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# OpenNebula.org

## OpenNebula 4.10 Quickstart CentOS 7 and KVM

*Release 4.10*

OpenNebula Project

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<b>1</b>	<b>Package Layout</b>	<b>3</b>
<b>2</b>	<b>Step 1. Installation in the Frontend</b>	<b>5</b>
2.1	1.1. Install the repo . . . . .	5
2.2	1.2. Install the required packages . . . . .	5
2.3	1.3. Configure and Start the services . . . . .	6
2.4	1.4. Configure NFS . . . . .	6
2.5	1.5. Configure SSH Public Key . . . . .	6
<b>3</b>	<b>Step 2. Installation in the Nodes</b>	<b>7</b>
3.1	2.1. Install the repo . . . . .	7
3.2	2.2. Install the required packages . . . . .	7
3.3	2.3. Configure the Network . . . . .	7
3.4	2.4. Configure NFS . . . . .	8
<b>4</b>	<b>Step 3. Basic Usage</b>	<b>9</b>
4.1	3.1. Adding a Host . . . . .	9
4.2	3.2. Adding virtual resources . . . . .	10
4.3	3.3. Running a Virtual Machine . . . . .	11
<b>5</b>	<b>Further information</b>	<b>13</b>



The purpose of this guide is to provide users with step by step guide to install OpenNebula using CentOS 7 as the operating system and KVM as the hypervisor.

After following this guide, users will have a working OpenNebula with graphical interface (Sunstone), at least one hypervisor (host) and a running virtual machines. This is useful at the time of setting up pilot clouds, to quickly test new features and as base deployment to build a large infrastructure.

Throughout the installation there are two separate roles: **Frontend** and **Nodes**. The Frontend server will execute the OpenNebula services, and the Nodes will be used to execute virtual machines. Please not that **it is possible** to follow this guide with just one host combining both the Frontend and Nodes roles in a single server. However it is recommended execute virtual machines in hosts with virtualization extensions. To test if your host supports virtualization extensions, please run:

```
grep -E 'svm|vmx' /proc/cpuinfo
```

If you don't get any output you probably don't have virtualization extensions supported/enabled in your server.



## PACKAGE LAYOUT

- `opennebula-server`: OpenNebula Daemons
- `opennebula`: OpenNebula CLI commands
- `opennebula-sunstone`: OpenNebula's web GUI
- `opennebula-java`: OpenNebula Java API
- `opennebula-node-kvm`: Installs dependencies required by OpenNebula in the nodes
- `opennebula-gate`: Send information from Virtual Machines to OpenNebula
- `opennebula-flow`: Manage OpenNebula Services
- `opennebula-context`: Package for OpenNebula Guests

Additionally `opennebula-common` and `opennebula-ruby` exist but they're intended to be used as dependencies.

**Warning:** In order to avoid problems, we recommend to disable SELinux in all the nodes, **Frontend** and **Nodes**.

```
# vi /etc/sysconfig/selinux
...
SELINUX=disabled
...

# setenforce 0
# getenforce
Permissive
```

**Warning:** Some commands may fail depending on your `iptables/firewalld` configuration. Disable the firewalls entirely for testing just to rule it out.





## STEP 1. INSTALLATION IN THE FRONTEND

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**Note:** Commands prefixed by # are meant to be run as `root`. Commands prefixed by \$ must be run as `oneadmin`.

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### 2.1 1.1. Install the repo

Enable the EPEL repo:

```
# yum install epel-release
```

Add the OpenNebula repository:

```
# cat << EOT > /etc/yum.repos.d/opennebula.repo
[opennebula]
name=opennebula
baseurl=http://downloads.opennebula.org/repo/4.10/CentOS/7/x86_64/
enabled=1
gpgcheck=0
EOT
```

### 2.2 1.2. Install the required packages

A complete install of OpenNebula will have at least both `opennebula-server` and `opennebula-sunstone` package:

```
# yum install opennebula-server opennebula-sunstone
```

Now run `install_gems` to install all the gem dependencies. Choose the *CentOS/RedHat* if prompted:

```
# /usr/share/one/install_gems
lsb_release command not found. If you are using a RedHat based
distribution install redhat-lsb
```

Select your distribution or press enter to continue without installing dependencies.

- 0. Ubuntu/Debian
- 1. CentOS/RedHat

## 2.3 1.3. Configure and Start the services

There are two main processes that must be started, the main OpenNebula daemon: `oned`, and the graphical user interface: `sunstone`.

Sunstone listens only in the loopback interface by default for security reasons. To change it edit `/etc/one/sunstone-server.conf` and change `:host: 127.0.0.1` to `:host: 0.0.0.0`.

Now we can start the services:

```
# service opennebula start
# service opennebula-sunstone start
```

## 2.4 1.4. Configure NFS

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**Note:** Skip this section if you are using a single server for both the frontend and worker node roles.

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Export `/var/lib/one/` from the frontend to the worker nodes. To do so add the following to the `/etc/exports` file in the frontend:

```
/var/lib/one/ *(rw, sync, no_subtree_check, root_squash)
```

Refresh the NFS exports by doing:

```
# systemctl restart nfs.service
```

## 2.5 1.5. Configure SSH Public Key

OpenNebula will need to SSH passwordlessly from any node (including the frontend) to any other node.

Add the following snippet to `~/.ssh/config` as `oneadmin` so it doesn't prompt to add the keys to the `known_hosts` file:

```
# su - oneadmin
$ cat << EOT > ~/.ssh/config
Host *
    StrictHostKeyChecking no
    UserKnownHostsFile /dev/null
EOT
$ chmod 600 ~/.ssh/config
```

## STEP 2. INSTALLATION IN THE NODES

### 3.1 2.1. Install the repo

Add the OpenNebula repository:

```
# cat << EOT > /etc/yum.repos.d/opennebula.repo
[opennebula]
name=opennebula
baseurl=http://downloads.opennebula.org/repo/4.10/CentOS/7/x86_64/
enabled=1
gpgcheck=0
EOT
```

### 3.2 2.2. Install the required packages

```
# yum install opennebula-node-kvm
```

Start the required services:

```
# systemctl start messagebus.service
# systemctl start libvirtd.service
# systemctl start nfs.service
```

### 3.3 2.3. Configure the Network

**Warning:** Backup all the files that are modified in this section before making changes to them.

You will need to have your main interface connected to a bridge. We will do the following example with `ens3` but the name of the interface may vary. An OpenNebula requirements is that the name of the bridge should be the same in all nodes.

To do so, substitute `/etc/sysconfig/network-scripts/ifcfg-ens3` with:

```
DEVICE=ens3
BOOTPROTO=none
NM_CONTROLLED=no
ONBOOT=yes
TYPE=Ethernet
BRIDGE=br0
```

And add a new `/etc/sysconfig/network-scripts/ifcfg-br0` file.

If you were using DHCP for your `ens3` interface, use this template:

```
DEVICE=br0
TYPE=Bridge
ONBOOT=yes
BOOTPROTO=dhcp
NM_CONTROLLED=no
```

If you were using a static IP address use this other template:

```
DEVICE=br0
TYPE=Bridge
IPADDR=<YOUR_IPADDRESS>
NETMASK=<YOUR_NETMASK>
ONBOOT=yes
BOOTPROTO=static
NM_CONTROLLED=no
```

After these changes, restart the network:

```
# systemctl restart network.service
```

## 3.4 2.4. Configure NFS

---

**Note:** Skip this section if you are using a single server for both the frontend and worker node roles.

---

Mount the datastores export. Add the following to your `/etc/fstab`:

```
192.168.1.1:/var/lib/one/ /var/lib/one/ nfs soft,intr,rsize=8192,wsiz=8192,noauto
```

---

**Note:** Replace `192.168.1.1` with the IP of the frontend.

---

Mount the NFS share:

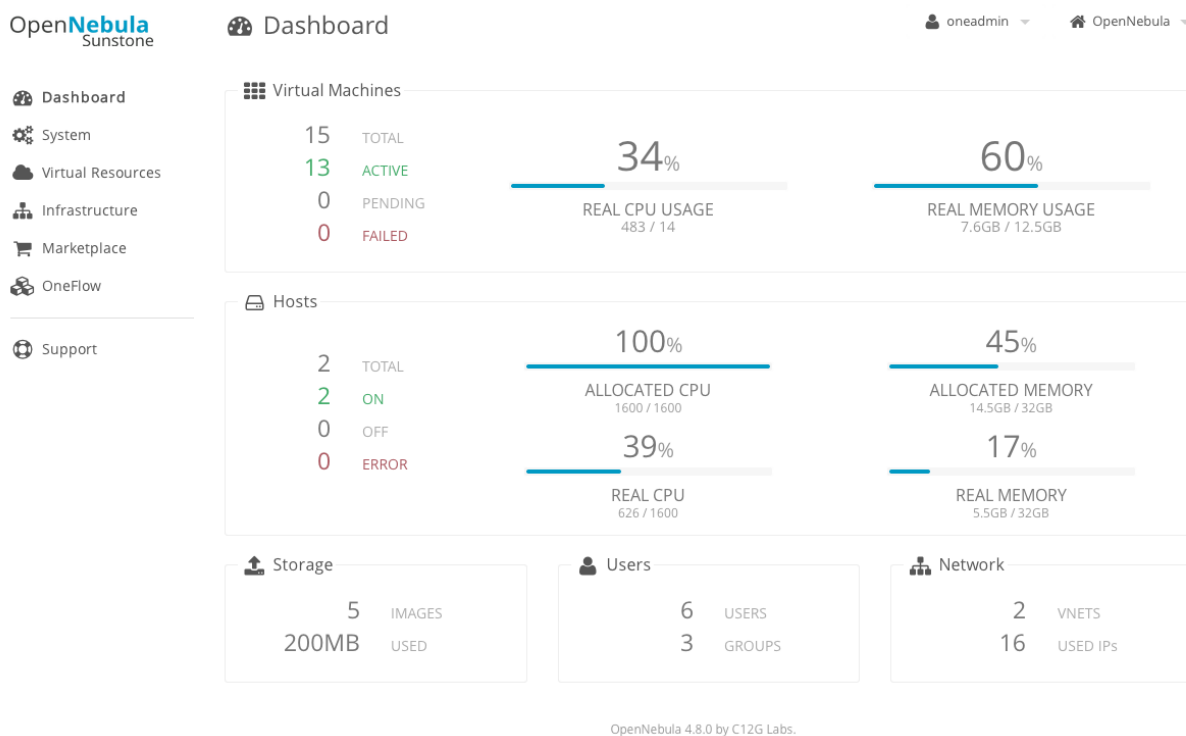
```
# mount /var/lib/one/
```

If the above command fails or hangs, it could be a firewall issue.

## STEP 3. BASIC USAGE

**Note:** All the operations in this section can be done using Sunstone instead of the command line. Point your browser to: `http://frontend:9869`.

The default password for the `oneadmin` user can be found in `~/ .one/one_auth` which is randomly generated on every installation.



To interact with OpenNebula, you have to do it from the `oneadmin` account in the frontend. We will assume all the following commands are performed from that account. To login as `oneadmin` execute `su - oneadmin`.

### 4.1 3.1. Adding a Host

To start running VMs, you should first register a worker node for OpenNebula.

Issue this command for each one of your nodes. Replace `localhost` with your node's hostname.

```
$ onehost create localhost -i kvm -v kvm -n dummy
```

Run `onehost list` until it's set to on. If it fails you probably have something wrong in your ssh configuration. Take a look at `/var/log/one/oned.log`.

### 4.2 3.2. Adding virtual resources

Once it's working you need to create a network, an image and a virtual machine template.

To create networks, we need to create first a network template file `mynetwork.one` that contains:

```
NAME = "private"

BRIDGE = br0

AR = [
    TYPE = IP4,
    IP = 192.168.0.100,
    SIZE = 3
]
```

---

**Note:** Replace the address range with free IPs in your host's network. You can add more than one address range.

---

Now we can move ahead and create the resources in OpenNebula:

```
$ onevnet create mynetwork.one

$ oneimage create --name "CentOS-7-one-4.8" \
  --path http://marketplace.c12g.com/appliance/53e7bf928fb81d6a69000002/download \
  --driver qcow2 \
  -d default

$ onetemplate create --name "CentOS-7" \
  --cpu 1 --vcpu 1 --memory 512 --arch x86_64 \
  --disk "CentOS-7-one-4.8" \
  --nic "private" \
  --vnc --ssh --net_context
```

---

**Note:** If `oneimage create` complains because there's not enough space available in the datastore, you can disable the datastore capacity check in OpenNebula: `/etc/one/oned.conf:DATASTORE_CAPACITY_CHECK = "no"`. You need to restart OpenNebula after changing this.

---

You will need to wait until the image is ready to be used. Monitor its state by running `oneimage list`.

In order to dynamically add ssh keys to Virtual Machines we must add our ssh key to the user template, by editing the user template:

```
$ EDITOR=vi oneuser update oneadmin
```

Add a new line like the following to the template:

```
SSH_PUBLIC_KEY="ssh-dss AAAAB3NzaC1kc3MAAACBANBWTQmm4Gt..."
```

Substitute the value above with the output of `cat ~/.ssh/id_dsa.pub`.

## 4.3 3.3. Running a Virtual Machine

To run a Virtual Machine, you will need to instantiate a template:

```
$ onetemplate instantiate "CentOS-7"
```

Execute `onevm list` and watch the virtual machine going from PENDING to PROLOG to RUNNING. If the vm fails, check the reason in the log: `/var/log/one/<VM_ID>/vm.log`.

---

**Note:** If it stays too long in `pend` status you can check why by doing: `onevm show <vmid>|grep ^SCHED_MESSAGE`. If it reports that no datastores have enough capacity for the VM, you can force a manual deployment by running: `onevm deploy <vmid> <hostid>`.

---





## FURTHER INFORMATION

- *Planning the Installation*
- *Installing the Software*
- [FAQs](#). Good for troubleshooting
- *Main Documentation*