demands of service end-users
- **Support for heterogeneous execution environments** with multiple, even conflicting, software requirements on the same shared infrastructure
- **Full control** of the lifecycle of virtualized services management

For System Integrators

- **Fits into any existing data center** thanks to its open, flexible and extensible interfaces, architecture and components
- **Builds any type of Cloud deployment**
- **Open source software**, Apache license
- **Seamless integration with any product and service in the virtualization/cloud ecosystem and management tool in the data center**, such as cloud providers, VM managers, virtual image managers, service managers, management tools, scheduler.

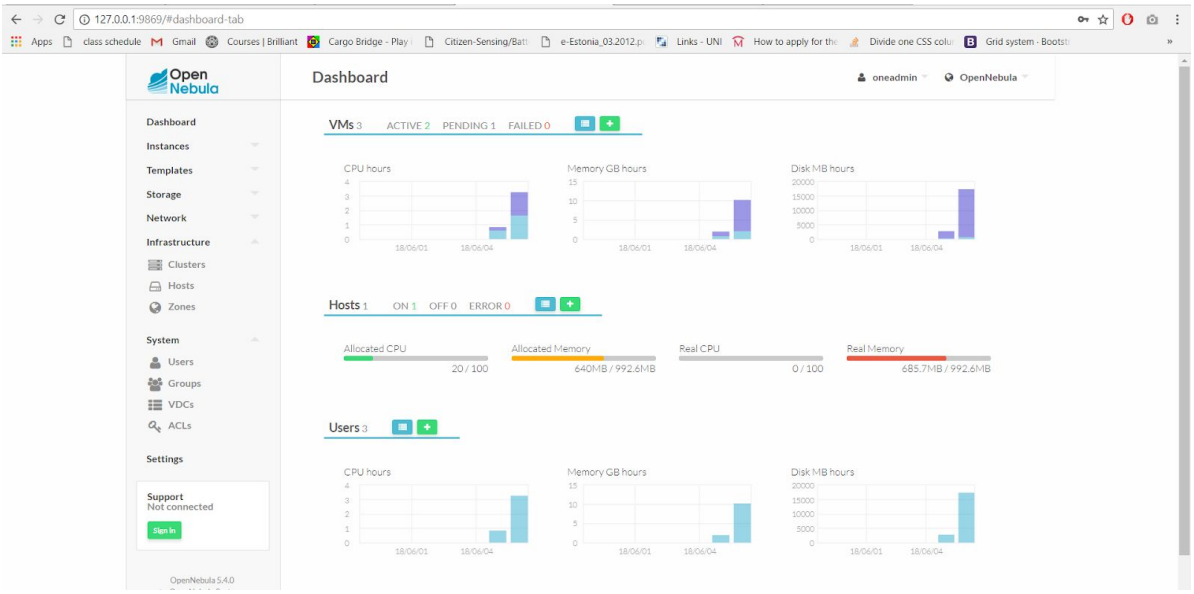
Deployment of OpenNebula:

Installation steps I followed:

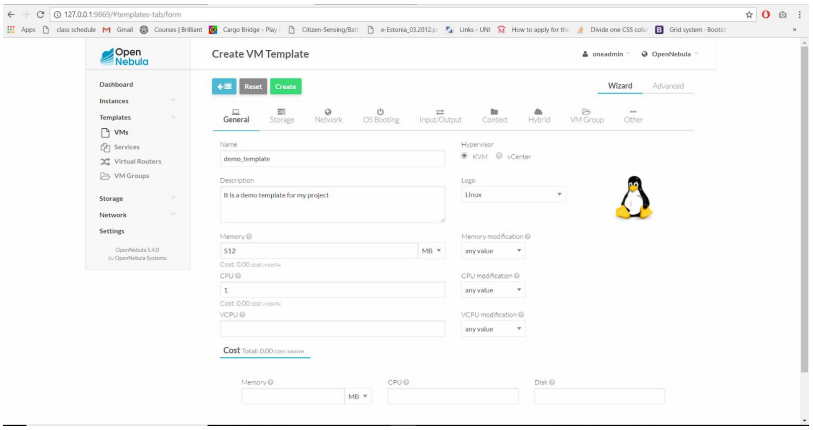
1. Install Virtual Machine (VM) in my machine
2. Download the virtual appliance
3. Import Sandbox OVA file in VM
4. In browser, access the OpenNebula platform by http://127.0.0.1:9869/

Deployment steps:

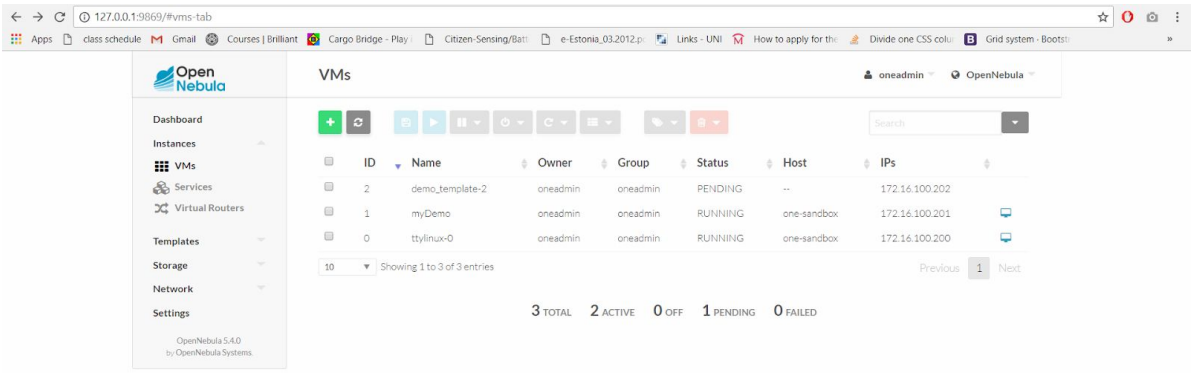
1. Dashboard



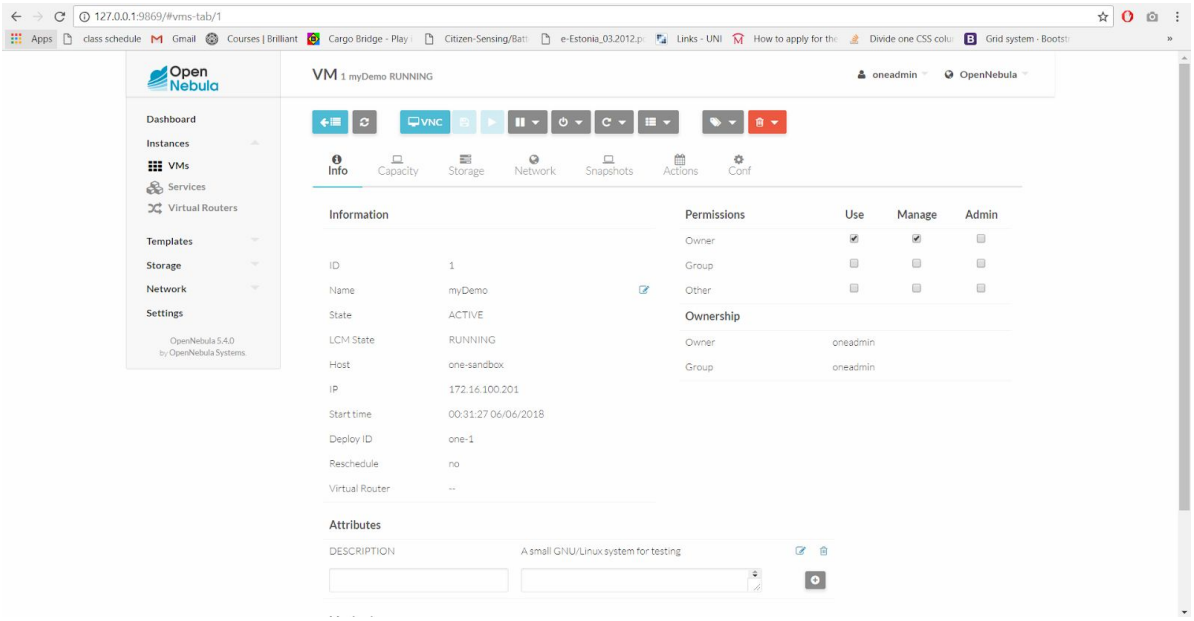
2. Create Virtual Machine (VM) in OpenNebula Platform:



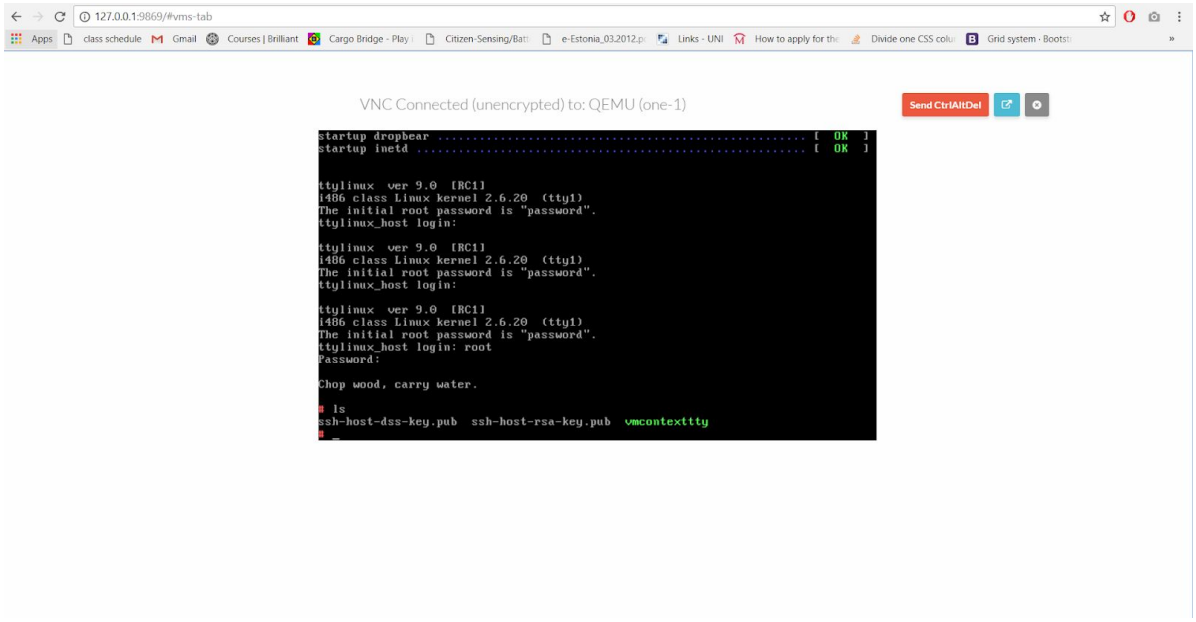
2.1. Create VM Template Infrastructure:



2.2 Setting up attributes for VM:

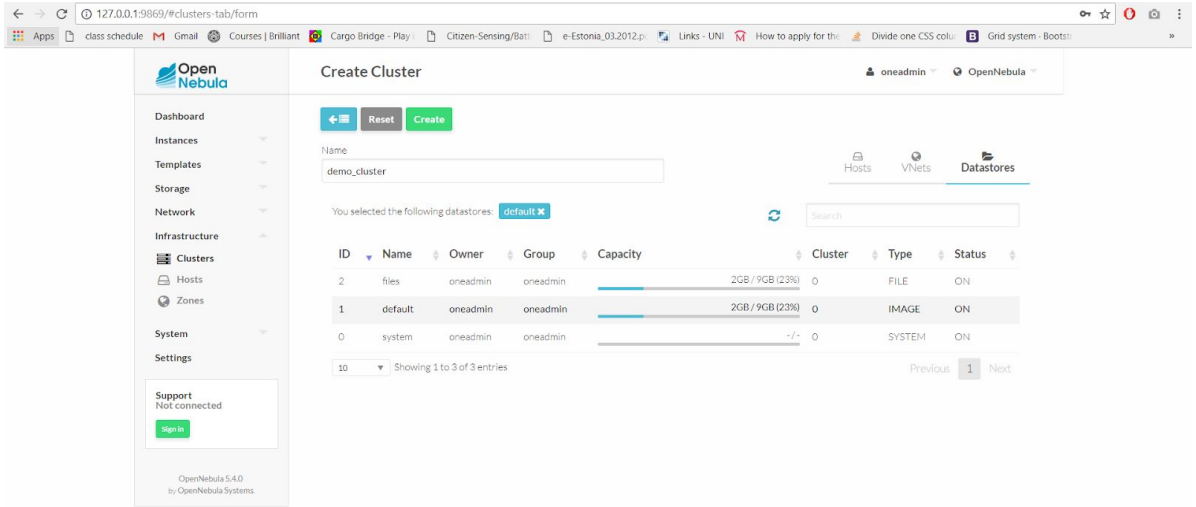


2.3 Run the VM in CLI command:

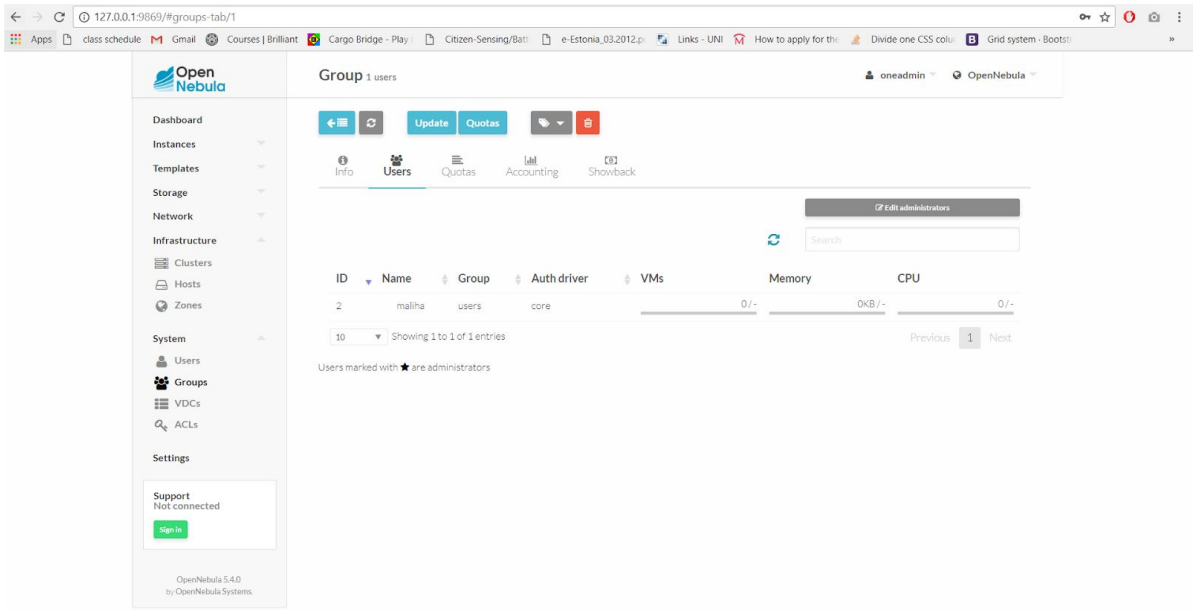


The VM can also be run from the web interface.

3. Create Cluster:



4. Create Virtualized Data Center (VDC):



4.1 Setting up VDC attributes: