

INSTALLATION OF OPENNEBULA

1. Switch the login into root user privilege mode by the command
 - a. **sudo -i**
 - b. When asked for password, give sel@123
2. Check the system whether it supports virtualisation or not by the command
 - a. **grep -E 'svm|vmx' /proc/cpuinfo**

Output must be like this

```
root@sel50-HP-Compaq-Pro-6305-SFF: ~
sel-50@sel50-HP-Compaq-Pro-6305-SFF:~$ sudo -i
[sudo] password for sel-50:
root@sel50-HP-Compaq-Pro-6305-SFF:~# grep -E 'svm|vmx' /proc/cpuinfo
flags              : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx mmxext fxsr_opt pdpe1gb rdtscp
lm constant_tsc rep_good nopl nonstop_tsc extd_apicid aperfmperf pni pclmulqdq
monitor ssse3 fma cx16 sse4_1 sse4_2 popcnt aes xsave avx f16c lah_f_lm cmp_legacy
y svm extapic cr8_legacy abm sse4a misalignsse 3dnowprefetch osvw ibs xop skinit
wdt lwp fma4 tce nodeid_msr tlm topoext perfctr_core perfctr_nb arat cpb hw_pst
ate npt lbrv svm_lock nrip_save tsc_scale vmcb_clean flushbyasid decodeassists p
ausefilter pfthreshold bmi1
flags              : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx mmxext fxsr_opt pdpe1gb rdtscp
lm constant_tsc rep_good nopl nonstop_tsc extd_apicid aperfmperf pni pclmulqdq
monitor ssse3 fma cx16 sse4_1 sse4_2 popcnt aes xsave avx f16c lah_f_lm cmp_legacy
y svm extapic cr8_legacy abm sse4a misalignsse 3dnowprefetch osvw ibs xop skinit
wdt lwp fma4 tce nodeid_msr tlm topoext perfctr_core perfctr_nb arat cpb hw_pst
ate npt lbrv svm_lock nrip_save tsc_scale vmcb_clean flushbyasid decodeassists p
ausefilter pfthreshold bmi1
flags              : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx mmxext fxsr_opt pdpe1gb rdtscp
lm constant_tsc rep_good nopl nonstop_tsc extd_apicid aperfmperf pni pclmulqdq
monitor ssse3 fma cx16 sse4_1 sse4_2 popcnt aes xsave avx f16c lah_f_lm cmp_legacy
y svm extapic cr8_legacy abm sse4a misalignsse 3dnowprefetch osvw ibs xop skinit
wdt lwp fma4 tce nodeid_msr tlm topoext perfctr_core perfctr_nb arat cpb hw_pst
ate npt lbrv svm_lock nrip_save tsc_scale vmcb_clean flushbyasid decodeassists p
ausefilter pfthreshold bmi1
root@sel50-HP-Compaq-Pro-6305-SFF:~#
```

The red lettered svm proves that the system supports virtualisation.

Installation of the frontend:

3. **apt-get update** [sudo is not required as we are already in root mode]
4. The command to install the packages required for frontend are:

- a. **apt-get install opennebula opennebula-sunstone nfs-kernel-server**
5. To ensure that the packages have been correctly
 - a. The command is : **ls -l /dev/kvm**
6. Sunstone listens only in the loopback interface by default for security reasons. To change it **gedit /etc/one/sunstone-server.conf** and change `:host: 127.0.0.1` to `:host: 0.0.0.0`.
7. Restart the sunstone server –
 - a. The output should be as follows:

```

sel-48@sel48-HP-Compaq-Pro-6305-SFF: ~
Ign http://in.archive.ubuntu.com trusty/multiverse Translation-en_IN
Ign http://in.archive.ubuntu.com trusty/restricted Translation-en_IN
Ign http://in.archive.ubuntu.com trusty/universe Translation-en_IN
Fetched 3,135 kB in 31s (100 kB/s)
Reading package lists... Done
root@sel48-HP-Compaq-Pro-6305-SFF:~# apt-get install opennebula opennebula-sunstone nfs-kernel-server
Reading package lists... Done
Building dependency tree
Reading state information... Done
nfs-kernel-server is already the newest version.
opennebula is already the newest version.
opennebula-sunstone is already the newest version.
0 upgraded, 0 newly installed, 0 to remove and 713 not upgraded.
root@sel48-HP-Compaq-Pro-6305-SFF:~# ls -l /dev/kvm
crw-rw----+ 1 root root 10, 232 Aug  9 07:22 /dev/kvm
root@sel48-HP-Compaq-Pro-6305-SFF:~# /etc/init.d/opennebula-sunstone restart
* Restarting Sunstone Web interface sunstone-server
Couldn't find sunstone-server process pid.
VNC server is not running
VNC proxy started
sunstone-server started
[ OK ]
root@sel48-HP-Compaq-Pro-6305-SFF:~# ifconfig

```

Generation of keys:

8. After ensuring that you are still in root mode, type the following command in the terminal. This command creates a hidden folder named `.ssh` in the root's home folder. In that a private and public key will be created.
 //doubt whether “su –oneadmin” should be given or not. Please refer!
ssh-keygen -t rsa
 Click “enter” for all subsequent queries the terminal asks.

At the end of this step, the following files should have been created in .ssh folder - **id_rsa** and **id_rsa.pub**

The output would like :

```
root@sel48-HP-Compaq-Pro-6305-SFF: ~
[sudo] password for sel-48:
root@sel48-HP-Compaq-Pro-6305-SFF:~# ssh-keygen -t rsa
Generating public/private rsa key pair.
Enter file in which to save the key (/root/.ssh/id_rsa):
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /root/.ssh/id_rsa.
Your public key has been saved in /root/.ssh/id_rsa.pub.
The key fingerprint is:
3a:26:1b:63:63:eb:fd:c5:af:58:19:fa:5f:89:37:44 root@sel48-HP-Compaq-Pro-6305-SFF
The key's randomart image is:
+--[ RSA 2048 ]-----+
|           |
|          E|
|         .|
|        S .|
|       . o o o|
|      B + . = . =|
|     o X . = . o|
|    .+ ..o 000|
+-----+
root@sel48-HP-Compaq-Pro-6305-SFF:~#
```

9. Now we must copy the public key into a file named “authorized_keys”.
The same can be done as

cd /root/.ssh

chmod 600 id_rsa.pub

cp id_rsa.pub authorized_keys

The output should be:

```
root@sel50-HP-Compaq-Pro-6305-SFF: ~/.ssh
|  o o . |
|    o   |
|         |
+-----+
root@sel50-HP-Compaq-Pro-6305-SFF:/# ls -h
bin    dev    initrd.img  lib64    mnt  proc /sbin  tmp  vmlinuz
boot   etc    lib         lost+found  net  root  /srv  usr
cdrom  home  lib32      media    opt  run  /sys  var
root@sel50-HP-Compaq-Pro-6305-SFF:/# cd /.ssh
-bash: cd: /.ssh: No such file or directory
root@sel50-HP-Compaq-Pro-6305-SFF:/# cd /home/.ssh
-bash: cd: /home/.ssh: No such file or directory
root@sel50-HP-Compaq-Pro-6305-SFF:/# cd /Home/.ssh
-bash: cd: /Home/.ssh: No such file or directory
root@sel50-HP-Compaq-Pro-6305-SFF:/# cd /home/sel-50/.ssh
root@sel50-HP-Compaq-Pro-6305-SFF:/home/sel-50/.ssh# cd /root/.ssh
root@sel50-HP-Compaq-Pro-6305-SFF:~/.ssh# ls
id_rsa id_rsa.pub known_hosts
root@sel50-HP-Compaq-Pro-6305-SFF:~/.ssh# chmod 600 id_rsa.pub
root@sel50-HP-Compaq-Pro-6305-SFF:~/.ssh# chmod 600 id_rsa
root@sel50-HP-Compaq-Pro-6305-SFF:~/.ssh# cp ~/.ssh/id_rsa.pub ~/.ssh/authorized_keys
root@sel50-HP-Compaq-Pro-6305-SFF:~/.ssh#
```


10. The restrictions to the public key should be listed in a file named “config”. So to create a file and write contents into it,
- Give **gedit config**. Once gedit opens, type the following contents and save.
 - For systems where gedit is not working, give **nano config**. Nano is another text editor, but within the terminal. Preserve the indentation in the following text as such.
 - Host *

StrictHostKey Checking no

UserKnownHostsFile /dev/null

Give **Ctrl+O** to save in nano. It will ask you to confirm the name of the file being written. Click Enter. Give **Ctrl+X** to return to main terminal. The contents can be verified by giving **cat config**. The output is:

```
root@sel48-HP-Compaq-Pro-6305-SFF: ~/.ssh
root@sel48-HP-Compaq-Pro-6305-SFF:/# cd /home/.ssh
-bash: cd: /home/.ssh: No such file or directory
root@sel48-HP-Compaq-Pro-6305-SFF:/# cd /home/sel-48/.ssh
root@sel48-HP-Compaq-Pro-6305-SFF:/home/sel-48/.ssh# ls -h
known_hosts
root@sel48-HP-Compaq-Pro-6305-SFF:/home/sel-48/.ssh# cd ..
root@sel48-HP-Compaq-Pro-6305-SFF:/home/sel-48# ls -h
AndroidStudioProjects  Documents  ex5-3.cpp  examples.desktop  Music
Desktop                Downloads  ex5-3.cpp~  mc lab           NetBeansProjects
root@sel48-HP-Compaq-Pro-6305-SFF:/home/sel-48# cd /root/.ssh/
root@sel48-HP-Compaq-Pro-6305-SFF:~/.ssh# ls -h
id_rsa  id_rsa.pub  known_hosts
root@sel48-HP-Compaq-Pro-6305-SFF:~/.ssh# chmod 600 id_rsa.pub
root@sel48-HP-Compaq-Pro-6305-SFF:~/.ssh# chmod 600 id_rsa
root@sel48-HP-Compaq-Pro-6305-SFF:~/.ssh# cp ~/.ssh/id_rsa.pub ~/.ssh/authorized
root@sel48-HP-Compaq-Pro-6305-SFF:~/.ssh# ls
authorized_keys  id_rsa  id_rsa.pub  known_hosts
root@sel48-HP-Compaq-Pro-6305-SFF:~/.ssh# nano config
root@sel48-HP-Compaq-Pro-6305-SFF:~/.ssh# cat config
Host *
    StrictHostKeyChecking no
    UserKnownHostsFile /dev/null
root@sel48-HP-Compaq-Pro-6305-SFF:~/.ssh#
```

Installation at the nodes:

11. **apt-get update**
apt-get install opennebula-node nfs-common bridge-utils

The output should be

```
root@sel50-HP-Compaq-Pro-6305-SFF: ~/.ssh
Ign http://in.archive.ubuntu.com trusty/multiverse Translation-en_IN
Ign http://in.archive.ubuntu.com trusty/restricted Translation-en_IN
Ign http://in.archive.ubuntu.com trusty/universe Translation-en_IN
Fetched 3,135 kB in 15s (205 kB/s)
Reading package lists... Done
root@sel50-HP-Compaq-Pro-6305-SFF:~/.ssh# apt-get install opennebula-node nfs-common bridge-utils
Reading package lists... Done
Building dependency tree
Reading state information... Done
nfs-common is already the newest version.
nfs-common set to manually installed.
The following extra packages will be installed:
  augeas-lenses cgroup-lite ebttables gawk libaugeas0 libboost-thread1.54.0
  libnetcf1 librados2 librbd1 libsigsegv2 libvirt-bin libvirt0 libxen-4.4
  libxenstore3.0 libxml2-utils
Suggested packages:
  augeas-doc gawk-doc augeas-tools qemu-kvm qemu radvd
The following NEW packages will be installed:
  augeas-lenses bridge-utils cgroup-lite ebttables gawk libaugeas0
  libboost-thread1.54.0 libnetcf1 librados2 librbd1 libsigsegv2
  libvirt-bin libvirt0 libxen-4.4 libxenstore3.0 libxml2-utils
  opennebula-node
0 upgraded, 17 newly installed, 0 to remove and 711 not upgraded.
Need to get 6,326 kB of archives.
After this operation, 29.6 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://in.archive.ubuntu.com/ubuntu/ trusty/main libsigsegv2 amd64 2.1
```

Once it is successfully done, proceed to next step.

-
- ☆ By this time, go to browser and type **localhost:9869** in URL bar and see if you are getting the home page of OpenNebula.
-

Configuring the server interface at node

12. Go to interfaces.d folder by typing the command

```
cd /etc/network/interfaces.d
```

There create a file named **eth0.config**

The following lines are from the website intended to be written in this config file, but with changes.

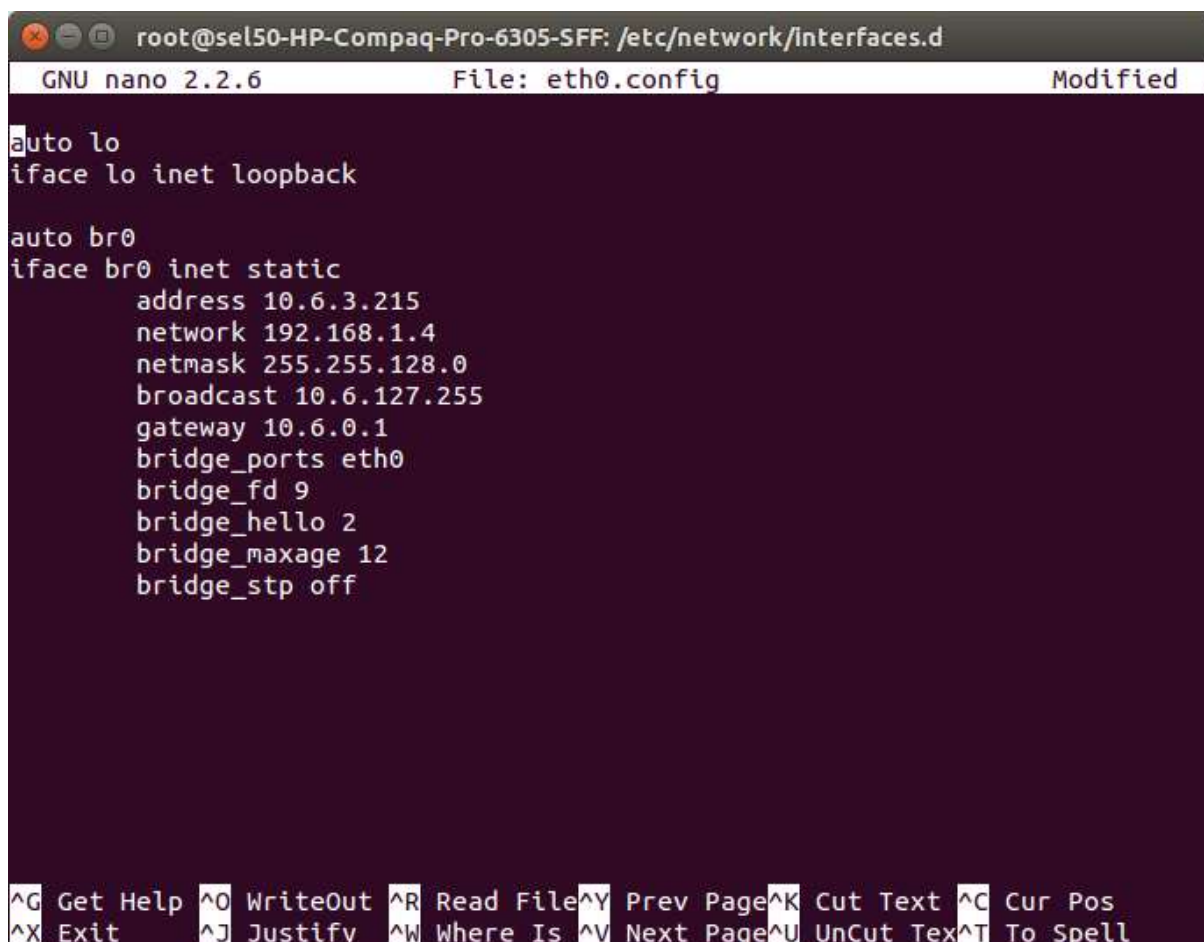
```
auto lo
iface lo inet loopback
```

```
auto br0
iface br0 inet static
    address 192.168.0.10
    network 192.168.0.0
```

```
netmask 255.255.255.0
broadcast 192.168.0.255
gateway 192.168.0.1
bridge_ports eth0
bridge_fd 9
bridge_hello 2
bridge_maxage 12
bridge_stp off
```

- ➔ Change address to our IP address.
- ➔ Network should be changed to 192.168.1.4
- ➔ Netmask, broadcast, gateway must be changed
- ➔ Note: To change the above information, the information is available in the terminal by typing **ifconfig**

The output will be:



```
root@sel50-HP-Compaq-Pro-6305-SFF: /etc/network/interfaces.d
GNU nano 2.2.6 File: eth0.config Modified
auto lo
iface lo inet loopback

auto br0
iface br0 inet static
    address 10.6.3.215
    network 192.168.1.4
    netmask 255.255.128.0
    broadcast 10.6.127.255
    gateway 10.6.0.1
    bridge_ports eth0
    bridge_fd 9
    bridge_hello 2
    bridge_maxage 12
    bridge_stp off

^G Get Help ^O WriteOut ^R Read File ^Y Prev Page ^K Cut Text ^C Cur Pos
^X Exit ^J Justify ^W Where Is ^V Next Page ^U UnCut Text ^T To Spell
```

13. After these changes, restart the network –

```
# /etc/init.d/networking restart
```