

Ex.no : 1

Installation of Opennebula

Aim:

To install opennebula in ubuntu operating system for creating virtualization in cloud.

Procedure:

Step 1. Installation of opennenula in the

Frontend 1.1. Install the repo

1. Open Terminal (ctrl+alt+t) or from dashboard type terminal
2. Here # indirectly tells to work on root.
\$ indirectly tells to work on normal user

Add the OpenNebula repository: # - root user

```
#wget -q -O- http://downloads.opennebula.org/repo/Ubuntu/repo.key | apt-key add -  
#echo "deb http://downloads.opennebula.org/repo/4.12/Ubuntu/14.04/  
stable opennebula" \  
> /etc/apt/sources.list.d/opennebula.list
```

1.2. Install the required packages

```
#apt-get update  
#apt-get install opennebula opennebula-sunstone nfs-kernel-server
```

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

```
# gedit /etc/one/sunstone-server.conf  
and change :host: 127.0.0.1 to :host: 0.0.0.0.
```

Now we must restart Sunstone:

```
# /etc/init.d/opennebula-sunstone restart
```

1.4. Configure SSH Public Key

OpenNebula will need SSH for passwordless from any node (including the frontend) to any

other node.

To do so run the following commands:

```
#su - oneadmin  
$ cp ~/.ssh/id_rsa.pub ~/.ssh/authorized_keys
```

Add the following snippet to `~/.ssh/config` so it doesn't prompt to add the keys to the

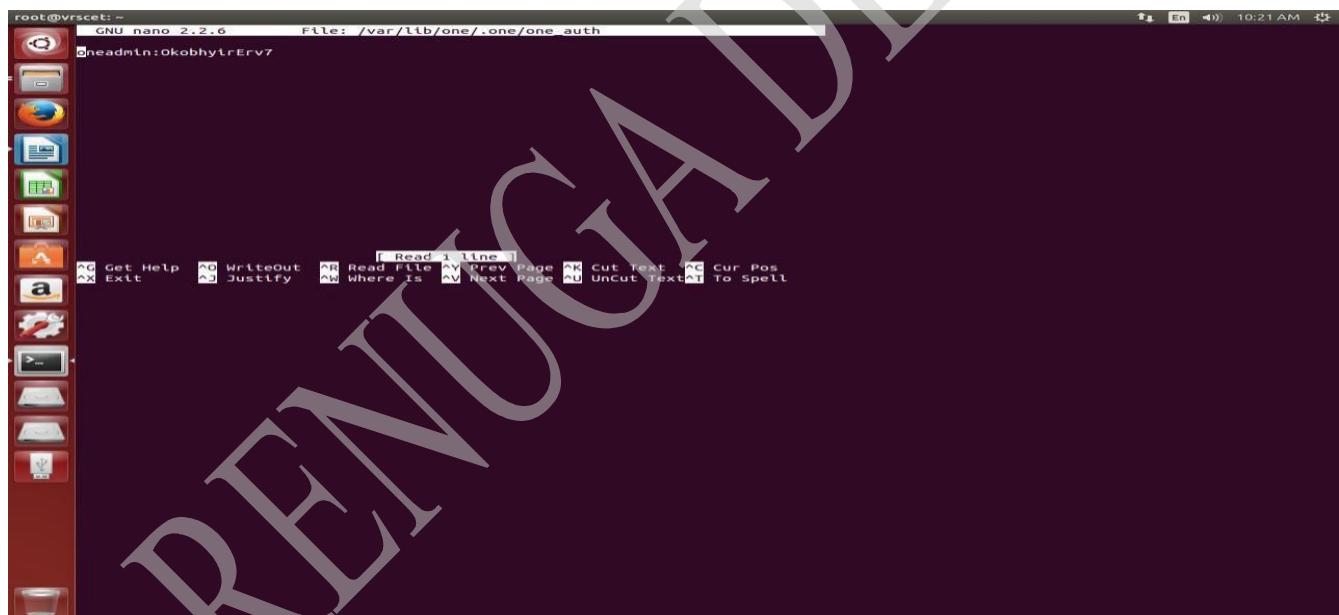
`known_hosts` file:

```
$ cat<< EOT > ~/.ssh/config#Type the below commands Host *  
  StrictHostKeyChecking no  
  UserKnownHostsFile /dev/null  
EOT  
$ chmod 600 ~/.ssh/config
```

Step 3. Basic Usage

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

```
$ nano ~/.one/one_auth
```



```
root@vrscet:~  
[cloud_grid_cpm@vrscet:~]$ sudo bash  
[sudo] password for cloud_grid_cpm:  
root@vrscet:~# su - oneadmin  
oneadmin@vrscet:~$ nano ~/.one/one_auth  
oneadmin@vrscet:~$
```

**Open mozilla firefox
localhost:9869**

**Enter Username : oneadmin
Password : from ~/.one/one_auth (file)**



The screenshot shows the OpenNebula Sunstone Dashboard interface. On the left is a vertical sidebar with icons for various management functions like Dashboard, System, Virtual Resources, Infrastructure, Marketplace, OneFlow, Support, and a Sign In button. The main dashboard area has three main sections: 'Virtual Machines' (0 TOTAL, 0 ACTIVE, 0 PENDING, 0 FAILED), 'Hosts' (0 TOTAL, 0 ON, 0 OFF, 0 ERROR), and 'Users' (2 USERS, 2 GROUPS). Each section includes a status message ('There is no information available') and a 'Create' button.

Result :

Thus, opennebula has been installed successfully.

EXP 2: Checking the Service Status for Open-nebula, Open-nebula-Sunstone, NFS(Network File System)

AIM:

To Check the Service Status for Open-nebula, Open-nebula-Sunstone, NFS(Network File System).

PROCEDURE:

Step: 1 To open Terminal:

Press Alt+Ctrl+T, Initially it will be in gcclab username. Then, We have to switch into root user

```
File Edit View Search Preferences Tabs Help  
gcclab@gcc-server:~$
```

Step: 2 Command to switch from gcclab user to root user:

Command: \$ sudo bash

```
File Edit View Search Preferences Tabs Help  
gcclab@gcc-server:~$ sudo bash  
root@gcc-server:~#
```

Step: 3 Checking the service status for Open-Nebula

Command: \$ service open-nebula status

```
File Edit View Search Preferences Tabs Help  
gcclab@gcc-server:~$ sudo bash  
root@gcc-server:~# service opennebula status  
* one is running
```

Step: 4 Checking the service status for Open-Nebula Sunstone

Command: \$ service open-nebula-sunstone status

```
File Edit View Search Preferences Tabs Help  
jcclab@gcc-server:~$ sudo bash  
root@gcc-server:~# service opennebula status  
* one is running  
root@gcc-server:~# service opennebula-sunstone status  
* sunstone-server is running  
root@gcc-server:~#
```

Step: 5 Checking the service status for NFS Kernel Server

Command: \$ service nfs-kernel-server status

```
File Edit View Search Preferences Tabs Help  
jcclab@gcc-server:~$ sudo bash  
root@gcc-server:~# service opennebula status  
* one is running  
root@gcc-server:~# service opennebula-sunstone status  
* sunstone-server is running  
root@gcc-server:~# service nfs-kernel-server status  
nfsd running  
root@gcc-server:~#
```

Check whether all the above services are in running status. If, so Proceed with Login as oneadmin user else, restart all the above services with the following command.

Step: 6 Command to restart the Open-Nebula service:

Command: \$ service open-nebula-sunstone restart

```
File Edit View Search Preferences Tabs Help  
jcclab@gcc-server:~$ sudo bash  
root@gcc-server:~# service opennebula status  
* one is running  
root@gcc-server:~# service opennebula-sunstone status  
* sunstone-server is running  
root@gcc-server:~# service nfs-kernel-server status  
nfsd running  
root@gcc-server:~# echo "In case, if the above services is not running, then you may need to restart the serv:  
In case, if the above services is not running, then you may need to restart the services  
root@gcc-server:~# service opennebula restart  
* Restarting OpenNebula cloud one  
oned and scheduler stopped  
  
root@gcc-server:~# service opennebula-sunstone restart  
* Restarting Sunstone Web interface sunstone-server  
sunstone-server stopped
```

Step: 7 Command to restart the Open-Nebula service:

Command: \$ service nfs-kernel-server restart

```
File Edit View Search Preferences Tabs Help
jcclab@gcc-server:~$ sudo bash
root@gcc-server:~# service opennebula status
* one is running
root@gcc-server:~# service opennebula-sunstone status
* sunstone-server is running
root@gcc-server:~# service nfs-kernel-server status
nfsd running
root@gcc-server:~# echo "In case, if the above services is not running, then you may need to restart the serv:
In case, if the above services is not running, then you may need to restart the services
root@gcc-server:~# service opennebula restart
* Restarting OpenNebula cloud one
oned and scheduler stopped

root@gcc-server:~# service opennebula-sunstone restart
* Restarting Sunstone Web interface sunstone-server
sunstone-server stopped
VNC proxy started
sunstone-server started

root@gcc-server:~# service nfs-kernel-server restart
* Stopping NFS kernel daemon
* Unexporting directories for NFS kernel daemon...
* Exporting directories for NFS kernel daemon...
* Starting NFS kernel daemon
root@gcc-server:~# |
```

Verify all the services are in running status if it is in running status proceed Step:2(Logging into Open-Nebula-sunstone web interface for managing opennebula cloud services.)

```

File Edit View Search Preferences Tabs Help
jcclab@gcc-server:~$ sudo bash
root@gcc-server:~# service opennebula status
* one is running
root@gcc-server:~# service opennebula-sunstone status
* sunstone-server is running
root@gcc-server:~# service nfs-kernel-server status
nfsd running
root@gcc-server:~# echo "In case, if the above services is not running, then you may need to restart the serv:
In case, if the above services is not running, then you may need to restart the services
root@gcc-server:~# service opennebula restart
* Restarting OpenNebula cloud one
ned and scheduler stopped

root@gcc-server:~# service opennebula-sunstone restart
* Restarting Sunstone Web interface sunstone-server
sunstone-server stopped
/VNC proxy started
sunstone-server started

root@gcc-server:~# service nfs-kernel-server restart
* Stopping NFS kernel daemon
* Unexporting directories for NFS kernel daemon...
* Exporting directories for NFS kernel daemon...
* Starting NFS kernel daemon
root@gcc-server:~# echo "Verification is services is complete now, proceed to step 2"
/verification is services is complete now, proceed to step 2
root@gcc-server:~#

```

Result:

Thus, all the Open-nebula, Open-nebula-sunstone and NFS (Network File System) Cloud services are running successfully.

EXP 3 : Logging into Open-Nebula-sunstone web interface for managing opennebula cloud services.

AIM:

To log into Open-Nebula-sunstone web interface for managing open-nebula cloud services.

PROCEDURE:

Step: 1 To open Terminal:

Press Alt+Ctrl+T, Initially it will be in jcclab username. Then, We have to switch into root user

```

File Edit View Search Preferences Tabs Help
jcclab@gcc-server:~$ 
```

Step: 2 Command to Switch from jcclab user to root user:

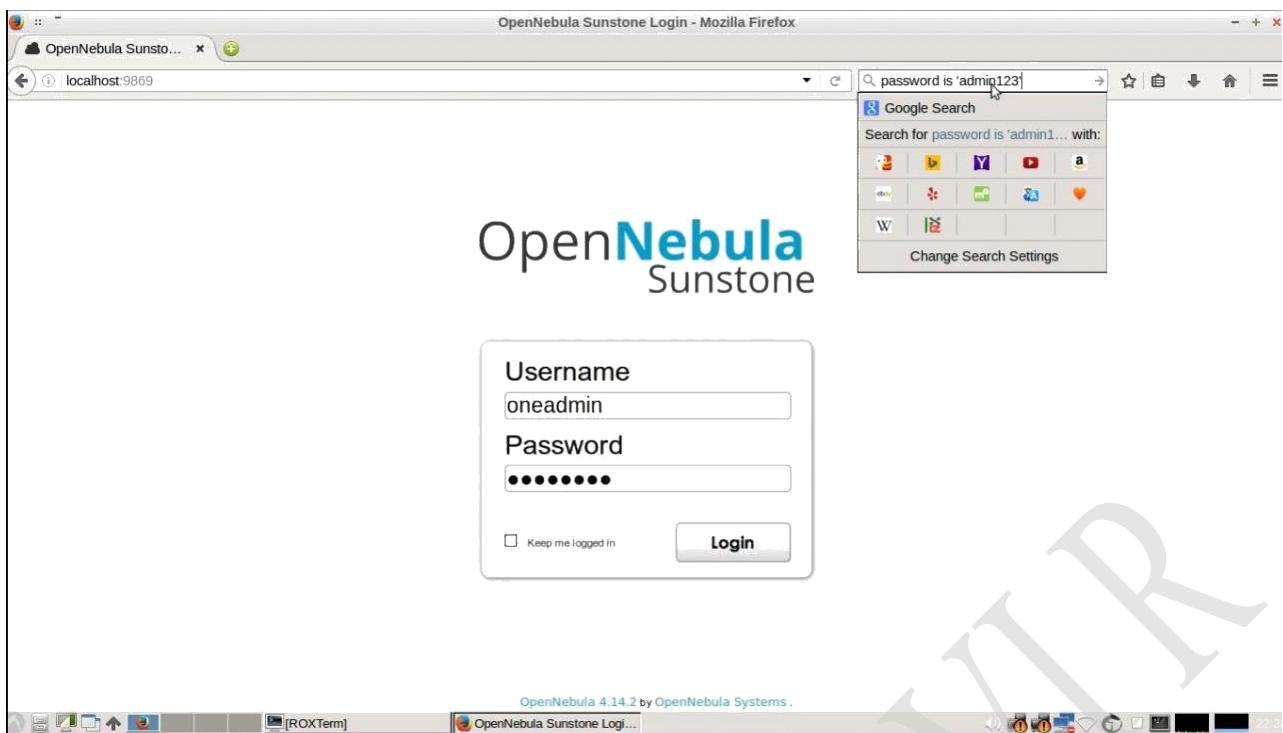
Command: \$ sudo bash

```
File Edit View Search Preferences Tabs Help  
jcclab@gcc-server:~$ sudo bash  
root@gcc-server:~#
```

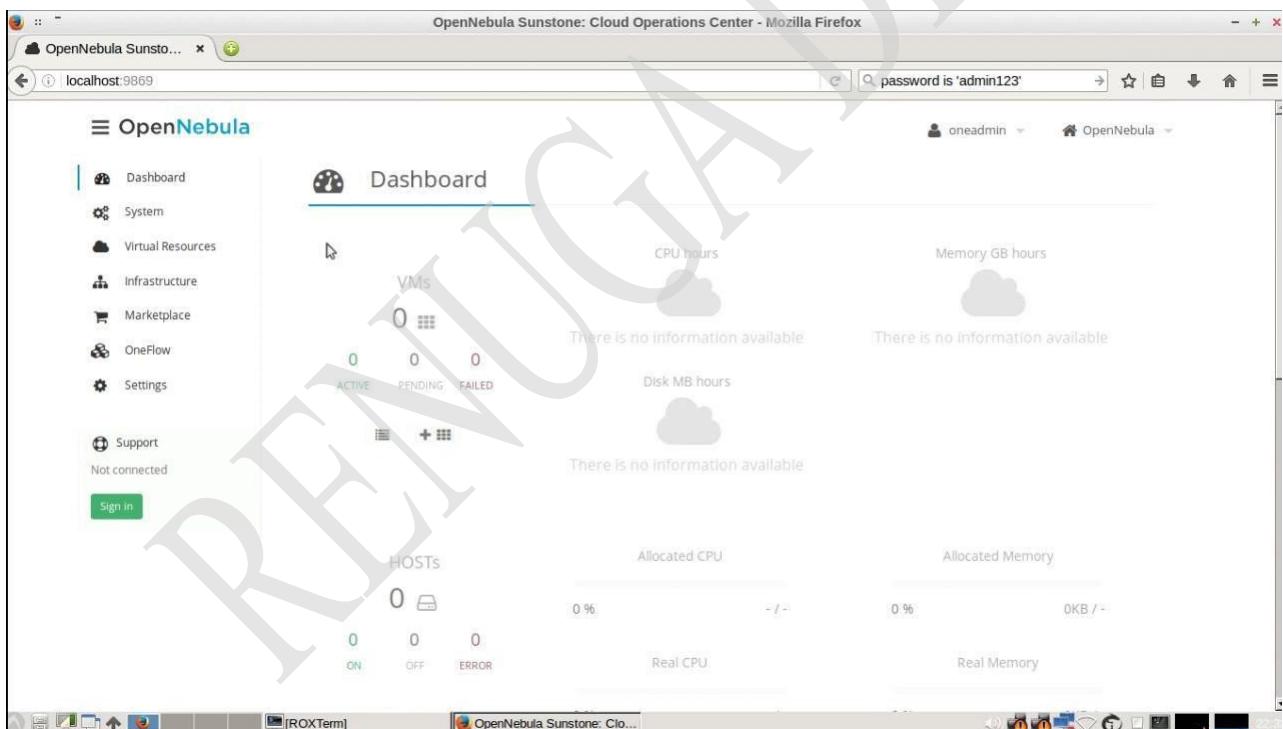
Step: 3 Open Web browser (Google Chrome/Mozilla Firefox/Opera...) and Login with open-nebula port number in url as localhost:9869 along with Username and Password



Step: 4 **Username: oneadmin**
 Password: admin123



Once, you logged in as oneadmin you will be redirected to open-nebula dashboard where you can find out the services which are available in the open-nebula.



Step: 5 To check the number of users which are available in the systems dashboard.

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The screenshot shows the 'Users' page of the OpenNebula Sunstone interface. On the left, a sidebar menu includes 'Dashboard', 'System' (with 'Users' selected), 'Groups', 'VDCs', 'ACLs', 'Virtual Resources', 'Infrastructure', 'Marketplace', 'OneFlow', 'Settings', 'Support' (not connected), and a 'Sign in' button. The main content area has a header 'Users' with a search bar and a '+' button. A table lists two users: 'serveradmin' (ID 1) and 'oneadmin' (ID 0). The table columns are ID, Name, Group, Auth driver, VMs, Memory, and CPU. Below the table, it says 'Showing 1 to 2 of 2 entries' and '2 TOTAL'. At the bottom right, it says 'OpenNebula 4.14.2 by OpenNebula Systems.' The browser address bar shows 'localhost:9869'.

Step: 6 To check the number of Groups which are available in the systems dashboard.

The screenshot shows the 'Groups' page of the OpenNebula Sunstone interface. The sidebar menu is identical to the previous screenshot. The main content area has a header 'Groups' with a search bar and a '+' button. A table lists two groups: 'users' (ID 1) and 'oneadmin' (ID 0). The table columns are ID, Name, Users, VMs, Memory, and CPU. Below the table, it says 'Showing 1 to 2 of 2 entries' and '2 TOTAL'. At the bottom right, it says 'OpenNebula 4.14.2 by OpenNebula Systems.' The browser address bar shows 'localhost:9869'.

Step: 7 To check the number of Virtual Data Centers which are available in the systems dashboard.

The screenshot shows the OpenNebula Sunstone interface in Mozilla Firefox. The URL is `localhost:9869`. The sidebar on the left has a 'System' section with 'VDCs' selected. The main area is titled 'Virtual Data Centers' and displays a table with one entry:

ID	Name	Groups	Clusters	Hosts	VNets	Datastores
0	default	1	All	0	0	0

Below the table, it says 'Showing 1 to 1 of 1 entries'. At the bottom right, there are buttons for 'Previous', '1', 'Next', and a dropdown for page size. A note at the bottom center says 'OpenNebula 4.14.2 by OpenNebula Systems.'.

Step: 8 To check the number of Access Control Lists which are available in the systems dashboard.

The screenshot shows the OpenNebula Sunstone interface in Mozilla Firefox. The URL is `localhost:9869`. The sidebar on the left has a 'System' section with 'ACLS' selected. The main area is titled 'Access Control Lists' and displays a table with four entries:

ID	Applies to	Affected resources	Resource ID / Owned by	Allowed operations	Zone
3	Group users	Virtual Networks, Datastores	All	use	0
2	Group user's	Hosts	All	manage	0
1	All	Zones	All	use	All
0	Group users	Virtual Machines, Images, VM Templates, Documents, Security Groups	All	create	All

Below the table, it says 'Showing 1 to 4 of 4 entries'. At the bottom right, there are buttons for 'Previous', '1', 'Next', and a dropdown for page size. A note at the bottom center says 'OpenNebula 4.14.2 by OpenNebula Systems.'.

Step: 9 To Check the number of templates which are available in the system dashboard

The screenshot shows the OpenNebula Sunstone interface in Mozilla Firefox. The URL is `localhost:9869`. The password field contains 'admin123'. The left sidebar has sections for Dashboard, System (Users, Groups, VDCs, ACLs), Virtual Resources (Virtual Machines, Templates, Images, Files & Kernels), Infrastructure, Marketplace, OneFlow, Settings, and Support. The Templates section is selected. The main area is titled 'Templates' and shows a table with columns: ID, Owner, Group, Name, and Registration time. A search bar and buttons for Update, Instantiate, and Clone are at the top of the table. A message says 'There is no data available'. The footer displays 'Showing 0 to 0 of 0 entries' and the OpenNebula version 'OpenNebula 4.14.2 by OpenNebula Systems.'

Step: 10 To check the number of Images which are available in the systems dashboard.

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OpenNebula Sunstone: Cloud Operations Center - Mozilla Firefox

localhost:9869 password is 'admin123' oneadmin OpenNebula

OpenNebula

Images

Dashboard System Virtual Resources Infrastructure Marketplace OneFlow Settings Support Not connected

Users Groups VDCs ACLs Templates Images Files & Kernels

ID Owner Group Name Datastore Type Status #VMS

Clone

There is no data available

Showing 0 to 0 of 0 entries Previous Next 10

OpenNebula 4.14.2 by OpenNebula Systems.

localhost:9869/# [ROXTerm] OpenNebula Sunstone: Clo... [22:3]

Step: 11 To check the number of Files and Kernels which are available in the systems dashboard.

OpenNebula Sunstone: Cloud Operations Center - Mozilla Firefox

localhost:9869 password is 'admin123' oneadmin OpenNebula

OpenNebula

Files & Kernels

Dashboard System Virtual Resources Infrastructure Marketplace OneFlow Settings Support Not connected

Users Groups VDCs ACLs Templates Images Files & Kernels

ID Owner Group Name Datastore Type Status

Clone

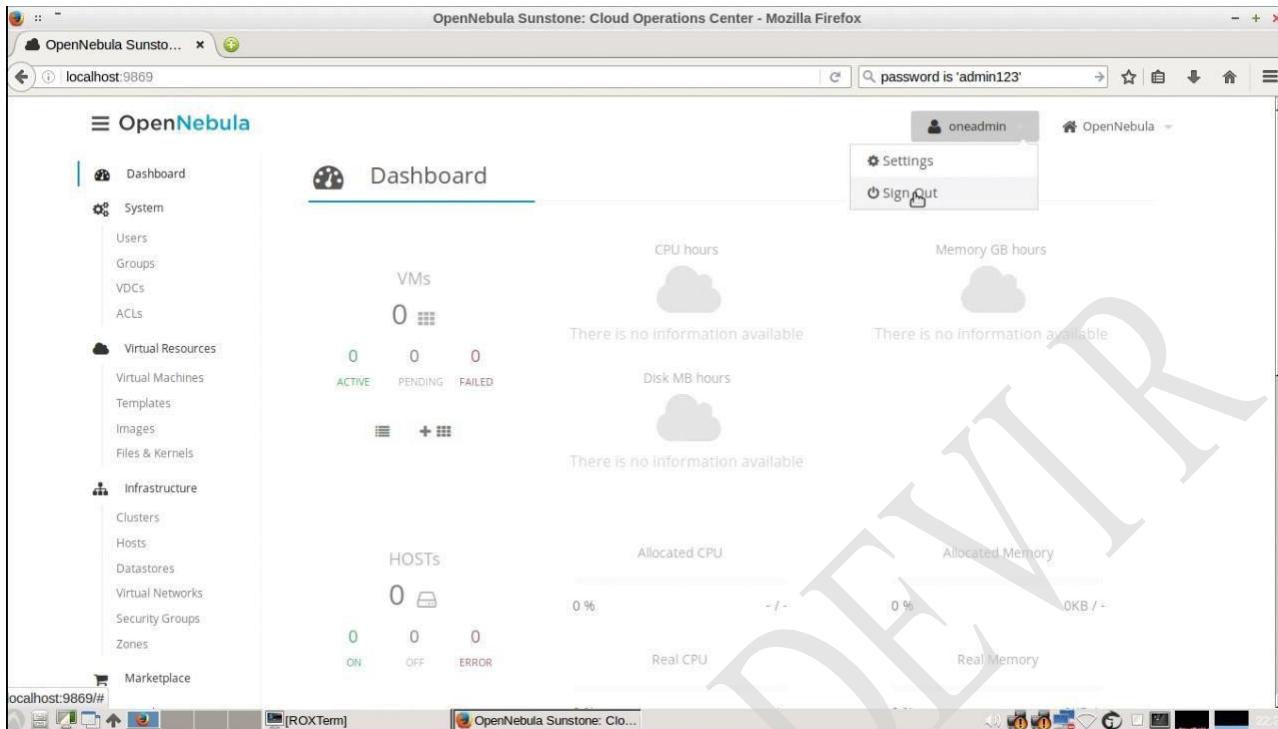
There is no data available

Showing 0 to 0 of 0 entries Previous Next 10

OpenNebula 4.14.2 by OpenNebula Systems.

localhost:9869/# [ROXTerm] OpenNebula Sunstone: Clo... [22:3]

Once, all the process done we need to sign out and stop all the services which are running in the open-nebula cloud services.



Result:

Thus, we have logged into Open-nebula dashboard successfully with the help of Open-nebula port number and we found what are all the hosts, virtual network, images, Templates, virtual machines, Groups and users which are created inside the open-nebula cloud service.

EXP 4 : Configuring Physical Network Interface (em1) as Bridge Interface (br0) in Local host as Opennebula node (Localhost) for creating a New Virtual Machine

AIM:

To configure Physical Network Interface (em1) as Bridge Interface (br0) in Local host as Open-nebula node (Local host) for creating a New Virtual Machine.

PROCEDURE:

Step: 1 To open Terminal:

Press Alt+Ctrl+T, Initially it will be in gcclab username. Then, We have to switch into root user

```
File Edit View Search Preferences Tabs Help
gcclab@gcc-server:~$ id
uid=0(root) gid=0(root) groups=0(root)
```

Step: 2 Command to switch from gcclab user to root user:

Command:\$ sudo bash

```
File Edit View Search Preferences Tabs Help  
gcclab@gcc-server:~$ sudo bash  
root@gcc-server:~#
```

Step: 3 To check whether which physical interface you are working with:

Command to check physical interface name: \$ ifconfig

```
File Edit View Search Preferences Tabs Help  
gcclab@gcc-server:~$ sudo bash  
root@gcc-server:~# ifconfig  
en1      Link encap:Ethernet HWaddr 38:60:77:8d:9b:76  
          UP BROADCAST MULTICAST MTU:1500 Metric:1  
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0  
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0  
          collisions:0 txqueuelen:1000  
          RX bytes:0 (0.0 B) TX bytes:0 (0.0 B)  
          Interrupt:28 Memory:fe400000-fe420000  
  
lo      Link encap:Local Loopback  
        inet addr:127.0.0.1 Mask:255.0.0.0  
        inet6 addr: ::1/128 Scope:Host  
          UP LOOPBACK RUNNING MTU:65536 Metric:1  
          RX packets:978 errors:0 dropped:0 overruns:0 frame:0  
          TX packets:978 errors:0 dropped:0 overruns:0 carrier:0  
          collisions:0 txqueuelen:0  
          RX bytes:76975 (76.9 KB) TX bytes:76975 (76.9 KB)  
  
virbr8  Link encap:Ethernet HWaddr 56:6b:13:3b:4e:1e  
        inet addr:192.168.122.1 Bcast:192.168.122.255 Mask:255.255.255.0  
          UP BROADCAST MULTICAST MTU:1500 Metric:1  
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0  
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0  
          collisions:0 txqueuelen:0  
          RX bytes:0 (0.0 B) TX bytes:0 (0.0 B)  
root@gcc-server:~#
```

Step: 4 Display the content of Network Interface and bridge configuration file

Command: \$ cat /etc/network/interfaces.d/bridge.cfg

```

File Edit View Search Preferences Tabs Help
RX packets:978 errors:0 dropped:0 overruns:0 frame:0
TX packets:978 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:0
RX bytes:76975 (76.9 KB) TX bytes:76975 (76.9 KB)

virbr0 Link encap:Ethernet HWaddr 56:6b:13:3b:4e:1e
inet addr:192.168.122.1 Bcast:192.168.122.255 Mask:255.255.255.0
UP BROADCAST MULTICAST MTU:1500 Metric:1
RX packets:0 errors:0 dropped:0 overruns:0 frame:0
TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:0
RX bytes:0 (0.0 B) TX bytes:0 (0.0 B)

root@gcc-server:~# echo "The name of the physical interface is 'em1'. This interface has to be configured as bridge in OpenNebula nodes connecting to the OpenNebula Frontend (Server)"
The name of the physical interface is 'em1'. This interface has to be configured as bridge in OpenNebula nodes connecting to the OpenNebula Frontend (Server)
root@gcc-server:~# cat /etc/network/interfaces.d/br0.cfg
#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 em1
    bridge_fd 9
    bridge_hello 2
    bridge_maxage 12
    bridge_stp off
root@gcc-server:~#

```

Step: 5 Appending a file from /etc/network/ interfaces.d/br0.cfg to /etc/network/interfaces

Command: \$ cat /etc/network/interfaces.d/br0.cfg >> /etc/network/interface

```

File Edit View Search Preferences Tabs Help
TX packets:978 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:0
RX bytes:76975 (76.9 KB) TX bytes:76975 (76.9 KB)

virbr0 Link encap:Ethernet HWaddr 56:6b:13:3b:4e:1e
inet addr:192.168.122.1 Bcast:192.168.122.255 Mask:255.255.255.0
UP BROADCAST MULTICAST MTU:1500 Metric:1
RX packets:0 errors:0 dropped:0 overruns:0 frame:0
TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:0
RX bytes:0 (0.0 B) TX bytes:0 (0.0 B)

root@gcc-server:~# echo "The name of the physical interface is 'em1'. This interface has to be configured as bridge in OpenNebula nodes connecting to the OpenNebula Frontend (Server)"
The name of the physical interface is 'em1'. This interface has to be configured as bridge in OpenNebula nodes connecting to the OpenNebula Frontend (Server)
root@gcc-server:~# cat /etc/network/interfaces.d/br0.cfg
#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 em1
    bridge_fd 9
    bridge_hello 2
    bridge_maxage 12
    bridge_stp off
root@gcc-server:~# /etc/network/interfaces.d/br0.cfg >> /etc/network/interfaces
root@gcc-server:~#

```

Step: 6 Edit network interfaces to Bridge interface with the following Static ip config.

Command: \$ nano /etc/network/interfaces

```
File Edit View Search Preferences Tabs Help
TX packets:978 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:0
RX bytes:76975 (76.9 KB) TX bytes:76975 (76.9 KB)

virbr0 Link encap:Ethernet HWaddr 56:6b:13:3b:4e:1e
inet addr:192.168.122.1 Bcast:192.168.122.255 Mask:255.255.255.0
UP BROADCAST MULTICAST MTU:1500 Metric:1
RX packets:0 errors:0 dropped:0 overruns:0 frame:0
TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:0
RX bytes:0 (0.0 B) TX bytes:0 (0.0 B)

root@gcc-server:~# echo "The name of the physical interface is 'em1'. This interface has to be configured as bridge in OpenNebula nodes connecting to the OpenNebula Frontend (Server)"
The name of the physical interface is 'em1'. This interface has to be configured as bridge in OpenNebula nodes connecting to the OpenNebula Frontend (Server)
root@gcc-server:~# cat /etc/network/interfaces.d/br0.cfg
#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 em1
    bridge_fd 9
    bridge_hello 2
    bridge_maxage 12
    bridge_stp off
root@gcc-server:~# cat /etc/network/interfaces.d/br0.cfg >> /etc/network/interfaces
root@gcc-server:~# nano /etc/network/interfaces
```

```
File Edit View Search Preferences Tabs Help
GNU nano 2.2.6          File: /etc/network/interfaces

# interfaces(5) file used by ifup(8) and ifdown(8)
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 em1
    bridge_fd 9
    bridge_hello 2
    bridge_maxage 12
    bridge_stp off

[ Read 15 lines ]
^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
```

Step:7 Before Setting up network interface as Bridge interface after editing bridge configuration in the network interfaces editor it shows as physical interface name as (em1) . To set up Bridge interface use ifup br0 command.

Command: \$ ifconfig

```
File Edit View Search Preferences Tabs Help
bridge_maxage 12
bridge_stp off
root@gcc-server:~# cat /etc/network/interfaces.d/br0.cfg >> /etc/network/interfaces
root@gcc-server:~# nano /etc/network/interfaces
root@gcc-server:~# ifconfig
em1      Link encap:Ethernet HWaddr 38:60:77:0d:9b:76
          UP BROADCAST MULTICAST MTU:1500 Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B) TX bytes:0 (0.0 B)
          Interrupt:20 Memory:fe400000-fe420000

lo      Link encap:Local Loopback
        inet addr:127.0.0.1 Mask:255.0.0.0
        inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING MTU:65536 Metric:1
          RX packets:1772 errors:0 dropped:0 overruns:0 frame:0
          TX packets:1772 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:143171 (143.1 KB) TX bytes:143171 (143.1 KB)

virbr0   Link encap:Ethernet HWaddr 56:6b:13:3b:4e:1e
         inet addr:192.168.122.1 Bcast:192.168.122.255 Mask:255.255.255.0
           UP BROADCAST MULTICAST MTU:1500 Metric:1
           RX packets:0 errors:0 dropped:0 overruns:0 frame:0
           TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
           collisions:0 txqueuelen:0
           RX bytes:0 (0.0 B) TX bytes:0 (0.0 B)

root@gcc-server:~#
```

Command: \$ ifup br0

```

File Edit View Search Preferences Tabs Help
root@gcc-server:~# nano /etc/network/interfaces
root@gcc-server:~# ifconfig
em1      Link encap:Ethernet HWaddr 38:60:77:0d:9b:76
          UP BROADCAST MULTICAST MTU:1500 Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B) TX bytes:0 (0.0 B)
          Interrupt:20 Memory:fe400000-fe420000

lo      Link encap:Local Loopback
        inet addr:127.0.0.1 Mask:255.0.0.0
        inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING MTU:65536 Metric:1
          RX packets:1772 errors:0 dropped:0 overruns:0 frame:0
          TX packets:1772 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:143171 (143.1 KB) TX bytes:143171 (143.1 KB)

virbr0   Link encap:Ethernet HWaddr 56:6b:13:3b:4e:1e
          inet addr:192.168.122.1 Bcast:192.168.122.255 Mask:255.255.255.0
          UP BROADCAST MULTICAST MTU:1500 Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B) TX bytes:0 (0.0 B)

root@gcc-server:~# ifup br0
Waiting for br0 to get ready (MAXWAIT is 20 seconds).

```

**Check again whether it has converted from physical to Bridge interface using ifconfig.
It shows with Bridge interface name as (br0)**

```

File Edit View Search Preferences Tabs Help
root@gcc-server:~# ifup br0
Waiting for br0 to get ready (MAXWAIT is 20 seconds).
root@gcc-server:~# ifconfig
br0      Link encap:Ethernet HWaddr 38:60:77:0d:9b:76
          inet addr:192.168.0.10 Bcast:192.168.0.255 Mask:255.255.255.0
          UP BROADCAST MULTICAST MTU:1500 Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B) TX bytes:0 (0.0 B)

em1      Link encap:Ethernet HWaddr 38:60:77:0d:9b:76
          UP BROADCAST MULTICAST MTU:1500 Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B) TX bytes:0 (0.0 B)
          Interrupt:20 Memory:fe400000-fe420000

lo      Link encap:Local Loopback
        inet addr:127.0.0.1 Mask:255.0.0.0
        inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING MTU:65536 Metric:1
          RX packets:2148 errors:0 dropped:0 overruns:0 frame:0
          TX packets:2148 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:171974 (171.9 KB) TX bytes:171974 (171.9 KB)

virbr0   Link encap:Ethernet HWaddr 56:6b:13:3b:4e:1e

```

Result:

Thus, the physical interface (em1) is configured as bridge interface (br0). In all opennebula nodes the physical network interface have configured as Bridge interface (br0) before adding as nodes

to the opennebula from the frontend(server).

EXP 5: Creating Host and Managing Open-nebula using Command Line Interface(CLI) as oneadmin users and also through OpenNebula- sunstone Web Interface

AIM:

To Create Host and Managing Open-nebula using Command Line Interface (CLI) as oneadmin users and also through OpenNebula- sunstone Web Interface.

PROCEDURE:

Step: 1 To open Terminal:

Press Alt+Ctrl+T, Initially it will be in gcclab username. Then, We have to switch into root user

```
File Edit View Search Preferences Tabs Help  
gcclab@gcc-server:~$
```

Step: 2 Command to switch from gcclab user to root user:

Command: \$ sudo bash

```
File Edit View Search Preferences Tabs Help  
gcclab@gcc-server:~$ sudo bash  
root@gcc-server:~#
```

Step: 3 Login as one-admin

Command: \$ su – oneadmin

```
File Edit View Search Preferences Tabs Help  
gcclab@gcc-server:~$ sudo bash  
root@gcc-server:~# su - oneadmin  
oneadmin@gcc-server:~$
```

Step: 4 To check Open Nebula home directory

Command: \$ pwd

```
File Edit View Search Preferences Tabs Help  
gcclab@gcc-server:~$ sudo bash  
root@gcc-server:~# su - oneadmin  
oneadmin@gcc-server:~$ pwd  
/var/lib/one  
oneadmin@gcc-server:~$ |
```

RENUGADEVIR

Step: 5 To check the host list in oneadmin

Command: \$ onehost list

```

File Edit View Search Preferences Tabs Help
gcclab@gcc-server:~$ sudo bash
root@gcc-server:~# su - oneadmin
oneadmin@gcc-server:~$ pwd
/var/lib/one
oneadmin@gcc-server:~$ echo "The 'home' directory of the user 'oneadmin' is /var/lib/one"
The 'home' directory of the user 'oneadmin' is /var/lib/one
oneadmin@gcc-server:~$ onehost list
  ID NAME      CLUSTER   RVM     ALLOCATED_CPU     ALLOCATED_MEM STAT
oneadmin@gcc-server:~$ |

```

Step: 6 To check the virtual network list in oneadmin

Command: \$ onevnet list

```

File Edit View Search Preferences Tabs Help
gcclab@gcc-server:~$ sudo bash
root@gcc-server:~# su - oneadmin
oneadmin@gcc-server:~$ pwd
/var/lib/one
oneadmin@gcc-server:~$ echo "The 'home' directory of the user 'oneadmin' is /var/lib/one"
The 'home' directory of the user 'oneadmin' is /var/lib/one
oneadmin@gcc-server:~$ onehost list
  ID NAME      CLUSTER   RVM     ALLOCATED_CPU     ALLOCATED_MEM STAT
oneadmin@gcc-server:~$ onevnet list
  ID USER      GROUP      NAME      CLUSTER      BRIDGE      LEASES
oneadmin@gcc-server:~$ |

```

Step: 7 To check the image list in oneadmin

Command: \$ oneimage list

```

File Edit View Search Preferences Tabs Help
gcclab@gcc-server:~$ sudo bash
root@gcc-server:~# su - oneadmin
oneadmin@gcc-server:~$ pwd
/var/lib/one
oneadmin@gcc-server:~$ echo "The 'home' directory of the user 'oneadmin' is /var/lib/one"
The 'home' directory of the user 'oneadmin' is /var/lib/one
oneadmin@gcc-server:~$ onehost list
  ID NAME      CLUSTER   RVM     ALLOCATED_CPU     ALLOCATED_MEM STAT
oneadmin@gcc-server:~$ onevnet list
  ID USER      GROUP      NAME      CLUSTER      BRIDGE      LEASES
oneadmin@gcc-server:~$ oneimage list|

```

Step: 8 To check the template list in oneadmin

Command: \$ onetemplate list

```

File Edit View Preferences Tabs Help
gcclab@gcc-server:~$ sudo bash
root@gcc-server:~# su - oneadmin
oneadmin@gcc-server:~$ pwd
/var/lib/one
oneadmin@gcc-server:~$ echo "The 'home' directory of the user 'oneadmin' is /var/lib/one"
The 'home' directory of the user 'oneadmin' is /var/lib/one
oneadmin@gcc-server:~$ onehost list
  ID NAME      CLUSTER   RVM      ALLOCATED_CPU      ALLOCATED_MEM STAT
oneadmin@gcc-server:~$ onevnet list
  ID USER      GROUP      NAME      CLUSTER      BRIDGE      LEASES
oneadmin@gcc-server:~$ oneimage list
  ID USER      GROUP      NAME      DATASTORE      SIZE TYPE PER STAT RVMS
oneadmin@gcc-server:~$ onetemplate list
  ID USER      GROUP      NAME      REGTIME

```

Step: 9 To check the vm list in oneadmin

Command:\$ onevm list

```

File Edit View Preferences Tabs Help
gcclab@gcc-server:~$ sudo bash
root@gcc-server:~# su - oneadmin
oneadmin@gcc-server:~$ pwd
/var/lib/one
oneadmin@gcc-server:~$ echo "The 'home' directory of the user 'oneadmin' is /var/lib/one"
The 'home' directory of the user 'oneadmin' is /var/lib/one
oneadmin@gcc-server:~$ onehost list
  ID NAME      CLUSTER   RVM      ALLOCATED_CPU      ALLOCATED_MEM STAT
oneadmin@gcc-server:~$ onevnet list
  ID USER      GROUP      NAME      CLUSTER      BRIDGE      LEASES
oneadmin@gcc-server:~$ oneimage list
  ID USER      GROUP      NAME      DATASTORE      SIZE TYPE PER STAT RVMS
oneadmin@gcc-server:~$ onetemplate list
  ID USER      GROUP      NAME      REGTIME
oneadmin@gcc-server:~$ onevm list
  ID USER      GROUP      NAME      STAT UCPU      UMEM HOST      TIME
oneadmin@gcc-server:~$ 

```

Step: 10 To check the user list in oneadmin

Command: \$ oneuser list

```
File Edit View Preferences Tabs Help
gcclab@gcc-server:~$ sudo bash
root@gcc-server:~# su - oneadmin
oneadmin@gcc-server:~$ pwd
/var/lib/one
oneadmin@gcc-server:~$ echo "The 'home' directory of the user 'oneadmin' is /var/lib/one"
The 'home' directory of the user 'oneadmin' is /var/lib/one
oneadmin@gcc-server:~$ onehost list
  ID NAME      CLUSTER   RVM      ALLOCATED_CPU      ALLOCATED_MEM_STAT
oneadmin@gcc-server:~$ onevnet list
  ID USER      GROUP      NAME      CLUSTER      BRIDGE      LEASES
oneadmin@gcc-server:~$ oneimage list
  ID USER      GROUP      NAME      DATASTORE      SIZE      TYPE      PER_STAT      RVMS
oneadmin@gcc-server:~$ onetemplate list
  ID USER      GROUP      NAME      REGTIME
oneadmin@gcc-server:~$ onevmlist
  ID USER      GROUP      NAME      STAT      UCPU      UMEM      HOST      TIME
oneadmin@gcc-server:~$ oneuser list
  ID NAME      GROUP      AUTH      VMS      MEMORY      CPU
  0 oneadmin    oneadmin    core      -      -      -
  1 serveradmin oneadmin    server_c  0 /      -      0M /      -      0.0 /      -
oneadmin@gcc-server:~$ |
```

Step: 11 To check the Group list in oneadmin

Command: \$ onegroup list

```

File Edit View Search Preferences Tabs Help
ccclab@gcc-server:~$ sudo bash
root@gcc-server:~# su - oneadmin
oneadmin@gcc-server:~$ pwd
/var/lib/one
oneadmin@gcc-server:~$ echo "The 'home' directory of the user 'oneadmin' is /var/lib/one"
The 'home' directory of the user 'oneadmin' is /var/lib/one
oneadmin@gcc-server:~$ onehost list


| ID | NAME      | CLUSTER | RVM | ALLOCATED_CPU | ALLOCATED_MEM | STAT |
|----|-----------|---------|-----|---------------|---------------|------|
| 0  | localhost | -       | 0   | -             | -             | init |


oneadmin@gcc-server:~$ onevnet list


| ID | USER     | GROUP    | NAME      | CLUSTER | BRIDGE | LEASES |
|----|----------|----------|-----------|---------|--------|--------|
| 0  | oneadmin | oneadmin | localhost | -       | -      | -      |


oneadmin@gcc-server:~$ oneimage list


| ID | USER     | GROUP    | NAME      | DATASTORE | SIZE | TYPE | PER_STAT | RVMS |
|----|----------|----------|-----------|-----------|------|------|----------|------|
| 0  | oneadmin | oneadmin | localhost | -         | -    | -    | -        | -    |


oneadmin@gcc-server:~$ onetemplate list


| ID | USER     | GROUP    | NAME      | REGTIME |
|----|----------|----------|-----------|---------|
| 0  | oneadmin | oneadmin | localhost | -       |


oneadmin@gcc-server:~$ onevm list


| ID | USER     | GROUP    | NAME      | STAT | UCPU | UMEM | HOST | TIME |
|----|----------|----------|-----------|------|------|------|------|------|
| 0  | oneadmin | oneadmin | localhost | -    | -    | -    | -    | -    |


oneadmin@gcc-server:~$ oneuser list


| ID | NAME        | GROUP    | AUTH     | VMS   | MEMORY | CPU     |
|----|-------------|----------|----------|-------|--------|---------|
| 0  | oneadmin    | oneadmin | core     | -     | -      | -       |
| 1  | serveradmin | oneadmin | server_c | 0 / - | 0M / - | 0.0 / - |


oneadmin@gcc-server:~$ onegroup list


| ID | NAME     | USERS | VMS   | MEMORY | CPU     |
|----|----------|-------|-------|--------|---------|
| 0  | oneadmin | 2     | -     | -      | -       |
| 1  | users    | 0     | 0 / - | 0M / - | 0.0 / - |


oneadmin@gcc-server:~$
```

Step: 12 To Create onehost List

Command: \$ onehost create localhost -i kvm -v kvm -n dummy

```

File Edit View Search Preferences Tabs Help
oneadmin@gcc-server:~$ echo "Currently there are no Nodes available. Let's add 'localhost' as node"
Currently there are no Nodes available. Let's add 'localhost' as node
oneadmin@gcc-server:~$ onehost create localhost -i kvm -v kvm -n dummy
ID: 0
oneadmin@gcc-server:~$
```

After creating local host you can check whether host has been created or not with the help of following command.

Command: \$ onehost list

```

File Edit View Search Preferences Tabs Help
oneadmin@gcc-server:~$ echo "Currently there are no Nodes available. Let's add 'localhost' as node"
Currently there are no Nodes available. Let's add 'localhost' as node
oneadmin@gcc-server:~$ onehost create localhost -i kvm -v kvm -n dummy
ID: 0
oneadmin@gcc-server:~$ onehost list


| ID | NAME      | CLUSTER | RVM | ALLOCATED_CPU | ALLOCATED_MEM | STAT |
|----|-----------|---------|-----|---------------|---------------|------|
| 0  | localhost | -       | 0   | -             | -             | init |


oneadmin@gcc-server:~$
```

Login into Open-nebula Dashboard with the following id:

Type in URL: Bridge Interface id: Open nebula port number (192.168.0.10:9869)

The image shows two screenshots of the OpenNebula Sunstone interface. The top screenshot is the 'OpenNebula Sunstone Login - Mozilla Firefox' window, showing a login form with 'Username' set to 'oneadmin' and 'Password' masked. The bottom screenshot is the 'OpenNebula Sunstone: Cloud Operations Center - Mozilla Firefox' window, showing the 'Dashboard' with various resource statistics and a sidebar menu.

OpenNebula Sunstone Login - Mozilla Firefox

OpenNebula Sunstone Login - Mozilla Firefox
192.168.0.10:9869
password is 'admin123'

OpenNebula Sunstone

Username: oneadmin
Password: Keep me logged in

OpenNebula Sunstone: Cloud Operations Center - Mozilla Firefox

OpenNebula Sunstone: Cloud Operations Center - Mozilla Firefox
192.168.0.10:9869
password is 'admin123'

OpenNebula

Dashboard

VMs: 0
HOSTS: 0
CPU hours: 0 %
Allocated CPU: 0 % / -
Real CPU: 0 % / -
Memory GB hours: 0 KB / -
Allocated Memory: 0 KB / -
Real Memory: 0 KB / -

Infrastructure

- Clusters
- Hosts
- Datastores
- Virtual Networks
- Security Groups
- Zones
- Marketplace
- OneFlow
- Settings

Virtual Resources

- Virtual Machines
- Templates
- Images
- Files & Kernels

System

Dashboard

There is no information available.

192.168.0.10:9869/# port

OpenNebula Sunstone: Cloud Operations Center - Mozilla Firefox ROXTerm

OpenNebula Sunstone: Cloud Operations Center - Mozilla Firefox

OpenNebula Sunstone... 192.168.0.10:9869 password is 'admin123'

OpenNebula

Hosts

Dashboard System Virtual Resources Infrastructure Marketplace OneFlow Settings

Hosts Datastores Virtual Networks Security Groups Zones

Clusters Hosts

Virtual Machines Templates Images Files & Kernels

Showing 1 to 1 of 1 entries

ID	Name	Cluster	RVMs	Allocated CPU	Allocated MEM	Status
0	localhost	-	0	0 / 400 (0%)	0KB / 7.7GB (0%)	ON

1 TOTAL 1 ON 0 OFF 0 ERROR

OpenNebula 4.14.2 by OpenNebula Systems.

192.168.0.10:9869/# iport

OpenNebula Sunstone: Cloud Operations Center - Mozilla Firefox

OpenNebula Sunstone... 192.168.0.10:9869 password is 'admin123'

OpenNebula

Hosts

Dashboard System Virtual Resources Infrastructure Marketplace OneFlow Settings

Hosts Datastores Virtual Networks Security Groups Zones

Clusters Hosts

Virtual Machines Templates Images Files & Kernels

Showing 1 to 1 of 1 entries

ID	Name	Cluster	RVMs	Allocated CPU	Allocated MEM	Status
0	localhost	-	0	0 / 400 (0%)	0KB / 7.7GB (0%)	ON

1 TOTAL 1 ON 0 OFF 0 ERROR

OpenNebula 4.14.2 by OpenNebula Systems.

OpenNebula Sunstone: Cloud Operations Center - Mozilla Firefox

OpenNebula Sunstone... 192.168.0.10:9869 password is 'admin123'

OpenNebula

Hosts

Dashboard System Virtual Resources Infrastructure Marketplace OneFlow Settings

Hosts Datastores Virtual Networks Security Groups Zones

Clusters Hosts

Virtual Machines Templates Images Files & Kernels

Showing 1 to 1 of 1 entries

ID	Name	Cluster	RVMs	Allocated CPU	Allocated MEM	Status
0	localhost	-	0	0 / 400 (0%)	0KB / 7.7GB (0%)	ON

1 TOTAL 1 ON 0 OFF 0 ERROR

OpenNebula 4.14.2 by OpenNebula Systems.

Result:

Thus, the host has been created successfully and Managing Open-nebula using Command Line Interface (CLI) as oneadmin users and also through OpenNebula- sunstone Web Interface.

EXP 6 : Creating Virtual Network using “onevnet” command with the help of “mynetwork.one” text file

AIM:

To Create Virtual Network using “onevnet” command with the help of “mynetwork.one” text file.

PROCEDURE:

Step: 1 To open Terminal:

Press Alt+Ctrl+T, Initially it will be in gcclab username. Then, we have to switch into root user

```
File Edit View Search Preferences Tabs Help  
gcclab@gcc-server:~$
```

Step: 2 Command to Switch from gcclab user to root user:

Command: \$ sudo bash

```
File Edit View Search Preferences Tabs Help  
gcclab@gcc-server:~$ sudo bash  
root@gcc-server:~#
```

Step: 3 Login as one-admin

Command: \$ su – oneadmin

```
File Edit View Search Preferences Tabs Help  
gcclab@gcc-server:~$ sudo bash  
root@gcc-server:~# su - oneadmin  
oneadmin@gcc-server:~$
```

Step: 4 To check Open Nebula home directory

Command: \$ pwd

```

File Edit View Search Preferences Tabs Help ROXTerm
oneadmin@gcc-server:~$ onegroup list
  ID NAME          USERS      VMS      MEMORY      CPU
  0 oneadmin        2          -          -          -
  1 users           0          0 /       0M /       - 0.0 /
oneadmin@gcc-server:~$ clear
oneadmin@gcc-server:~$ echo "Currently there are no Nodes available. Let's add 'localhost' as node"
Currently there are no Nodes available. Let's add 'localhost' as node
oneadmin@gcc-server:~$ onehost create localhost -i kvm -v kvm -n dummy
ID: 0
oneadmin@gcc-server:~$ onehost list
  ID NAME      CLUSTER      RVM      ALLOCATED_CPU      ALLOCATED_MEM_STAT
  0 localhost      -          0          -          - init
oneadmin@gcc-server:~$ onehost list
  ID NAME      CLUSTER      RVM      ALLOCATED_CPU      ALLOCATED_MEM_STAT
  0 localhost      -          0          0 / 400 (0%)  OK / 7.7G (0%) on
oneadmin@gcc-server:~$ echo "The 'localhost' is added as a node, and is active now"
The 'localhost' is added as a node, and is active now
oneadmin@gcc-server:~$ echo "In the next step, we will add 'Virtual Network'"
In the next step, we will add 'Virtual Network'
oneadmin@gcc-server:~$ pwd
/var/lib/one
oneadmin@gcc-server:~$
```

Step: 5 To check the list of files in length in oneadmin

Command: \$ ls -l

```

File Edit View Search Preferences Tabs Help ROXTerm
oneadmin@gcc-server:~$ clear
oneadmin@gcc-server:~$ echo "Currently there are no Nodes available. Let's add 'localhost' as node"
Currently there are no Nodes available. Let's add 'localhost' as node
oneadmin@gcc-server:~$ onehost create localhost -i kvm -v kvm -n dummy
ID: 0
oneadmin@gcc-server:~$ onehost list
  ID NAME      CLUSTER      RVM      ALLOCATED_CPU      ALLOCATED_MEM_STAT
  0 localhost      -          0          -          - init
oneadmin@gcc-server:~$ onehost list
  ID NAME      CLUSTER      RVM      ALLOCATED_CPU      ALLOCATED_MEM_STAT
  0 localhost      -          0          0 / 400 (0%)  OK / 7.7G (0%) on
oneadmin@gcc-server:~$ echo "The 'localhost' is added as a node, and is active now"
The 'localhost' is added as a node, and is active now
oneadmin@gcc-server:~$ echo "In the next step, we will add 'Virtual Network'"
In the next step, we will add 'Virtual Network'
oneadmin@gcc-server:~$ pwd
/var/lib/one
oneadmin@gcc-server:~$ ls -l
total 448
-rw-rw-r-- 1 oneadmin oneadmin 3339 Jun 26 23:40 config
drwxr-xr-x 5 oneadmin oneadmin 4096 Jun 26 22:23 datastores
-rw-r--r-- 1 dovenull nova    93 May 28 16:07 mynetwork.one
-rw-r--r-- 1 oneadmin oneadmin 427008 Jun 27 00:21 one.db
drwxr-xr-x 9 oneadmin oneadmin 4096 Jun 14 01:55 remotes
drwxrwxr-x 2 oneadmin oneadmin 4096 Jun 14 16:52 sunstone_vnc_tokens
drwxr-xr-x 2 oneadmin oneadmin 4096 Nov 26 2015 vms
oneadmin@gcc-server:~$
```

Step: 6 To display “mynetwork.one” text file oneadmin

Command: \$ cat mynetwork.one

```

File Edit View Search Preferences Tabs Help
ROXTerm
ID NAME CLUSTER RVM ALLOCATED CPU ALLOCATED MEM STAT
0 localhost - 0 0 / 400 (0%) OK / 7.7G (0%) on
oneadmin@gcc-server:~$ echo "The 'localhost' is added as a node, and is active now"
The 'localhost' is added as a node, and is active now
oneadmin@gcc-server:~$ echo "In the next step, we will add 'Virtual Network'"
In the next step, we will add 'Virtual Network'
oneadmin@gcc-server:~$ pwd
/var/lib/one
oneadmin@gcc-server:~$ ls -l
total 448
-rw-r--r-- 1 oneadmin oneadmin 3339 Jun 26 23:40 config
drwxr-xr-x 5 oneadmin oneadmin 4096 Jun 26 22:23 datastores
-rw-r--r-- 1 dovenull nova 93 May 28 16:07 mynetwork.one
-rw-r--r-- 1 oneadmin oneadmin 427008 Jun 27 00:21 one.db
drwxr-xr-x 9 oneadmin oneadmin 4096 Jun 14 01:55 remotes
drwxrwxr-x 2 oneadmin oneadmin 4096 Jun 14 16:52 sunstone_vnc_tokens
drwxr-xr-x 2 oneadmin oneadmin 4096 Nov 26 2015 vms
oneadmin@gcc-server:~$ cat mynetwork.one
NAME = "private"

BRIDGE = br0

AR = [
    TYPE = IP4,
    IP = 192.168.0.100,
    SIZE = 100
]

oneadmin@gcc-server:~$ |

```

You will be finding the size as 100. Hence, we can lease up to 100 ips. The starting ip is 192.168.0.100, actually the size is 100. So, we can lease ips upto 192.168.0.199.

Step: 7 To check the vnet list in oneadmin

Command: \$ onevnet list

```

total 448
-rw-rw-r-- 1 oneadmin oneadmin 3339 Jun 26 23:40 config
drwxr-xr-x 5 oneadmin oneadmin 4096 Jun 26 22:23 datastores
-rw-r--r-- 1 dovenull nova 93 May 28 16:07 mynetwork.one
-rw-r--r-- 1 oneadmin oneadmin 427008 Jun 27 00:21 one.db
drwxr-xr-x 9 oneadmin oneadmin 4096 Jun 14 01:55 remotes
drwxrwxr-x 2 oneadmin oneadmin 4096 Jun 14 16:52 sunstone_vnc_tokens
drwxr-xr-x 2 oneadmin oneadmin 4096 Nov 26 2015 vms
oneadmin@gcc-server:~$ cat mynetwork.one
NAME = "private"

BRIDGE = br0

NR = [
    TYPE = IP4,
    IP = 192.168.0.100,
    SIZE = 100
]

oneadmin@gcc-server:~$ echo "The file 'mynetwork.one' is being used for creating virtual network for use by Virtual Machine inside opennebula. The starting IP is 192.168.0.100 and size of the lease is 100. Hence, it can lease upto 100 IPs for the Virtual Machines, i.e. upto 192.168.0.199"
The file 'mynetwork.one' is being used for creating virtual network for use by Virtual Machines inside opennebula. The starting IP is 192.168.0.100 and size of the lease is 100. Hence, it can lease upto 100 IPs for the Virtual Machines, i.e. upto 192.168.0.199
oneadmin@gcc-server:~$ onevnet list
  ID  USER      GROUP      NAME      CLUSTER      BRIDGE      LEASES
oneadmin@gcc-server:~$ |

```

Step: 8 To create onevnet in oneadmin

Command: \$ onevnet create mynetwork.one

```

drwxr-xr-x 5 oneadmin oneadmin 4096 Jun 26 22:23 datastores
-rw-r--r-- 1 dovenull nova 93 May 28 16:07 mynetwork.one
-rw-r--r-- 1 oneadmin oneadmin 427008 Jun 27 00:21 one.db
drwxr-xr-x 9 oneadmin oneadmin 4096 Jun 14 01:55 remotes
drwxrwxr-x 2 oneadmin oneadmin 4096 Jun 14 16:52 sunstone_vnc_tokens
drwxr-xr-x 2 oneadmin oneadmin 4096 Nov 26 2015 vms
oneadmin@gcc-server:~$ cat mynetwork.one
NAME = "private"

BRIDGE = br0

NR = [
    TYPE = IP4,
    IP = 192.168.0.100,
    SIZE = 100
]

oneadmin@gcc-server:~$ echo "The file 'mynetwork.one' is being used for creating virtual network for use by Virtual Machine inside opennebula. The starting IP is 192.168.0.100 and size of the lease is 100. Hence, it can lease upto 100 IPs for the Virtual Machines, i.e. upto 192.168.0.199"
The file 'mynetwork.one' is being used for creating virtual network for use by Virtual Machines inside opennebula. The starting IP is 192.168.0.100 and size of the lease is 100. Hence, it can lease upto 100 IPs for the Virtual Machines, i.e. upto 192.168.0.199
oneadmin@gcc-server:~$ onevnet list
  ID  USER      GROUP      NAME      CLUSTER      BRIDGE      LEASES
oneadmin@gcc-server:~$ onevnet create mynetwork.one
ID: 0
oneadmin@gcc-server:~$ |

```

After creation of onevnet you can list out and check whether vnet has been created or not with the help of “\$ onevnet list” command

Step: 9 To get information about onevnet using “onevnet show id” command R.

Command: \$ onevnet show 0

```
File Edit View Search Preferences Tabs Help
oneadmin@gcc-server:~$ onevnet create mynetwork.one
ID: 0
oneadmin@gcc-server:~$ onevnet list
  ID USER      GROUP      NAME      CLUSTER      BRIDGE      LEASES
  0 oneadmin    oneadmin    private    -           br0          0
oneadmin@gcc-server:~$ onevnet show 0
VIRTUAL NETWORK 0 INFORMATION
ID : 0
NAME : private
USER : oneadmin
GROUP : oneadmin
CLUSTER : -
BRIDGE : br0
VLAN : No
USED LEASES : 0

PERMISSIONS
OWNER : um-
GROUP : ---
OTHER : ---

VIRTUAL NETWORK TEMPLATE
BRIDGE="br0"
PHYDEV=""
SECURITY_GROUPS="0"
VLAN="No"
VLAN_ID=""

ADDRESS RANGE POOL
[Icons] OpenNebula Sunstone: Clo... ROXTerm [Icons]
```

Result:

Thus, the virtual network has been created successfully with the help of “mynetwork.one” text file.

EXP 7 : Creating Virtual Disk Image in CentOS 6.5 using “oneimage” command

AIM:

To Create Virtual Network using “onevnet” command with the help of “mynetwork.one” text file .

PROCEDURE:

Step: 1 To open Terminal:

Press Alt+Ctrl+T, Initially it will be in gcclab username. Then, We have to switch into root user

```
File Edit View Search Preferences Tabs Help
gcclab@gcc-server:~$
```

Step:2 Command to Switch from gcclab user to root user:

Command:\$ sudo bash

```
File Edit View Search Preferences Tabs Help  
gcclab@gcc-server:~$ sudo bash  
root@gcc-server:~#
```

Step: 3 Login as one-admin

Command: \$ su – oneadmin

```
File Edit View Search Preferences Tabs Help  
gcclab@gcc-server:~$ sudo bash  
root@gcc-server:~# su - oneadmin  
oneadmin@gcc-server:~$
```

Step: 4 To check the image list in oneadmin

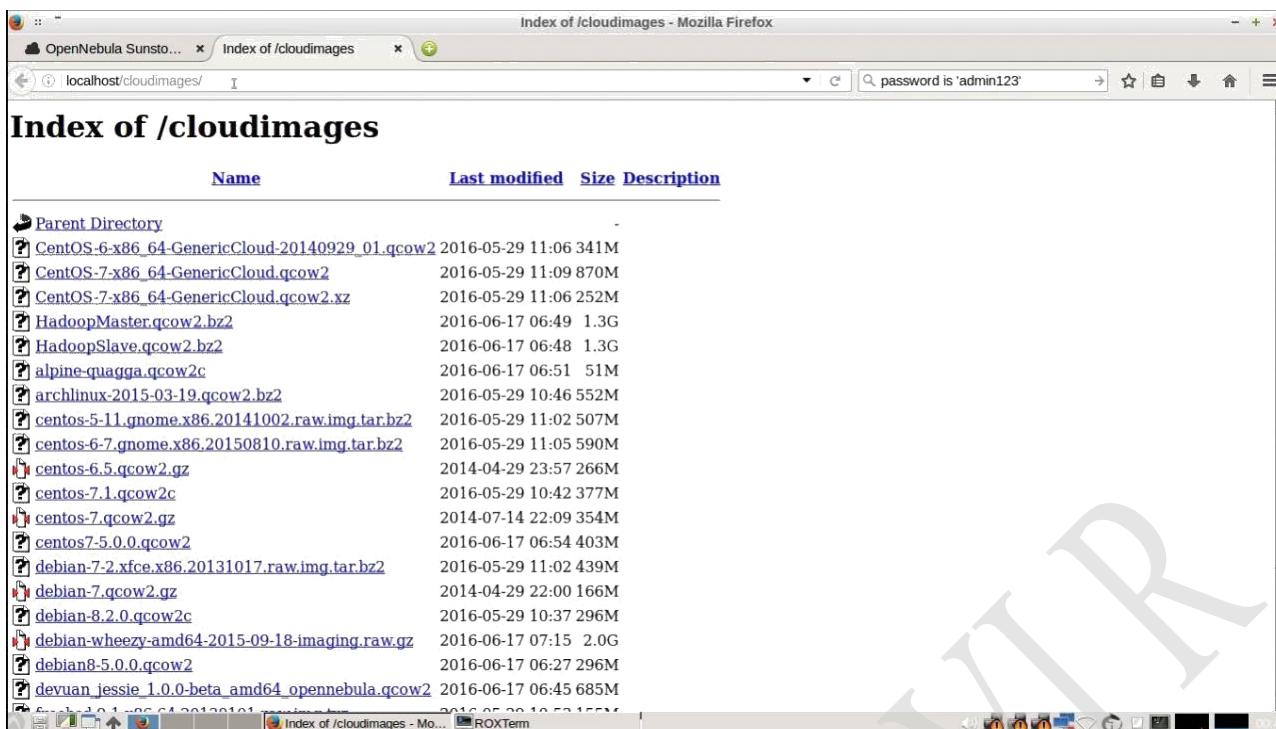
Command: \$ oneimage list

```
ROXTerm  
File Edit View Search Preferences Tabs Help  
oneadmin@gcc-server:~$ echo "Now, we are going to create Virtual Disk images in OpenNebula. The images are available through the local apache2 web server, which can be accessed through the URL, http://localhost/cloudimages"  
Now, we are going to create Virtual Disk images in OpenNebula. The images are available through the local apache2 web server, which can be accessed through the URL, http://localhost/cloudimages  
oneadmin@gcc-server:~$ oneimage list  


| ID | USER | GROUP | NAME | DATASTORE | SIZE | TYPE | PER | STAT | RVMS |
|----|------|-------|------|-----------|------|------|-----|------|------|
|    |      |       |      |           |      |      |     |      |      |

  
oneadmin@gcc-server:~$
```

Step: 5 Before creating image we have to check whether the image file has been resided in the local server or not. I kept the files in <http://localhost/cloudimages>, where you can find the list of files that has been saved.



Step: 6 To create the virtual Disk image in oneadmin

Command: \$ oneimage create --name "CentOS-6.5_x86_64" --path "<http://localhost/cloudimages/centos-6.5.qcow2.gz>" --driver qcow2 --datastore default

```
File Edit View Search Preferences Tabs Help ROXTerm
oneadmin@gcc-server:~$ echo "Now, we are going to create Virtual Disk images in OpenNebula. The images are available in the local apache2 web server, which can be accessed through the URL, http://localhost/cloudimages"
Now, we are going to create Virtual Disk images in OpenNebula. The images are available through the local apache2 web server, which can be accessed through the URL, http://localhost/cloudimages
oneadmin@gcc-server:~$ oneimage list
  ID  USER      GROUP      NAME      DATASTORE      SIZE      TYPE      PER      STAT      RVMS
oneadmin@gcc-server:~$ oneimage create --name "CentOS-6.5_x86_64" --path "http://localhost/cloudimages/centos-6.5.qcow2.gz" --driver qcow2 --datastore default
ID: 0
oneadmin@gcc-server:~$ |
```

Step: 7 To check the image list in oneadmin after creating image

Command: \$ oneimage list

```

File Edit View Search Preferences Tabs Help
oneadmin@gcc-server:~$ echo "Now, we are going to create Virtual Disk images in OpenNebula. The images are available through the local apache2 web server, which can be accessed through the URL, http://localhost/cloudimages"
Now, we are going to create Virtual Disk images in OpenNebula. The images are available through the local apache2 web server, which can be accessed through the URL, http://localhost/cloudimages
oneadmin@gcc-server:~$ oneimage list
  ID USER      GROUP      NAME      DATASTORE      SIZE TYPE PER STAT RVMS
  0 oneadmin    oneadmin   CentOS-6.5_x86_ default     267M OS    No rdy    0
oneadmin@gcc-server:~$ |
```

Result:

Thus, the Virtual Disk image has been created successfully in CentOS-6.5 with the help of “oneimage” command.

EXP 8: Procedure to attach Virtual Block to the Virtual Machine.

AIM:

To attach Virtual Block to the Virtual Machine.

PROCEDURE:

Step: 1 To open Terminal:

Press Alt+Ctrl+T, Initially it will be in gcclab username. Then, We have to switch into root user

```

File Edit View Search Preferences Tabs Help
gcclab@gcc-server:~$
```

Step: 2 Command to Switch from gcclab user to root user:

Command: \$ sudo bash

```

File Edit View Search Preferences Tabs Help
gcclab@gcc-server:~$ sudo bash
root@gcc-server:~#
```

Step: 3 Login as one-admin

Command: \$ su – oneadmin

```
File Edit View Search Preferences Tabs Help  
gcclab@gcc-server:~$ sudo bash  
root@gcc-server:~# su - oneadmin  
oneadmin@gcc-server:~$
```

Step: 4 To List onevm

Command: \$ onevm list

```
File Edit View Search Preferences Tabs Help  
gcclab@gcc-server:~$ sudo bash  
root@gcc-server:~# su - oneadmin  
oneadmin@gcc-server:~$ onevm list  


| ID | USER     | GROUP    | NAME            | STAT | UCPU | UMEM | HOST      | TIME     |
|----|----------|----------|-----------------|------|------|------|-----------|----------|
| 0  | oneadmin | oneadmin | CentOS 6.5 (64- | poff | 0.0  | OK   | localhost | 0d 01h41 |
| 1  | oneadmin | oneadmin | Ubuntu 14.04 Vi | poff | 0.0  | OK   | localhost | 0d 01h39 |
| 2  | oneadmin | oneadmin | Debian 7 Virtua | poff | 0.0  | OK   | localhost | 0d 01h37 |
| 3  | oneadmin | oneadmin | Devuan 1.0.0-Be | poff | 0.0  | OK   | localhost | 0d 01h36 |

  
oneadmin@gcc-server:~$ |
```

After listing out the virtual machines the status of the machine is “power off”. Hence, we will “power on” the virtual machine and check for the Virtual Blocks.

Step: 5 Command to “Power on” the Virtual Machine ids are 0,1,2,3.

Command:\$ onevm resume 0,1,2,3

```
File Edit View Search Preferences Tabs Help  
gcclab@gcc-server:~$ sudo bash  
root@gcc-server:~# su - oneadmin  
oneadmin@gcc-server:~$ onevm list  


| ID | USER     | GROUP    | NAME            | STAT | UCPU | UMEM | HOST      | TIME     |
|----|----------|----------|-----------------|------|------|------|-----------|----------|
| 0  | oneadmin | oneadmin | CentOS 6.5 (64- | poff | 0.0  | OK   | localhost | 0d 01h41 |
| 1  | oneadmin | oneadmin | Ubuntu 14.04 Vi | poff | 0.0  | OK   | localhost | 0d 01h39 |
| 2  | oneadmin | oneadmin | Debian 7 Virtua | poff | 0.0  | OK   | localhost | 0d 01h37 |
| 3  | oneadmin | oneadmin | Devuan 1.0.0-Be | poff | 0.0  | OK   | localhost | 0d 01h36 |

  
oneadmin@gcc-server:~$  
oneadmin@gcc-server:~$ echo "We will 'Power ON' the Virtual Machines and check for the Block Devices"  
We will 'Power ON' the Virtual Machines and check for the Block Devices  
oneadmin@gcc-server:~$  
oneadmin@gcc-server:~$ onevm resume 0,1,2,3  
oneadmin@gcc-server:~$
```

After resuming the ids of 0,1,2 and 3 check, the status of id it should be in “power on” Status

Step: 6 Command to check the status of ids after resuming

Command:\$ onevm list

```

File Edit View Search Preferences Tabs Help
gccLab@gcc-server:~$ sudo bash
root@gcc-server:~# su - oneadmin
oneadmin@gcc-server:~$ onevm list
  ID USER GROUP NAME      STAT UCPU   UMEM HOST      TIME
  0 oneadmin oneadmin CentOS 6.5 (64- poff  0.0      OK localhost 0d 01h41
  1 oneadmin oneadmin Ubuntu 14.04 Vi poff  0.0      OK localhost 0d 01h39
  2 oneadmin oneadmin Debian 7 Virtua poff  0.0      OK localhost 0d 01h37
  3 oneadmin oneadmin Devuan 1.0.0-Be poff  0.0      OK localhost 0d 01h36
oneadmin@gcc-server:-
oneadmin@gcc-server:~$ echo "We will 'Power ON' the Virtual Machines and check for the Block Devices"
We will 'Power ON' the Virtual Machines and check for the Block Devices
oneadmin@gcc-server:-
oneadmin@gcc-server:~$ onevm resume 0,1,2,3
oneadmin@gcc-server:~$ onevm list
  ID USER GROUP NAME      STAT UCPU   UMEM HOST      TIME
  0 oneadmin oneadmin CentOS 6.5 (64- runn  0.0      OK localhost 0d 01h42
  1 oneadmin oneadmin Ubuntu 14.04 Vi runn  0.0      OK localhost 0d 01h40
  2 oneadmin oneadmin Debian 7 Virtua runn  0.0      OK localhost 0d 01h38
  3 oneadmin oneadmin Devuan 1.0.0-Be runn  0.0      OK localhost 0d 01h36
oneadmin@gcc-server:-

```

Step:7 Command to get the information of ID 0

Command:\$ onevm show 0

```

File Edit View Search Preferences Tabs Help
  2 oneadmin oneadmin Debian 7 Virtua runn  0.0      OK localhost 0d 01h38
  3 oneadmin oneadmin Devuan 1.0.0-Be runn  0.0      OK localhost 0d 01h36
oneadmin@gcc-server:-
oneadmin@gcc-server:~$ echo "We will use CentOS 6.5 (64-Bit) Virtual Machine to check for the presence of Block Device"
We will use CentOS 6.5 (64-Bit) Virtual Machine to check for the presence of Block Device
oneadmin@gcc-server:-
oneadmin@gcc-server:~$ onevm show 0
/VIRTUAL MACHINE 0 INFORMATION
ID          : 0
NAME        : CentOS 6.5 (64-Bit) Virtual Machine
USER        : oneadmin
GROUP       : oneadmin
STATE       : ACTIVE
LCM_STATE   : RUNNING
RESCHED    : No
HOST        : localhost
CLUSTER_ID  : -1
CLUSTER    : default
START TIME  : 07/09 12:37:41
END TIME    : -
DEPLOY_ID   : one-0

/VIRTUAL MACHINE MONITORING
CPU         : 100.9
MEMORY     : 1024M
NETTX      : 0K
NETRX      : 5K

PERMISSIONS
OWNER       : um-
GROUP      : ---
```

After listing out you will be finding the status of the state “is ACTIVE”

Step: 8 Command to switch to CentOS-6.5 with the help of CentOS ip address that you can find in the dashboard of Opennebula under Virtual Resources--> Virtual Machines where you can find CentOS-6.5 ip address(192.168.0.100).

Command:\$ ssh root@192.168.0.100

```

File Edit View Search Preferences Tabs Help
5 localhost poweroff 0 07/09 13:13:04 0d 00h09m 0h00m00s
6 localhost poweroff 0 07/09 14:03:19 0d 00h02m 0h00m00s
7 localhost poweroff 0 07/09 14:07:47 0d 00h02m 0h00m00s
8 localhost poweroff 0 07/09 14:15:11 0d 00h01m 0h00m00s
9 localhost none 0 07/09 14:20:15 0d 00h01m 0h00m00s

/VIRTUAL MACHINE TEMPLATE
AUTOMATIC_REQUIREMENTS="!(PUBLIC_CLOUD = YES)"
CONTEXT={}
DISK_ID="1",
SSH_PUBLIC_KEY="ssh-rsa AAAAB3NzaC1yc2EAAAQABAAQCPZ7VEsltM+8w360sQZdzBsINiIRTBqU6934vS2wIRZvhjzT4R06QS314gG3K0ghFk4iALS8ykMMjgw1lG0LtiIqMykUYOG4owf1b2hkeoGGJCPbjMzs3RKXkOs/n/bzg02iYXldiCTVLaj5d+c82xXHIErCK0K3AM2JYoeN/1R88nP6n8vCdJwaahpc!sggpKyHTAsJ+TBaxFl3TGVH9W0AAw6M/OA2+FNKqCnR+b57KI7fxBBVc/MckJfjI5PQXm+ZDrKa2LtFV9L5f71Vv0mc8YWI8mDfZ2Bx/FcHuCEphq75h8WLNLuqNW+Kf9lRcr33DBYIR0m9w2B root@gcc-server
',
TARGET="hdb"
CPU="1"
GRAPHICS=[LISTEN="0.0.0.0",
PORT="5900",
TYPE="vnc"]
MEMORY="1024"
DS=[ARCH="x86_64"]
TEMPLATE_ID="0"
/CPUs="1"
/MID="0"
pheadmin@gcc-server:~$ ssh root@192.168.0.100
Warning: Permanently added '192.168.0.100' (RSA) to the list of known hosts.
Last login: Sat Jul  9 08:45:48 2016 from 192.168.0.10
[root@localhost ~]#

```

Step: 9 To check the version of CentOS

Command:\$ cat /etc/issue

```

File Edit View Search Preferences Tabs Help
9 localhost none 0 07/09 14:20:15 0d 00h01m 0h00m00s

/VIRTUAL MACHINE TEMPLATE
AUTOMATIC_REQUIREMENTS="!(PUBLIC_CLOUD = YES)"
CONTEXT={}
DISK_ID="1",
SSH_PUBLIC_KEY="ssh-rsa AAAAB3NzaC1yc2EAAAQABAAQCPZ7VEsltM+8w360sQZdzBsINiIRTBqU6934vS2wIRZvhjzT4R06QS314gG3K0ghFk4iALS8ykMMjgw1lG0LtiIqMykUYOG4owf1b2hkeoGGJCPbjMzs3RKXkOs/n/bzg02iYXldiCTVLaj5d+c82xXHIErCK0K3AM2JYoeN/1R88nP6n8vCdJwaahpc!sggpKyHTAsJ+TBaxFl3TGVH9W0AAw6M/OA2+FNKqCnR+b57KI7fxBBVc/MckJfjI5PQXm+ZDrKa2LtFV9L5f71Vv0mc8YWI8mDfZ2Bx/FcHuCEphq75h8WLNLuqNW+Kf9lRcr33DBYIR0m9w2B root@gcc-server
',
TARGET="hdb"
CPU="1"
GRAPHICS=[LISTEN="0.0.0.0",
PORT="5900",
TYPE="vnc"]
MEMORY="1024"
DS=[ARCH="x86_64"]
TEMPLATE_ID="0"
/CPUs="1"
/MID="0"
pheadmin@gcc-server:~$ ssh root@192.168.0.100
Warning: Permanently added '192.168.0.100' (RSA) to the list of known hosts.
Last login: Sat Jul  9 08:45:48 2016 from 192.168.0.10
[root@localhost ~]# cat /etc/issue
CentOS release 6.5 (Final)
Kernel \r on an \m
[root@localhost ~]#

```

Now, we are inside the CentOS-6.5 Virtual Machine.

Step: 10 Command to Create disk for OS

Command:\$ fdisk -l /dev/sdb

```

File Edit View Search Preferences Tabs Help
CentOS release 6.5 (Final)
Kernel \r on an \m

[root@localhost ~]# echo "Now, we are inside the CentOS 6.5 Virtual Machine"
Now, we are inside the CentOS 6.5 Virtual Machine
[root@localhost ~]#
[root@localhost ~]# fdisk -l /dev/sda

Disk /dev/sda: 10.7 GB, 10737418240 bytes
255 heads, 63 sectors/track, 1305 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x000c55ce

Device Boot      Start        End      Blocks   Id  System
/dev/sda1  *          1       64     512000   83  Linux
Partition 1 does not end on cylinder boundary.
/dev/sda2          64      1306    9972736   8e  Linux LVM
[root@localhost ~]#
[root@localhost ~]# echo "The disk /dev/sda is for OS"
The disk /dev/sda is for OS
[root@localhost ~]#
[root@localhost ~]# fdisk -l /dev/sdb
root@localhost ~]#
[root@localhost ~]# echo "There is no such disk named /dev/sdb. We will create a DATABLOCK (Virtual Block) and attach it to this CentOS 6.5 Virtual Machine as /dev/sdb"
There is no such disk named /dev/sdb. We will create a DATABLOCK (Virtual Block) and attach it to this CentOS 6.5 Virtual Machine as /dev/sdb
[root@localhost ~]#
[root@localhost ~]#

```

Now we can start creating our Virtual blocks under dev/sdb disk. We, cannot create Virtual block during running state of Virtual machine. In order to create Virtual blocks we have to “Power off” the Virtual machine before creating blocks.

Step: 11 Command to power off the Virtual machine

Command:1. \$ exit

2. **\$ onevm list**
3. **\$ onevm poweroff 0**
4. **\$ onevm list**
5. **\$ onevm poweroff 1**
6. **\$ onevm list**

Similarly you have to poweroff all the virtual machines.

```

File Edit View Search Preferences Tabs Help
root@localhost ~]#
root@localhost ~]# fdisk -l /dev/sdb
root@localhost ~]#
root@localhost ~]# echo "There is no such disk named /dev/sdb. We will create a DATABLOCK (Virtual Block) and attach it to this CentOS 6.5 Virtual Machine as /dev/sdb"
There is no such disk named /dev/sdb. We will create a DATABLOCK (Virtual Block) and attach it to this CentOS 6.5 Virtual Machine as /dev/sdb
root@localhost ~]#
root@localhost ~]# echo "The Virtual Block cannot be attached during the Virtual Machine is running, so let us exit from the Virtual Machine and Power OFF the Virtual Machine before attaching the disk"
The Virtual Block cannot be attached during the Virtual Machine is running, so let us exit from the Virtual Machine and Power OFF the Virtual Machine before attaching the disk
root@localhost ~]#
root@localhost ~]# logout
Connection to 192.168.0.100 closed.
oneadmin@gcc-server:~$ 
oneadmin@gcc-server:~$ onevm list
  ID USER   GROUP   NAME      STAT UCPU   UMEM HOST      TIME
  0 oneadmin oneadmin CentOS 6.5 (64- poff  0.0    1024M localhost 0d 01h47
  1 oneadmin oneadmin Ubuntu 14.04 Vi runn  0.0    512M localhost 0d 01h44
  2 oneadmin oneadmin Debian 7 Virtua runn  0.0    512M localhost 0d 01h42
  3 oneadmin oneadmin Devuan 1.0.0-Be runn  0.0    1024M localhost 0d 01h41
oneadmin@gcc-server:~$ onevm poweroff 0
oneadmin@gcc-server:~$ onevm list
  ID USER   GROUP   NAME      STAT UCPU   UMEM HOST      TIME
  0 oneadmin oneadmin CentOS 6.5 (64- poff  0.0    0K localhost 0d 01h47
  1 oneadmin oneadmin Ubuntu 14.04 Vi runn  0.0    512M localhost 0d 01h44
  2 oneadmin oneadmin Debian 7 Virtua runn  0.0    512M localhost 0d 01h43
  3 oneadmin oneadmin Devuan 1.0.0-Be runn  0.0    1024M localhost 0d 01h41
oneadmin@gcc-server:~$ 

```

Step:11 Command to create Virtual Datablock in the virtual machine using “oneimage” command.

Command: \$ oneimage create -d 1 --name data --type DATABLOCK --size 20G --fstype ext4

```

File Edit View Search Preferences Tabs Help
  1 oneadmin oneadmin Ubuntu 14.04 Vi runn  0.0    512M localhost 0d 01h44
  2 oneadmin oneadmin Debian 7 Virtua runn  0.0    512M localhost 0d 01h42
  3 oneadmin oneadmin Devuan 1.0.0-Be runn  0.0    1024M localhost 0d 01h41
oneadmin@gcc-server:~$ onevm poweroff 0
oneadmin@gcc-server:~$ onevm list
  ID USER   GROUP   NAME      STAT UCPU   UMEM HOST      TIME
  0 oneadmin oneadmin CentOS 6.5 (64- poff  0.0    0K localhost 0d 01h47
  1 oneadmin oneadmin Ubuntu 14.04 Vi runn  0.0    512M localhost 0d 01h44
  2 oneadmin oneadmin Debian 7 Virtua runn  0.0    512M localhost 0d 01h43
  3 oneadmin oneadmin Devuan 1.0.0-Be runn  0.0    1024M localhost 0d 01h41
oneadmin@gcc-server:~$ 
oneadmin@gcc-server:~$ oneimage list
  ID USER   GROUP   NAME      DATASTORE      SIZE TYPE PER_STAT RVMS
  0 oneadmin oneadmin CentOS-6.5_x86_default 267M OS  No used  1
  1 oneadmin oneadmin Ubuntu-14.04_am default 287M OS  No used  1
  2 oneadmin oneadmin Debian-7_amd64 default 167M OS  No used  1
  3 oneadmin oneadmin Devuan-1.0.0_am default 686M OS  No used  1
oneadmin@gcc-server:~$ 
oneadmin@gcc-server:~$ echo "Now, we have to create a DATABLOCK (Virtual Block Device) using 'oneimage' command"
Now, we have to create a DATABLOCK (Virtual Block Device) using 'oneimage' command
oneadmin@gcc-server:~$ 
oneadmin@gcc-server:~$ oneimage create -d 1 --name data --type DATABLOCK --size 20G --fstype ext4
ID: 5
oneadmin@gcc-server:~$ oneimage list
  ID USER   GROUP   NAME      DATASTORE      SIZE TYPE PER_STAT RVMS
  0 oneadmin oneadmin CentOS-6.5_x86_default 267M OS  No used  1
  1 oneadmin oneadmin Ubuntu-14.04_am default 287M OS  No used  1
  2 oneadmin oneadmin Debian-7_amd64 default 167M OS  No used  1
  3 oneadmin oneadmin Devuan-1.0.0_am default 686M OS  No used  1
  5 oneadmin oneadmin data                 20G DB  No ready  0
oneadmin@gcc-server:~$ 

```

We have created Virtual data block named as “data” of size “20G”. Now, we have to attach Virtual Data Blocks to the CentOS Virtual Machine using “onevm” command.

Let, us attach Data Blocks to the CentOS 6.5 Virtual Machine using “onevm” command **Step: 12 Command:** \$ onevm list

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```

File Edit View Search Preferences Tabs Help
oneadmin@gcc-server:~$ oneimage create -d 1 --name data --type DATABLOCK --size 20G --fstype ext4
ID: 5
oneadmin@gcc-server:~$ oneimage list
  ID USER GROUP NAME DATASTORE SIZE TYPE PER STAT RVMS
  0 oneadmin oneadmin CentOS-6.5_x86 default 267M OS No used 1
  1 oneadmin oneadmin Ubuntu-14.04_am default 287M OS No used 1
  2 oneadmin oneadmin Debian-7_amd64 default 167M OS No used 1
  3 oneadmin oneadmin Devuan-1.0.0_am default 686M OS No used 1
  5 oneadmin oneadmin data default 20G DB No rdy 0
oneadmin@gcc-server:-
oneadmin@gcc-server:~$ echo "Now, we have created a DATABLOCK (Virtual Block Device) named 'data' for size '20G'"
Now, we have created a DATABLOCK (Virtual Block Device) named 'data' for size '20G'
oneadmin@gcc-server:-
oneadmin@gcc-server:~$ onevm list
  ID USER GROUP NAME STAT UCPU UMEM HOST TIME
  0 oneadmin oneadmin CentOS 6.5 (64- poff 0.0 0K localhost 0d 01h49
  1 oneadmin oneadmin Ubuntu 14.04 Vi runn 0.0 512M localhost 0d 01h47
  2 oneadmin oneadmin Debian 7 Virtua runn 0.0 512M localhost 0d 01h45
  3 oneadmin oneadmin Devuan 1.0.0-Be runn 0.0 1024M localhost 0d 01h43
oneadmin@gcc-server:-
oneadmin@gcc-server:~$ echo "Now, let us attach the DATABLOCK (Virtual Block Device) to the CentOS 6.5 (64-Bit) Virtual Machine using 'onevm' command"
Now, let us attach the DATABLOCK (Virtual Block Device) to the CentOS 6.5 (64-Bit) Virtual Machine using 'onevm' command
oneadmin@gcc-server:-
oneadmin@gcc-server:~$ onevm list
  ID USER GROUP NAME STAT UCPU UMEM HOST TIME
  0 oneadmin oneadmin CentOS 6.5 (64- poff 0.0 0K localhost 0d 01h50
  1 oneadmin oneadmin Ubuntu 14.04 Vi runn 0.0 512M localhost 0d 01h48
  2 oneadmin oneadmin Debian 7 Virtua runn 0.0 512M localhost 0d 01h46
  3 oneadmin oneadmin Devuan 1.0.0-Be runn 0.0 1024M localhost 0d 01h44
oneadmin@gcc-server:-

```

After creating Virtual block we have to attach the DATABLOCK to the CentOS 6.5 Virtual machine.

Step: 13 Command: \$ onevm disk-attach 0 --image data

```

File Edit View Search Preferences Tabs Help
ID: 5
oneadmin@gcc-server:~$ oneimage list
  ID USER GROUP NAME DATASTORE SIZE TYPE PER STAT RVMS
  0 oneadmin oneadmin CentOS-6.5_x86 default 267M OS No used 1
  1 oneadmin oneadmin Ubuntu-14.04_am default 287M OS No used 1
  2 oneadmin oneadmin Debian-7_amd64 default 167M OS No used 1
  3 oneadmin oneadmin Devuan-1.0.0_am default 686M OS No used 1
  5 oneadmin oneadmin data default 20G DB No rdy 0
oneadmin@gcc-server:-
oneadmin@gcc-server:~$ echo "Now, we have created a DATABLOCK (Virtual Block Device) named 'data' for size '20G'"
Now, we have created a DATABLOCK (Virtual Block Device) named 'data' for size '20G'
oneadmin@gcc-server:-
oneadmin@gcc-server:~$ onevm list
  ID USER GROUP NAME STAT UCPU UMEM HOST TIME
  0 oneadmin oneadmin CentOS 6.5 (64- poff 0.0 0K localhost 0d 01h49
  1 oneadmin oneadmin Ubuntu 14.04 Vi runn 0.0 512M localhost 0d 01h47
  2 oneadmin oneadmin Debian 7 Virtua runn 0.0 512M localhost 0d 01h45
  3 oneadmin oneadmin Devuan 1.0.0-Be runn 0.0 1024M localhost 0d 01h43
oneadmin@gcc-server:-
oneadmin@gcc-server:~$ echo "Now, let us attach the DATABLOCK (Virtual Block Device) to the CentOS 6.5 (64-Bit) Virtual Machine using 'onevm' command"
Now, let us attach the DATABLOCK (Virtual Block Device) to the CentOS 6.5 (64-Bit) Virtual Machine using 'onevm' command
oneadmin@gcc-server:-
oneadmin@gcc-server:~$ onevm list
  ID USER GROUP NAME STAT UCPU UMEM HOST TIME
  0 oneadmin oneadmin CentOS 6.5 (64- poff 0.0 0K localhost 0d 01h50
  1 oneadmin oneadmin Ubuntu 14.04 Vi runn 0.0 512M localhost 0d 01h48
  2 oneadmin oneadmin Debian 7 Virtua runn 0.0 512M localhost 0d 01h46
  3 oneadmin oneadmin Devuan 1.0.0-Be runn 0.0 1024M localhost 0d 01h44
oneadmin@gcc-server:~$ onevm disk-attach 0 --image data
oneadmin@gcc-server:-

```

Now, the 20G DATABLOCK has been attached to the CentOS6.5 Virtual machine. Then, we have to Power ON the CentOS6.5 Virtual machine, to create partition/format/mount.

```

File Edit View Search Preferences Tabs Help
ID USER GROUP NAME STAT UCPU UMEM HOST TIME
0 oneadmin oneadmin CentOS 6.5 (64- poff 0.0 0K localhost 0d 01h49
1 oneadmin oneadmin Ubuntu 14.04 Vi runn 0.0 512M localhost 0d 01h47
2 oneadmin oneadmin Debian 7 Virtua runn 0.0 512M localhost 0d 01h45
3 oneadmin oneadmin Devuan 1.0.0-Be runn 0.0 1024M localhost 0d 01h43
oneadmin@gcc-server:-
oneadmin@gcc-server:~$ echo "Now, let us attach the DATABLOCK (Virtual Block Device) to the CentOS 6.5 (64-Bit) Virtual Machine using 'onevm' command"
Now, let us attach the DATABLOCK (Virtual Block Device) to the CentOS 6.5 (64-Bit) Virtual Machine using 'onevm' command
oneadmin@gcc-server:-
oneadmin@gcc-server:~$ onevm list
ID USER GROUP NAME STAT UCPU UMEM HOST TIME
0 oneadmin oneadmin CentOS 6.5 (64- poff 0.0 0K localhost 0d 01h50
1 oneadmin oneadmin Ubuntu 14.04 Vi runn 0.5 512M localhost 0d 01h48
2 oneadmin oneadmin Debian 7 Virtua runn 0.0 512M localhost 0d 01h46
3 oneadmin oneadmin Devuan 1.0.0-Be runn 0.0 1024M localhost 0d 01h44
oneadmin@gcc-server:~$ onevm disk-attach 0 --image data
oneadmin@gcc-server:-
oneadmin@gcc-server:~$ echo "Now, the 20GB DATABLOCK has been attached to CentOS 6.5 (64-Bit) Virtual Machine. Now we have to Power ON the CentOS-6.5 Virtual Machine and we have to create partition/format/mount"
Now, the 20GB DATABLOCK has been attached to CentOS 6.5 (64-Bit) Virtual Machine. Now we have to Power ON the CentOS-6.5 Virtual Machine and we have to create partition/format/mount
oneadmin@gcc-server:-
oneadmin@gcc-server:~$ onevm resume 0
oneadmin@gcc-server:~$ onevm list
ID USER GROUP NAME STAT UCPU UMEM HOST TIME
0 oneadmin oneadmin CentOS 6.5 (64- runn 0.0 0K localhost 0d 01h52
1 oneadmin oneadmin Ubuntu 14.04 Vi runn 0.5 512M localhost 0d 01h49
2 oneadmin oneadmin Debian 7 Virtua runn 0.0 512M localhost 0d 01h47
3 oneadmin oneadmin Devuan 1.0.0-Be runn 0.0 1024M localhost 0d 01h46
oneadmin@gcc-server:-

```

After resuming CentOS 6.5 , we have to get into CentOS6.5 Virtual machine login, IP address for CentOS6.5 is 192.168.0.100.

Step:14 Command: \$ ssh root@192.168.0.100

```

File Edit View Search Preferences Tabs Help
oneadmin@gcc-server:-
oneadmin@gcc-server:~$ echo "Now, let us attach the DATABLOCK (Virtual Block Device) to the CentOS 6.5 (64-Bit) Virtual Machine using 'onevm' command"
Now, let us attach the DATABLOCK (Virtual Block Device) to the CentOS 6.5 (64-Bit) Virtual Machine using 'onevm' command
oneadmin@gcc-server:-
oneadmin@gcc-server:~$ onevm list
ID USER GROUP NAME STAT UCPU UMEM HOST TIME
0 oneadmin oneadmin CentOS 6.5 (64- poff 0.0 0K localhost 0d 01h50
1 oneadmin oneadmin Ubuntu 14.04 Vi runn 0.5 512M localhost 0d 01h48
2 oneadmin oneadmin Debian 7 Virtua runn 0.0 512M localhost 0d 01h46
3 oneadmin oneadmin Devuan 1.0.0-Be runn 0.0 1024M localhost 0d 01h44
oneadmin@gcc-server:~$ onevm disk-attach 0 --image data
oneadmin@gcc-server:-
oneadmin@gcc-server:~$ echo "Now, the 20GB DATABLOCK has been attached to CentOS 6.5 (64-Bit) Virtual Machine. Now we have to Power ON the CentOS-6.5 Virtual Machine and we have to create partition/format/mount"
Now, the 20GB DATABLOCK has been attached to CentOS 6.5 (64-Bit) Virtual Machine. Now we have to Power ON the CentOS-6.5 Virtual Machine and we have to create partition/format/mount
oneadmin@gcc-server:-
oneadmin@gcc-server:~$ onevm resume 0
oneadmin@gcc-server:~$ onevm list
ID USER GROUP NAME STAT UCPU UMEM HOST TIME
0 oneadmin oneadmin CentOS 6.5 (64- runn 0.0 0K localhost 0d 01h52
1 oneadmin oneadmin Ubuntu 14.04 Vi runn 0.5 512M localhost 0d 01h49
2 oneadmin oneadmin Debian 7 Virtua runn 0.0 512M localhost 0d 01h47
3 oneadmin oneadmin Devuan 1.0.0-Be runn 0.0 1024M localhost 0d 01h46
oneadmin@gcc-server:~$ ssh root@192.168.0.100
ssh: connect to host 192.168.0.100 port 22: Connection refused
oneadmin@gcc-server:~$ ssh root@192.168.0.100
Warning: Permanently added '192.168.0.100' (RSA) to the list of known hosts.
Last login: Sat Jul  9 08:51:52 2016 from 192.168.0.10
[root@localhost ~]#

```

Step:15 To check the version of OS:

Command:\$ cat /etc/issue

```
File Edit View Search Preferences Tabs Help
oneadmin@gcc-server:~$ 
oneadmin@gcc-server:~$ onevm list


| ID | USER     | GROUP    | NAME                 | STAT | UCPU  | UMEM      | HOST     | TIME |
|----|----------|----------|----------------------|------|-------|-----------|----------|------|
| 0  | oneadmin | oneadmin | CentOS 6.5 (64- poff | 0.0  | 0K    | localhost | 0d 01h50 |      |
| 1  | oneadmin | oneadmin | Ubuntu 14.04 Vi runn | 0.0  | 512M  | localhost | 0d 01h48 |      |
| 2  | oneadmin | oneadmin | Debian 7 Virtua runn | 0.0  | 512M  | localhost | 0d 01h46 |      |
| 3  | oneadmin | oneadmin | Devuan 1.0.0-Be runn | 0.0  | 1024M | localhost | 0d 01h44 |      |


oneadmin@gcc-server:~$ onevm disk-attach 0 --image data
oneadmin@gcc-server:~$ 
oneadmin@gcc-server:~$ echo "Now, the 20GB DATABLOCK has been attached to CentOS 6.5 (64-Bit) Virtual Machine. Now we have to Power ON the CentOS-6.5 Virtual Machine and we have to create partition/format/mount"
Now, the 20GB DATABLOCK has been attached to CentOS 6.5 (64-Bit) Virtual Machine. Now we have to Power ON the CentOS-6.5 Virtual Machine and we have to create partition/format/mount
oneadmin@gcc-server:~$ 
oneadmin@gcc-server:~$ onevm resume 0
oneadmin@gcc-server:~$ onevm list


| ID | USER     | GROUP    | NAME                 | STAT | UCPU  | UMEM      | HOST     | TIME |
|----|----------|----------|----------------------|------|-------|-----------|----------|------|
| 0  | oneadmin | oneadmin | CentOS 6.5 (64- runn | 0.0  | 0K    | localhost | 0d 01h52 |      |
| 1  | oneadmin | oneadmin | Ubuntu 14.04 Vi runn | 0.5  | 512M  | localhost | 0d 01h49 |      |
| 2  | oneadmin | oneadmin | Debian 7 Virtua runn | 0.0  | 512M  | localhost | 0d 01h47 |      |
| 3  | oneadmin | oneadmin | Devuan 1.0.0-Be runn | 0.0  | 1024M | localhost | 0d 01h46 |      |


oneadmin@gcc-server:~$ ssh root@192.168.0.100
ssh: connect to host 192.168.0.100 port 22: Connection refused
oneadmin@gcc-server:~$ ssh root@192.168.0.100
Warning: Permanently added '192.168.0.100' (RSA) to the list of known hosts.
Last login: Sat Jul  9 08:51:52 2016 from 192.168.0.10
[root@localhost ~]# cat /etc/issue
CentOS release 6.5 (Final)
Kernel \r on an \m
[root@localhost ~]#
```

```
File Edit View Search Preferences Tabs Help
ssh: connect to host 192.168.0.100 port 22: Connection refused
oneadmin@gcc-server:~$ ssh root@192.168.0.100
Warning: Permanently added '192.168.0.100' (RSA) to the list of known hosts.
Last login: Sat Jul  9 08:51:52 2016 from 192.168.0.10
[root@localhost ~]# cat /etc/issue
CentOS release 6.5 (Final)
Kernel \r on an \m

[root@localhost ~]# fdisk -l /dev/sda

Disk /dev/sda: 10.7 GB, 10737418240 bytes
255 heads, 63 sectors/track, 1305 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x000c55ce

   Device Boot      Start        End      Blocks   Id  System
/dev/sda1   *         1        64     512000   83  Linux
Partition 1 does not end on cylinder boundary.
/dev/sda2          64       1306    9972736   8e  Linux LVM
[root@localhost ~]# fdisk -l /dev/sdb

Disk /dev/sdb: 21.5 GB, 21474836992 bytes
255 heads, 63 sectors/track, 2610 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x00000000

[root@localhost ~]#
```

Step: 16 To format the created 20 GB Disk Block using “mkfs.ext4”

Command:\$ mkfs.ext4 /dev/sdb1

```

File Edit View Search Preferences Tabs Help
Disk identifier: 0x0a21ffe6

Device Boot      Start        End      Blocks   Id  System
/dev/sdb1            1       2610    20964793+  83  Linux

Command (m for help): w
The partition table has been altered!

Calling ioctl() to re-read partition table.
Syncing disks.
[root@localhost ~]# mkfs.ext4 /dev/sdb1
mke2fs 1.41.12 (17-May-2010)
Discarding device blocks: done
Filesystem label=
OS type: Linux
Block size=4096 (log=2)
Fragment size=4096 (log=2)
Stride=0 blocks, Stripe width=0 blocks
310720 inodes, 5241198 blocks
262059 blocks (5.00%) reserved for the super user
First data block=0
Maximum filesystem blocks=4294967296
160 block groups
32768 blocks per group, 32768 fragments per group
3192 inodes per group
Superblock backups stored on blocks:
      32768, 98304, 163840, 229376, 294912, 819200, 884736, 1605632, 2654208,
      4096000

Writing inode tables: done
Creating journal (32768 blocks): |


```

Now, we have formatted the 20 GB Disk Block. The file system now ready to use by us.

Step: 17 Mounting the DataBlock from /dev/sdb1 to /data(name of the image)

Command: \$ mount /dev/sdb1 data

```

File Edit View Search Preferences Tabs Help
mke2fs 1.41.12 (17-May-2010)
Discarding device blocks: done
Filesystem label=
OS type: Linux
Block size=4096 (log=2)
Fragment size=4096 (log=2)
Stride=0 blocks, Stripe width=0 blocks
310720 inodes, 5241198 blocks
262059 blocks (5.00%) reserved for the super user
First data block=0
Maximum filesystem blocks=4294967296
160 block groups
32768 blocks per group, 32768 fragments per group
3192 inodes per group
Superblock backups stored on blocks:
      32768, 98304, 163840, 229376, 294912, 819200, 884736, 1605632, 2654208,
      4096000

Writing inode tables: done
Creating journal (32768 blocks): done
Writing superblocks and filesystem accounting information: done

This filesystem will be automatically checked every 30 mounts or
180 days, whichever comes first.  Use tune2fs -c or -i to override.
[root@localhost ~]#
[root@localhost ~]# echo "Now, we have formatted the 20GB partition using 'mkfs.ext4' command. The filesystem now ready for use by us"
Now, we have formatted the 20GB partition using 'mkfs.ext4' command. The filesystem now ready for use by us
[root@localhost ~]#
[root@localhost ~]# mount /dev/sdb1 /data
[root@localhost ~]#

```

Step: 18 After mounting, we have to check the size we have created by using the following command to access by us.

Command: df -h

```

File Edit View Search Preferences Tabs Help
Writing inode tables: done
Creating journal (32768 blocks): done
Writing superblocks and filesystem accounting information: done

This filesystem will be automatically checked every 30 mounts or
180 days, whichever comes first. Use tune2fs -c or -i to override.
root@localhost ~]#
root@localhost ~]# echo "Now, we have formatted the 20GB partition using 'mkfs.ext4' command. The filesystem now ready for use by us"
Now, we have formatted the 20GB partition using 'mkfs.ext4' command. The filesystem now ready for use by us
root@localhost ~]#
root@localhost ~]# mount /dev/sdb1 /data
root@localhost ~]# df -h
Filesystem      Size  Used Avail Use% Mounted on
/dev/mapper/VolGroup-lv_root
                  8.5G  841M  7.2G  11% /
tmpfs           499M   0  499M  0% /dev/shm
/dev/sda1        485M  54M  407M  12% /boot
/dev/sdb1        20G  172M  19G  1% /data
root@localhost ~]#
root@localhost ~]# tune2fs -m 0 /dev/sdb1
tune2fs 1.41.12 (17-May-2010)
Setting reserved blocks percentage to 0% (0 blocks)
root@localhost ~]# df -h
Filesystem      Size  Used Avail Use% Mounted on
/dev/mapper/VolGroup-lv_root
                  8.5G  841M  7.2G  11% /
tmpfs           499M   0  499M  0% /dev/shm
/dev/sda1        485M  54M  407M  12% /boot
/dev/sdb1        20G  172M  20G  1% /data
root@localhost ~]#

```

Step: 19 To exit the Connection from CentOS6.5

Command: \$ exit

```

File Edit View Search Preferences Tabs Help
Now, we have formatted the 20GB partition using 'mkfs.ext4' command. The filesystem now ready for use by us
root@localhost ~]#
root@localhost ~]# mount /dev/sdb1 /data
root@localhost ~]# df -h
Filesystem      Size  Used Avail Use% Mounted on
/dev/mapper/VolGroup-lv_root
                  8.5G  841M  7.2G  11% /
tmpfs           499M   0  499M  0% /dev/shm
/dev/sda1        485M  54M  407M  12% /boot
/dev/sdb1        20G  172M  19G  1% /data
root@localhost ~]#
root@localhost ~]# tune2fs -m 0 /dev/sdb1
tune2fs 1.41.12 (17-May-2010)
Setting reserved blocks percentage to 0% (0 blocks)
root@localhost ~]# df -h
Filesystem      Size  Used Avail Use% Mounted on
/dev/mapper/VolGroup-lv_root
                  8.5G  841M  7.2G  11% /
tmpfs           499M   0  499M  0% /dev/shm
/dev/sda1        485M  54M  407M  12% /boot
/dev/sdb1        20G  172M  20G  1% /data
root@localhost ~]#
root@localhost ~]# echo "Now, we have successfully attached a DATABLOCK (Virtual Block Device) to the Virtual Machine. In the next step, we will see how to Detach the DATABLOCK from the Virtual Machine"
Now, we have successfully attached a DATABLOCK (Virtual Block Device) to the Virtual Machine. In the next step, we will see how to Detach the DATABLOCK from the Virtual Machine
root@localhost ~]#
root@localhost ~]# exit
logout
Connection to 192.168.0.100 closed.
oneadmin@gcc-server:~$
```

Result:

Thus, we have successfully attached the Virtual DataBlock to the CentOS6.5 Virtual machine.

EXP 9: Install C Compiler in the virtual machine and execute a sample program

AIM:

To Install C Compiler in the virtual machine and execute a sample program

PROCEDURE:

Step: 1 To open Terminal:

Press Alt+Ctrl+T, Initially it will be in gcclab username. Then, we have to switch into root user

```
File Edit View Search Preferences Tabs Help  
gcclab@gcc-server:~$
```

Step: 2 Command to switch from gcclab user to root user:

Command: \$ sudo bash

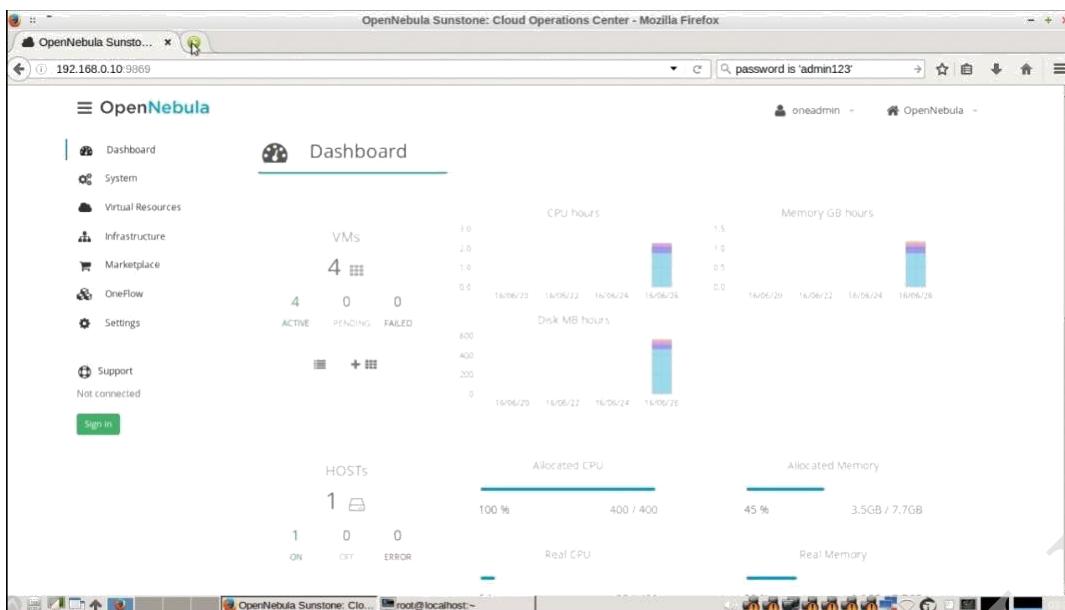
```
File Edit View Search Preferences Tabs Help  
gcclab@gcc-server:~$ sudo bash  
root@gcc-server:~#
```

Step: 3 Login as one-admin

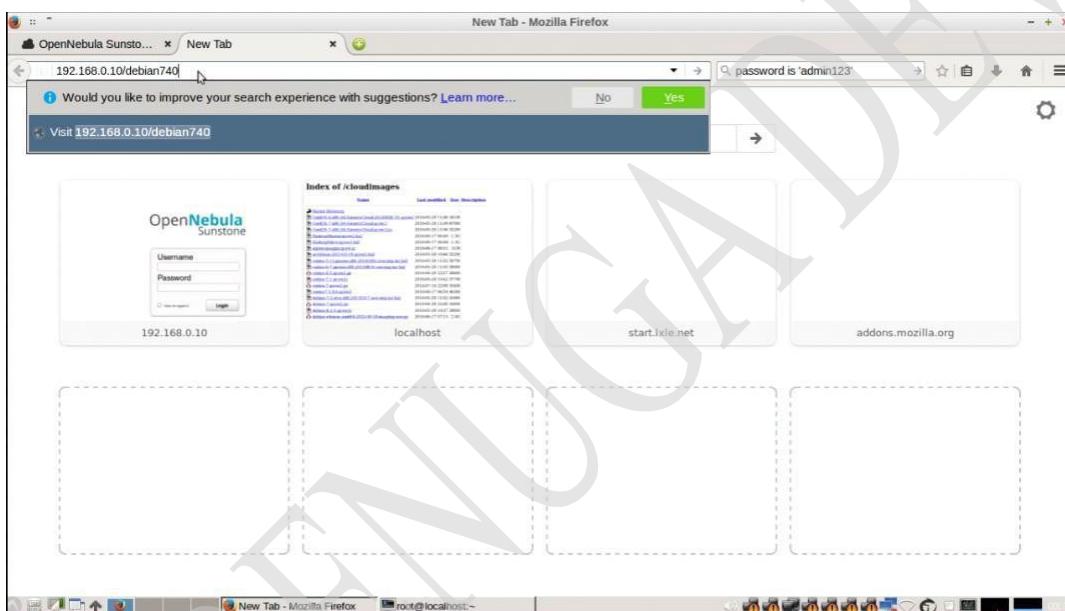
Command: \$ su – oneadmin

```
File Edit View Search Preferences Tabs Help  
gcclab@gcc-server:~$ sudo bash  
root@gcc-server:~# su - oneadmin  
oneadmin@gcc-server:~$
```

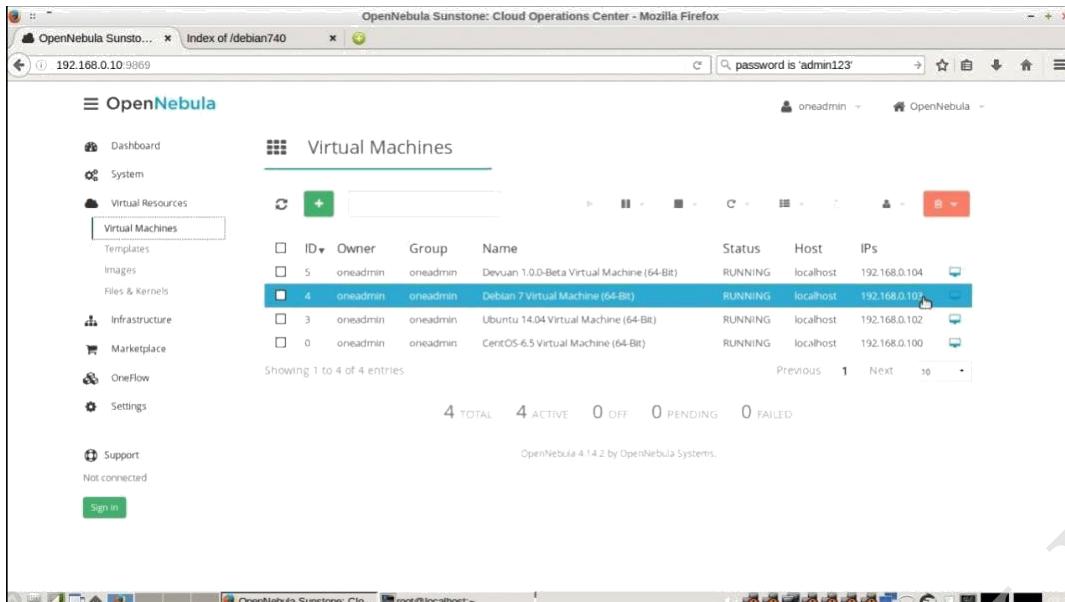
Step: 4 Open Open-Nebula Dashboard using Open-Nebula Bridge interface IP along with port id (192.168.0.10:9869)



Step: 5 In Open-Nebula Dashboard visit Debian740 by typing the following port number in the URL(192.168.0.10/debian740) then press Enter and copy the same.



Step:6 In Open-Nebula Dashboard, under Virtual resources-->Virtual Machines--> Right hand side you will be finding the number of VMs has been created from which you can find your OS along with ip address for installing gcc compiler in the selected OS. Here, we have chosen debian 7 virtual machine.



Step:7 Open Terminal using Alt+Ctrl+T and type the following command to switch into debian 7 Virtual machine ip(192.168.0.103).

Command: \$ ssh root@192.168.0.103

```

File Edit View Search Preferences Tabs Help root@localhost:~
ID USER GROUP NAME REGTIME
0 oneadmin oneadmin CentOS-6.5 06/27 00:58:27
1 oneadmin oneadmin Ubuntu-14.04 06/27 03:10:08
2 oneadmin oneadmin Debian-7 06/27 03:11:55
3 oneadmin oneadmin Devuan-1.0.0 06/27 03:14:02
/M ID: 5
ID USER GROUP NAME STAT UCPU UMEM HOST TIME
0 oneadmin oneadmin CentOS-6.5 Virt runn 0.0 512M localhost 0d 01h42
3 oneadmin oneadmin Ubuntu 14.04 Vi runn 0.0 512M localhost 0d 00h04
4 oneadmin oneadmin Debian 7 Virtua runn 0.5 512M localhost 0d 00h02
5 oneadmin oneadmin Devuan 1.0.0-Be pend 0 OK 0d 00h00
ID USER GROUP NAME STAT UCPU UMEM HOST TIME
0 oneadmin oneadmin CentOS-6.5 Virt runn 0.0 512M localhost 0d 01h42
3 oneadmin oneadmin Ubuntu 14.04 Vi runn 0.0 512M localhost 0d 00h04
4 oneadmin oneadmin Debian 7 Virtua runn 0.0 512M localhost 0d 00h02
5 oneadmin oneadmin Devuan 1.0.0-Be prol 0 OK localhost 0d 00h00
oneadmin@gcc-server:~$ onevm list
ID USER GROUP NAME STAT UCPU UMEM HOST TIME
0 oneadmin oneadmin CentOS-6.5 Virt runn 0.0 512M localhost 0d 01h42
3 oneadmin oneadmin Ubuntu 14.04 Vi runn 0.0 512M localhost 0d 00h04
4 oneadmin oneadmin Debian 7 Virtua runn 0.0 512M localhost 0d 00h02
5 oneadmin oneadmin Devuan 1.0.0-Be prol 0 OK localhost 0d 00h00
oneadmin@gcc-server:~$ onevm list
ID USER GROUP NAME STAT UCPU UMEM HOST TIME
0 oneadmin oneadmin CentOS-6.5 Virt runn 0.0 512M localhost 0d 01h42
3 oneadmin oneadmin Ubuntu 14.04 Vi runn 0.0 512M localhost 0d 00h04
4 oneadmin oneadmin Debian 7 Virtua runn 0.5 512M localhost 0d 00h02
5 oneadmin oneadmin Devuan 1.0.0-Be runn 0 OK localhost 0d 00h00
oneadmin@gcc-server:~$ ssh root@192.168.0.103

```

Step: 8 To check and display the version of OS

Command: \$ cat /etc/issue

```

root@localhost:~-
File Edit View Search Preferences Tabs Help
4 oneadmin oneadmin Debian 7 Virtua runn 0.0 512M localhost 0d 00h02
5 oneadmin oneadmin Devuan 1.0.0-Be prol 0 0K localhost 0d 00h00
oneadmin@gcc-server:~$ onevm list
ID USER GROUP NAME STAT UCPU UMEM HOST TIME
0 oneadmin oneadmin CentOS-6.5 Virt runn 0.0 512M localhost 0d 01h42
3 oneadmin oneadmin Ubuntu 14.04 Vi runn 0.0 512M localhost 0d 00h04
4 oneadmin oneadmin Debian 7 Virtua runn 0.0 512M localhost 0d 00h02
5 oneadmin oneadmin Devuan 1.0.0-Be prol 0 0K localhost 0d 00h00
oneadmin@gcc-server:~$ onevm list
ID USER GROUP NAME STAT UCPU UMEM HOST TIME
0 oneadmin oneadmin CentOS-6.5 Virt runn 0.0 512M localhost 0d 01h42
3 oneadmin oneadmin Ubuntu 14.04 Vi runn 0.0 512M localhost 0d 00h04
4 oneadmin oneadmin Debian 7 Virtua runn 0.5 512M localhost 0d 00h02
5 oneadmin oneadmin Devuan 1.0.0-Be runn 0 0K localhost 0d 00h00
oneadmin@gcc-server:~$ ssh root@192.168.0.103
Warning: Permanently added '192.168.0.103' (ECDSA) to the list of known hosts.
Linux debian 3.2.0-4-amd64 #1 SMP Debian 3.2.54-2 x86_64

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Mon Apr 21 17:29:51 2014 from 192.168.122.1
root@debian:~# cat /etc/issue
Debian GNU/Linux 7 \n \l

root@debian:~# |

```

Step: 9 To change the directory to /etc/apt

Command: \$ cd /etc/apt

```

root@localhost:~-
File Edit View Search Preferences Tabs Help
5 oneadmin oneadmin Devuan 1.0.0-Be prol 0 0K localhost 0d 00h00
oneadmin@gcc-server:~$ onevm list
ID USER GROUP NAME STAT UCPU UMEM HOST TIME
0 oneadmin oneadmin CentOS-6.5 Virt runn 0.0 512M localhost 0d 01h42
3 oneadmin oneadmin Ubuntu 14.04 Vi runn 0.0 512M localhost 0d 00h04
4 oneadmin oneadmin Debian 7 Virtua runn 0.0 512M localhost 0d 00h02
5 oneadmin oneadmin Devuan 1.0.0-Be prol 0 0K localhost 0d 00h00
oneadmin@gcc-server:~$ onevm list
ID USER GROUP NAME STAT UCPU UMEM HOST TIME
0 oneadmin oneadmin CentOS-6.5 Virt runn 0.0 512M localhost 0d 01h42
3 oneadmin oneadmin Ubuntu 14.04 Vi runn 0.0 512M localhost 0d 00h04
4 oneadmin oneadmin Debian 7 Virtua runn 0.5 512M localhost 0d 00h02
5 oneadmin oneadmin Devuan 1.0.0-Be runn 0 0K localhost 0d 00h00
oneadmin@gcc-server:~$ ssh root@192.168.0.103
Warning: Permanently added '192.168.0.103' (ECDSA) to the list of known hosts.
Linux debian 3.2.0-4-amd64 #1 SMP Debian 3.2.54-2 x86_64

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Mon Apr 21 17:29:51 2014 from 192.168.122.1
root@debian:~# cat /etc/issue
Debian GNU/Linux 7 \n \l

root@debian:~# cd /etc/apt
root@debian:/etc/apt# |

```

Step: 10 To list the contents which is present in the /etc/apt

Command:\$ ls -l

```
File Edit View Search Preferences Tabs Help
root@localhost:~-
3 oneadmin oneadmin Ubuntu 14.04 Vi runn 0.0 512M localhost 0d 00h04
4 oneadmin oneadmin Debian 7 Virtua runn 0.5 512M localhost 0d 00h02
5 oneadmin oneadmin Devuan 1.0.0-Be runn 0 OK localhost 0d 00h00
oneadmin@gcc-server:~$ ssh root@192.168.0.103
Warning: Permanently added '192.168.0.103' (ECDSA) to the list of known hosts.
Linux debian 3.2.0-4-amd64 #1 SMP Debian 3.2.54-2 x86_64

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Mon Apr 21 17:29:51 2014 from 192.168.122.1
root@debian:~# cat /etc/issue
Debian GNU/Linux 7 \n \l

root@debian:~# cd /etc/apt
root@debian:/etc/apt# ls -l
total 24
drwxr-xr-x 2 root root 4096 Apr 21 2014 apt.conf.d
drwxr-xr-x 2 root root 4096 Nov 16 2013 preferences.d
rw-r--r-- 1 root root 600 Apr 21 2014 sources.list
rw-r--r-- 1 root root 0 Apr 21 2014 sources.list-
drwxr-xr-x 2 root root 4096 Nov 16 2013 sources.list.d
rw----- 1 root root 1200 Apr 21 2014 trustdb.gpg
rw----- 1 root root 0 Apr 21 2014 trusted.gpg
drwxr-xr-x 2 root root 4096 Apr 21 2014 trusted.gpg.d
root@debian:/etc/apt# |
```

Step: 11 Moving the contents which is present in the sources.list to sources.list.orig
Command: \$ mv sources.list sources.list.orig

```
File Edit View Search Preferences Tabs Help
root@localhost:~-
4 oneadmin oneadmin Debian 7 Virtua runn 0.5 512M localhost 0d 00h02
5 oneadmin oneadmin Devuan 1.0.0-Be runn 0 OK localhost 0d 00h00
oneadmin@gcc-server:~$ ssh root@192.168.0.103
Warning: Permanently added '192.168.0.103' (ECDSA) to the list of known hosts.
Linux debian 3.2.0-4-amd64 #1 SMP Debian 3.2.54-2 x86_64

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Mon Apr 21 17:29:51 2014 from 192.168.122.1
root@debian:~# cat /etc/issue
Debian GNU/Linux 7 \n \l

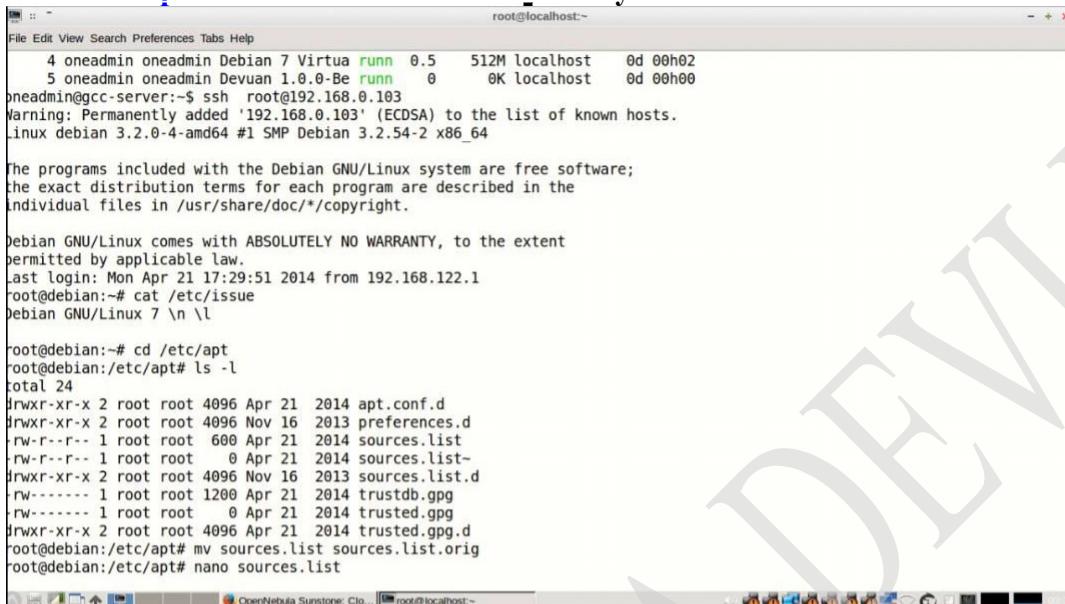
root@debian:~# cd /etc/apt
root@debian:/etc/apt# ls -l
total 24
drwxr-xr-x 2 root root 4096 Apr 21 2014 apt.conf.d
drwxr-xr-x 2 root root 4096 Nov 16 2013 preferences.d
rw-r--r-- 1 root root 600 Apr 21 2014 sources.list
rw-r--r-- 1 root root 0 Apr 21 2014 sources.list-
drwxr-xr-x 2 root root 4096 Nov 16 2013 sources.list.d
rw----- 1 root root 1200 Apr 21 2014 trustdb.gpg
rw----- 1 root root 0 Apr 21 2014 trusted.gpg
drwxr-xr-x 2 root root 4096 Apr 21 2014 trusted.gpg.d
root@debian:/etc/apt# mv sources.list sources.list.orig
root@debian:/etc/apt# |
```

Step: 12 Open Editor and type the following lines in the sources.list file.

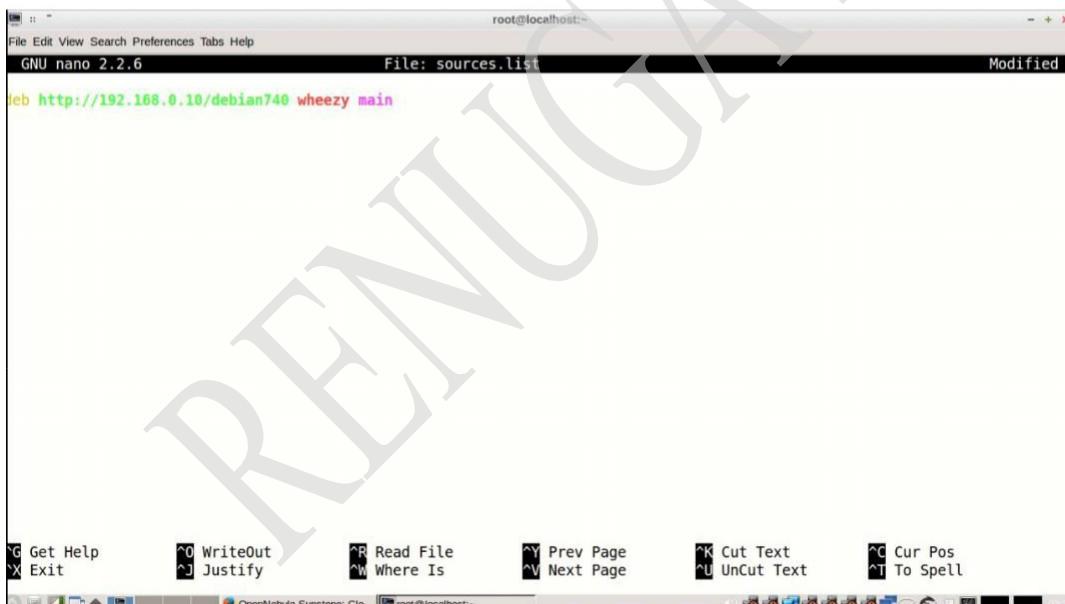
Command: \$ nano sources.list

Once, editor gets open type the following lines in the file.

deb http://192.168.0.10/debian740 wheezy main



```
root@localhost:~# apt-get update
Get:1 http://192.168.0.10/debian740 wheezy InRelease [10.8 kB]
Get:2 http://192.168.0.10/debian740 wheezy/main Sources [10.8 kB]
Get:3 http://192.168.0.10/debian740 wheezy/main Packages [10.8 kB]
Fetched 32.4 kB in 0s (10.1 kB/s)
root@localhost:~# ls -l /etc/apt
total 24
drwxr-xr-x 2 root root 4096 Apr 21 2014 apt.conf.d
drwxr-xr-x 2 root root 4096 Nov 16 2013 preferences.d
-rw-r--r-- 1 root root 600 Apr 21 2014 sources.list
-rw-r--r-- 1 root root 0 Apr 21 2014 sources.list~
drwxr-xr-x 2 root root 4096 Nov 16 2013 sources.list.d
-rw----- 1 root root 1200 Apr 21 2014 trustdb.gpg
-rw----- 1 root root 0 Apr 21 2014 trusted.gpg
drwxr-xr-x 2 root root 4096 Apr 21 2014 trusted.gpg.d
root@debian:/etc/apt# mv sources.list sources.list.orig
root@debian:/etc/apt# nano sources.list
```



```
File Edit View Preferences Tabs Help
GNU nano 2.2.6
File: sources.list
Modified

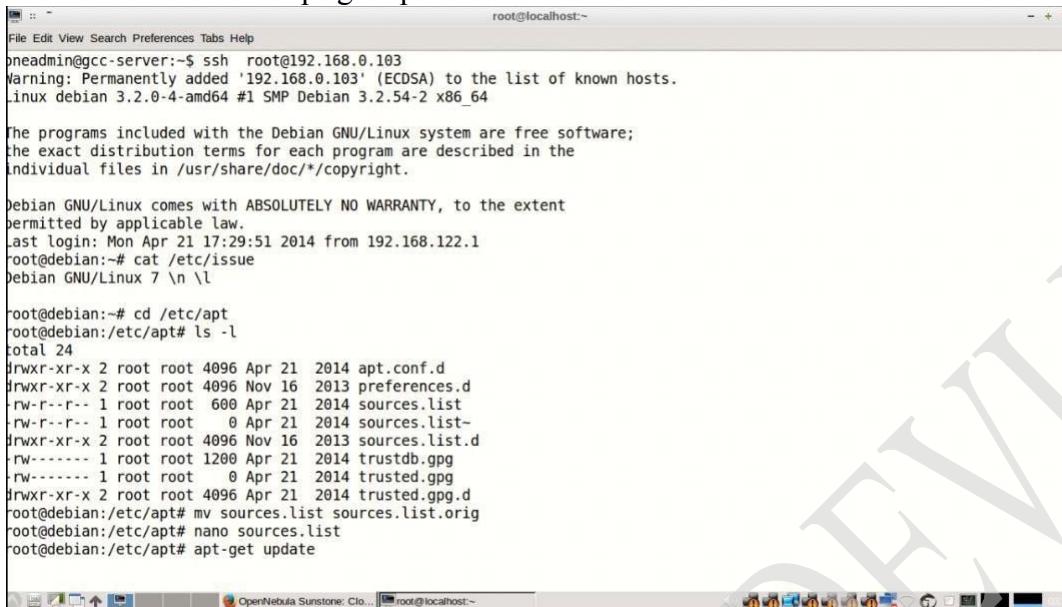
deb http://192.168.0.10/debian740 wheezy main
```

Key bindings:

- G Get Help
- X Exit
- W WriteOut
- J Justify
- R Read File
- W Where Is
- P Prev Page
- N Next Page
- K Cut Text
- U Uncut Text
- C Cur Pos
- T To Spell

Step: 13 To Update the /etc/apt

Command: \$ apt-get update



```
File Edit View Search Preferences Tabs Help
oneadmin@gcc-server:~$ ssh root@192.168.0.103
Warning: Permanently added '192.168.0.103' (ECDSA) to the list of known hosts.
Linux debian 3.2.0-4-amd64 #1 SMP Debian 3.2.54-2 x86_64

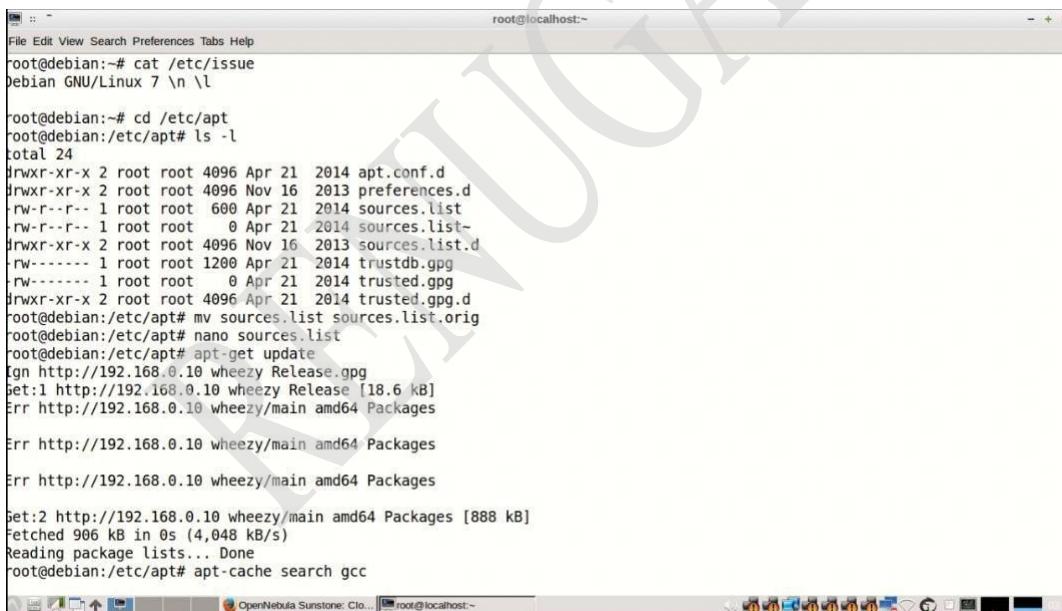
The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Mon Apr 21 17:29:51 2014 from 192.168.122.1
root@debian:~# cat /etc/issue
Debian GNU/Linux 7 \n \l

root@debian:~# cd /etc/apt
root@debian:/etc/apt# ls -l
total 24
drwxr-xr-x 2 root root 4096 Apr 21 2014 apt.conf.d
drwxr-xr-x 2 root root 4096 Nov 16 2013 preferences.d
rw-r--r-- 1 root root 600 Apr 21 2014 sources.list
rw-r--r-- 1 root root 0 Apr 21 2014 sources.list~
drwxr-xr-x 2 root root 4096 Nov 16 2013 sources.list.d
rw----- 1 root root 1200 Apr 21 2014 trustdb.gpg
rw----- 1 root root 0 Apr 21 2014 trusted.gpg
drwxr-xr-x 2 root root 4096 Apr 21 2014 trusted.gpg.d
root@debian:/etc/apt# mv sources.list sources.list.orig
root@debian:/etc/apt# nano sources.list
root@debian:/etc/apt# apt-get update
```

Step: 14 To install gcc compiler

Command: \$ apt-get install gcc



```
File Edit View Search Preferences Tabs Help
root@debian:~# cat /etc/issue
Debian GNU/Linux 7 \n \l

root@debian:~# cd /etc/apt
root@debian:/etc/apt# ls -l
total 24
drwxr-xr-x 2 root root 4096 Apr 21 2014 apt.conf.d
drwxr-xr-x 2 root root 4096 Nov 16 2013 preferences.d
rw-r--r-- 1 root root 600 Apr 21 2014 sources.list
rw-r--r-- 1 root root 0 Apr 21 2014 sources.list~
drwxr-xr-x 2 root root 4096 Nov 16 2013 sources.list.d
rw----- 1 root root 1200 Apr 21 2014 trustdb.gpg
rw----- 1 root root 0 Apr 21 2014 trusted.gpg
drwxr-xr-x 2 root root 4096 Apr 21 2014 trusted.gpg.d
root@debian:/etc/apt# mv sources.list sources.list.orig
root@debian:/etc/apt# nano sources.list
root@debian:/etc/apt# apt-get update
Ign http://192.168.0.10 wheezy Release.gpg
Get:1 http://192.168.0.10 wheezy Release [18.6 kB]
Err http://192.168.0.10 wheezy/main amd64 Packages
Err http://192.168.0.10 wheezy/main amd64 Packages
Get:2 http://192.168.0.10 wheezy/main amd64 Packages [888 kB]
Fetched 906 kB in 0s (4,048 kB/s)
Reading package lists... Done
root@debian:/etc/apt# apt-cache search gcc
```

```

root@localhost:~ 
File Edit View Search Preferences Tabs Help
gcc-4.7-multilib libmudflap0-4.7-dev gcc-4.7-doc libgcc1-dbg libgomp1-dbg libitm1-dbg libquadmath0-dbg libmudflap0-dbg
libcloog-pp10 libppl-c2 libpp17 binutils-gold glibc-doc
The following NEW packages will be installed:
binutils cpp cpp-4.7 gcc gcc-4.7 libc-dev-bin libc6-dev libgmp10 libgomp1 libitm1 libmpc2 libmpfr4 libquadmath0
linux-libc-dev manpages-dev
0 upgraded, 15 newly installed, 0 to remove and 0 not upgraded.
Need to get 25.0 MB of archives.
After this operation, 64.4 MB of additional disk space will be used.
WARNING: The following packages cannot be authenticated!
libgmp10 libgomp1 libitm1 libmpfr4 libquadmath0 libmpc2 binutils cpp-4.7 cpp gcc libc-dev-bin linux-libc-dev
libc6-dev manpages-dev
E: There are problems and -y was used without --force-yes
root@debian:/etc/apt# apt-get update
Ign http://192.168.0.10 wheezy Release.gpg
Hit http://192.168.0.10 wheezy Release
Ign http://192.168.0.10 wheezy/main amd64 Packages/DiffIndex
Err http://192.168.0.10 wheezy/main amd64 Packages
Err http://192.168.0.10 wheezy/main amd64 Packages
Hit http://192.168.0.10 wheezy/main amd64 Packages
Reading package lists... Done
root@debian:/etc/apt# apt-get install gcc
Reading package lists... Done
Building dependency tree
Reading state information... Done

```

While installing it will ask for user name and password. Remember Username and password to open in dashboard VNC.

```

root@localhost:~ 
File Edit View Search Preferences Tabs Help
Setting up cpp (4:4.7.2-1) ...
Setting up gcc-4.7 (4.7.2-5)
Setting up gcc (4:4.7.2-1) ...
Setting up libc-dev-bin (2.13-38+deb7u1) ...
Setting up linux-libc-dev:amd64 (3.2.54-2)
Setting up libc6-dev:amd64 (2.13-38+deb7u1) ...
Setting up manpages-dev (3.44-1) ...
root@debian:/etc/apt# adduser baskar
Adding user 'baskar' ...
Adding new group 'baskar' (1001) ...
Adding new user 'baskar' (1001) with group 'baskar' ...
Creating home directory '/home/baskar' ...
Copying files from '/etc/skel' ...
Enter new UNIX password:
Retype new UNIX password:
passwd: password updated successfully
Changing the user information for baskar
Enter the new value, or press ENTER for the default
  Full Name []: Baskar Selvaraj
  Room Number []:
  Work Phone []:
  Home Phone []:
  Other []:
Is the information correct? [Y/n] y
root@debian:/etc/apt# passwd root
Enter new UNIX password:
Retype new UNIX password:
passwd: password updated successfully
root@debian:/etc/apt#

```

Step:14 After installing gcc compiler, Open dashboard, Under Virtual resources-->Virtual machines--> Click Debian 7 OS-->Top right corner you will be finding VNC, Click VNC it will open the terminal.

OpenNebula Sunstone: Cloud Operations Center - Mozilla Firefox

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192.168.0.10:9869

password is 'admin123'

Virtual Machines

ID	Owner	Group	Name	Status	Host	IPs
5	oneadmin	oneadmin	Devuan 1.0.0-Beta Virtual Machine (64-Bit)	RUNNING	localhost	192.168.0.104
4	oneadmin	oneadmin	Debian 7 Virtual Machine (64-Bit)	RUNNING	localhost	192.168.0.103
3	oneadmin	oneadmin	Ubuntu 14.04 Virtual Machine (64-Bit)	RUNNING	localhost	192.168.0.102
0	oneadmin	oneadmin	CentOS 6.5 Virtual Machine (64-Bit)	RUNNING	localhost	192.168.0.100

Showing 1 to 4 of 4 entries

4 TOTAL 4 ACTIVE 0 OFF 0 PENDING 0 FAILED

Support: Not connected

Sign in

OpenNebula Sunstone: Cloud Operations Center - Mozilla Firefox

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192.168.0.10:9869

password is 'admin123'

VM 4 Debian 7 Virtual Machine (64-Bit) RUNNING

VNC

Info Capacity Storage Network Snapshots Placement Actions Template Log

Information

ID	4
Name	Debian 7 Virtual Machine (64-Bit)
State	ACTIVE
LCM State	RUNNING
Host	localhost
Start time	03:12:05 27/06/2016
Deploy ID	one-4
Reschedule	no

Attributes

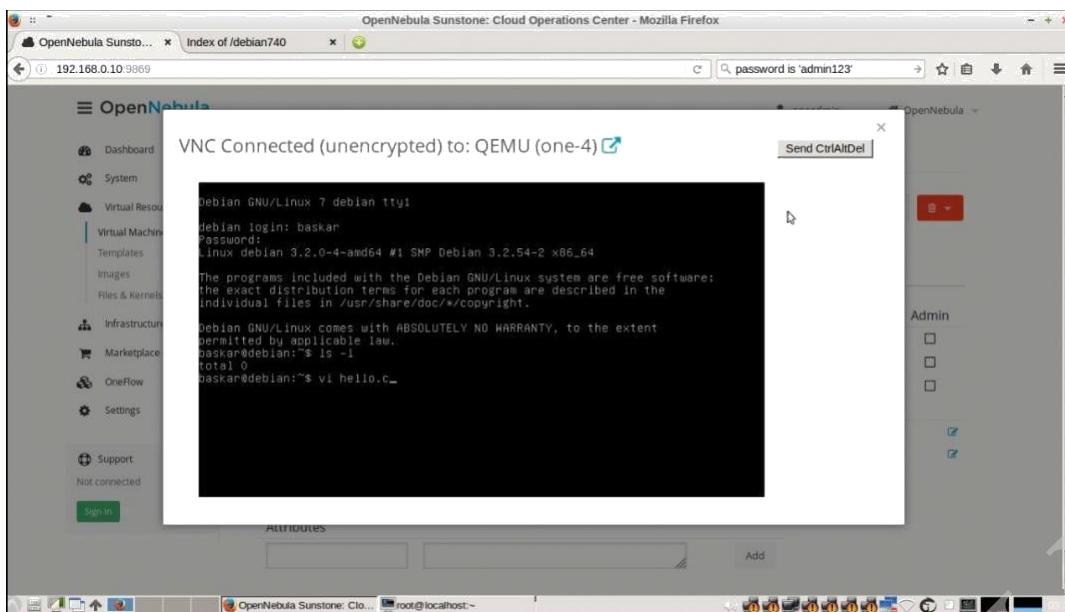
Add

Permissions:

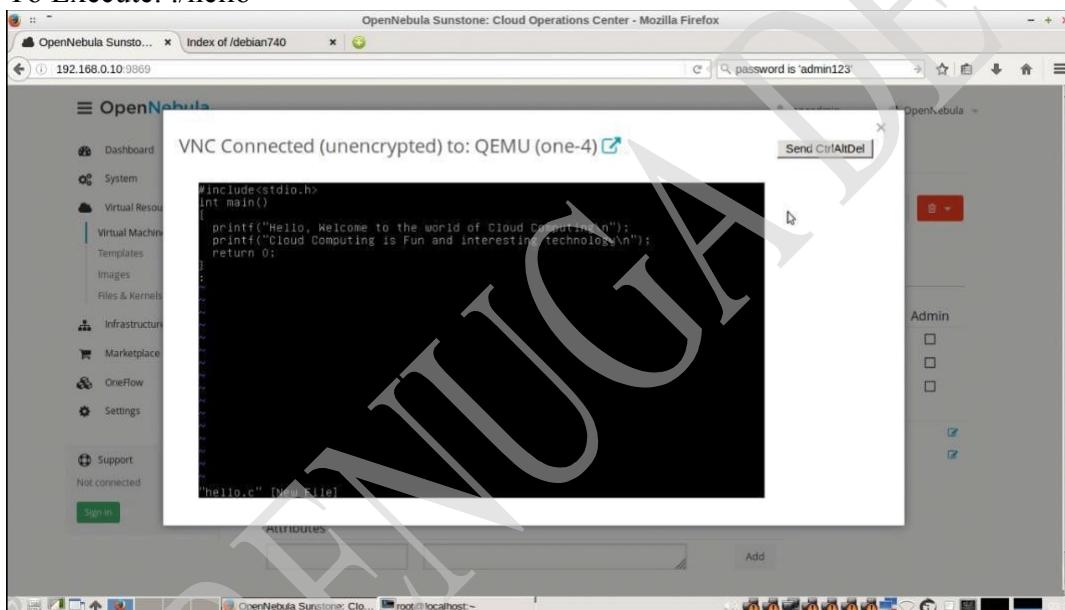
Owner	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Group	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

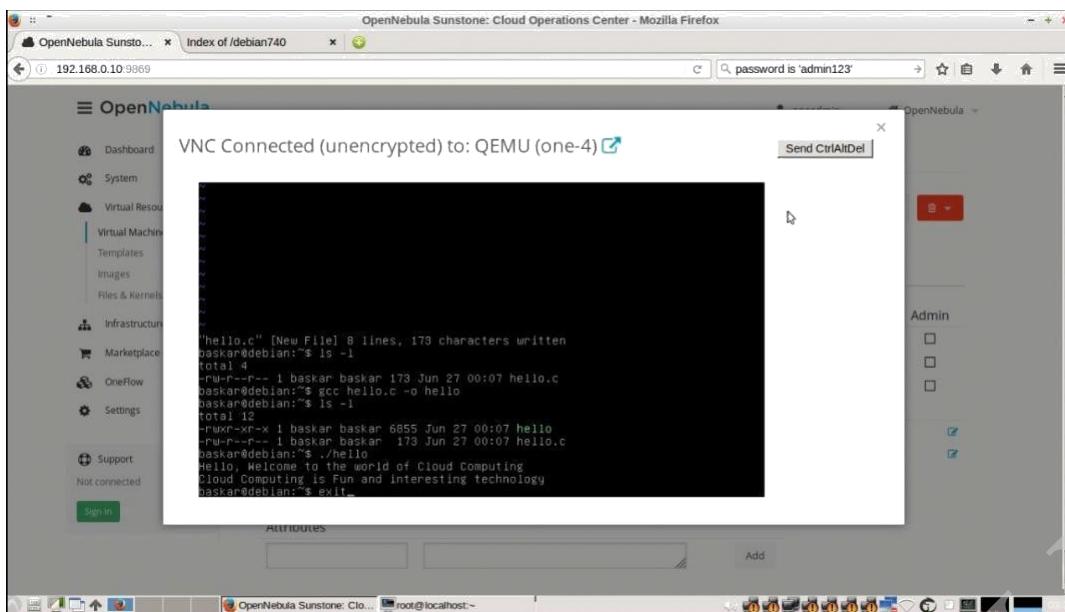
Ownership

Owner	oneadmin
Group	oneadmin



In the terminal, Open (nano/gedit or vi) editor followed by filename.c
Here, in the above screenshot I have typed vi hello.c and then type any sample c program. To compile: Command: gcc hello.c -o hello
To Execute: ./hello





Step: 15 To exit

Command: \$ exit.

```

root@localhost:~#
File Edit View Search Preferences Tabs Help
setting up cpp (4:4.7.2-1) ...
Setting up gcc-4.7 (4.7.2-5) ...
setting up gcc (4:4.7.2-1) ...
setting up libc-dev-bin (2.13-38+deb7u1) ...
Setting up linux-libc-dev:amd64 (3.2.54-2) ...
Setting up libc6-dev:amd64 (2.13-38+deb7u1) ...
Setting up manpages-dev (3.44-1) ...
root@debian:/etc/apt# adduser baskar
Adding user 'baskar' ...
Adding new group 'baskar' (1001) ...
Adding new user 'baskar' (1001) with group 'baskar' ...
Creating home directory '/home/baskar' ...
Copying files from '/etc/skel' ...
Enter new UNIX password:
Retype new UNIX password:
passwd: password updated successfully
changing the user information for baskar
Enter the new value, or press ENTER for the default
  Full Name []: Baskar Selvaraj
  Room Number []:
  Work Phone []:
  Home Phone []:
  Other []:
Is the information correct? [Y/n] y
root@debian:/etc/apt# passwd root
Enter new UNIX password:
Retype new UNIX password:
passwd: password updated successfully
root@debian:/etc/apt# exit

```

Result:

Thus, the C Compiler has been installed in the virtual machine and executed a sample program successfully.

EXP 10 : Creating Template in CentOS 6.5 using “onetemplate” command

AIM:

To Creating Template in CentOS 6.5 using “onetemplate” command

PROCEDURE:

Step:1 To open Terminal:

Press Alt+Ctrl+T, Initially it will be in gcclab username. Then, We have to switch into root user

```
File Edit View Search Preferences Tabs Help  
gcclab@gcc-server:~$
```

Step:2 Command to Switch from gcclab user to root user:

Command: \$ sudo bash

```
File Edit View Search Preferences Tabs Help  
gcclab@gcc-server:~$ sudo bash  
root@gcc-server:~#
```

Step:3 Login as one-admin

Command: \$ su – oneadmin

```
File Edit View Search Preferences Tabs Help  
gcclab@gcc-server:~$ sudo bash  
root@gcc-server:~# su – oneadmin  
oneadmin@gcc-server:~$
```

Step: 4 To check the template list in oneadmin

Command: \$ onetemplate list

```
File Edit View Search Preferences Tabs Help ROXTerm  
oneadmin@gcc-server:~$ onetemplate list  
ID USER GROUP NAME REGTIME  
oneadmin@gcc-server:~$
```

Step: 5 To create the template in oneadmin

R. RENUGA DEVI / IT / ANNA_UNIVERSITY_BIT_CAMPUS_TRICHY

Command: \$ onetemplate create --name "CentOS-6.5" --cpu 1 --vcpu 1 --memory 512 --arch x86_64 --disk "CentOS-6.5_x86_64" --nic "private" --vnc --ssh

```
File Edit View Search Preferences Tabs Help ROXTerm
oneadmin@gcc-server:~$ onetemplate list
  ID USER      GROUP      NAME      REGTIME
oneadmin@gcc-server:~$ onetemplate create --name "CentOS-6.5" --cpu 1 --vcpu 1 --memory 512 --arch x86_64 --disk "CentOS-6.5_x86_64" --nic "private" --vnc --ssh
ambiguous option: -nic
oneadmin@gcc-server:~$ onetemplate create --name "CentOS-6.5" --cpu 1 --vcpu 1 --memory 512 --arch x86_64 --disk "CentOS-6.5_x86_64" --nic "private" --vnc --ssh
ID: 0
oneadmin@gcc-server:~$ |
```

Step: 6 To check the template list in oneadmin

Command: \$ onetemplate list

```
File Edit View Search Preferences Tabs Help ROXTerm
oneadmin@gcc-server:~$ onetemplate list
  ID USER      GROUP      NAME      REGTIME
oneadmin@gcc-server:~$ onetemplate create --name "CentOS-6.5" --cpu 1 --vcpu 1 --memory 512 --arch x86_64 --disk "CentOS-6.5_x86_64" --nic "private" --vnc --ssh
ambiguous option: -nic
oneadmin@gcc-server:~$ onetemplate create --name "CentOS-6.5" --cpu 1 --vcpu 1 --memory 512 --arch x86_64 --disk "CentOS-6.5_x86_64" --nic "private" --vnc --ssh
ID: 0
oneadmin@gcc-server:~$ onetemplate list
  ID USER      GROUP      NAME      REGTIME
  0 oneadmin    oneadmin   CentOS-6.5  06/27 00:58:27
oneadmin@gcc-server:~$ |
```

Step: 7 Check whether template has been created or not in the Open-nebula dashboard. Under Virtual Resources--> Templates, You will be finding the templates which you have created.

ID	Owner	Group	Name	Registration time
0	oneadmin	oneadmin	CentOS-6.5	00:58:27 27/06/2016

Step: 8 Under Virtual Resources--> Templates; you will be finding the templates which you have created. Click CentOS-6.5 then you have click templates where you will be finding the information about templates.

The screenshot shows the OpenNebula Sunstone interface. The left sidebar has a 'Templates' section selected. The main area is titled 'Template' and shows details for 'CentOS-6.5'. It lists various configuration parameters under 'CONTEXT':

Parameter	Value
SSH_PUBLIC_KEY	\$USER{SSH_PUBLIC_KEY}
CPU	1.0
DISK	CentOS-6.5_x86_64
IMAGE	CentOS-6.5_x86_64
GRAPHICS	vnc
LISTEN	0.0.0.0
TYPE	vnc
MEMORY	512
NIC	private
NETWORK	x86_64
OS	1
ARCH	x86_64
VCPU	1

Result:

Thus, the Templates has been created successfully in the Virtual Machine CentOS-6.5

EXP 11 : Show the Virtual Machine migration based on certain condition from one node to other.

AIM:

To show the Virtual Machine migration based on certain condition from one node to other.

PROCEDURE:

Step: 1 To open Terminal:

Press Alt+Ctrl+T, Initially it will be in gcclab username. Then, We have to switch into root user

```
File Edit View Search Preferences Tabs Help
```

```
gcclab@gcc-server:~$
```

Step: 2 Command to Switch from gcclab user to root user:

Command:\$ sudo bash

```
File Edit View Search Preferences Tabs Help
```

```
gcclab@gcc-server:~$ sudo bash
root@gcc-server:~#
```

Step: 3 To Check ip Config

Command:\$ ifconfig

```
File Edit View Search Preferences Tabs Help
```

```
gcclab@ubuntu:~$ sudo bash
root@ubuntu:~# ifconfig
br0    Link encap:Ethernet HWaddr 70:f3:95:05:f1:3c
        inet addr:192.168.0.10 Bcast:192.168.0.255 Mask:255.255.255.0
          inet6 addr: fe80::72f3:95ff:fe05:f13c/64 Scope:Link
            UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
            RX packets:994669 errors:0 dropped:55 overruns:0 frame:0
            TX packets:98335 errors:0 dropped:0 overruns:0 carrier:0
            collisions:0 txqueuelen:0
            RX bytes:2862444094 (2.8 GB) TX bytes:3211141073 (3.2 GB)

em1    Link encap:Ethernet HWaddr 70:f3:95:05:f1:3c
        UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
        RX packets:2683326 errors:0 dropped:0 overruns:0 frame:0
        TX packets:2727318 errors:0 dropped:0 overruns:0 carrier:0
        collisions:0 txqueuelen:1000
        RX bytes:2998496028 (2.9 GB) TX bytes:3337266005 (3.3 GB)
        Interrupt:20 Memory:fe400000-fe420000

lo     Link encap:Local Loopback
        inet addr:127.0.0.1 Mask:255.0.0.0
        inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING MTU:65536 Metric:1
          RX packets:76584 errors:0 dropped:0 overruns:0 frame:0
          TX packets:76584 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:1503302877 (1.5 GB) TX bytes:1503302877 (1.5 GB)

virbr0   Link encap:Ethernet HWaddr 76:fc:2e:ce:b9:7e
        inet addr:192.168.122.1 Bcast:192.168.122.255 Mask:255.255.255.0
          UP BROADCAST MULTICAST MTU:1500 Metric:1
```

Step:4 Add the bridge ip address in the etc/hosts file

Command: \$nano /etc/hosts

Add the following bridge ip address in the hosts file.

192.168.0.10 frontend

192.168.0.11 node11

192.168.0.12 node12

192.168.0.13 node13

```

File Edit View Search Preferences Tabs Help
RX packets:994669 errors:0 dropped:55 overruns:0 frame:0
TX packets:98335 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:0
RX bytes:2862444094 (2.8 GB) TX bytes:3211141073 (3.2 GB)

em1      Link encap:Ethernet HWaddr 70:f3:95:05:f1:3c
          UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
          RX packets:2683326 errors:0 dropped:0 overruns:0 frame:0
          TX packets:2727318 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:2998496028 (2.9 GB) TX bytes:3337266005 (3.3 GB)
          Interrupt:20 Memory:fe400000-fe420000

lo       Link encap:Local Loopback
          inet addr:127.0.0.1 Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING MTU:65536 Metric:1
          RX packets:76584 errors:0 dropped:0 overruns:0 frame:0
          TX packets:76584 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:1503302877 (1.5 GB) TX bytes:1503302877 (1.5 GB)

virbr0   Link encap:Ethernet HWaddr 76:fc:2e:ce:b9:7e
          inet addr:192.168.122.1 Bcast:192.168.122.255 Mask:255.255.255.0
          UP BROADCAST MULTICAST MTU:1500 Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B) TX bytes:0 (0.0 B)

root@ubuntu:~# nano /etc/hosts|

```

```

File Edit View Search Preferences Tabs Help
GNU nano 2.2.6                               File: /etc/hosts                                         Modified
127.0.0.1      localhost
127.0.1.1      ubuntu

# The following lines are desirable for IPv6 capable hosts
::1      ip6-localhost ip6-loopback
fe00::0 ip6-localnet
ff00::0 ip6-mcastprefix
ff02::1 ip6-allnodes
ff02::2 ip6-allrouters

192.168.0.10  frontend
192.168.0.11  node11
192.168.0.12  node12
192.168.0.13  node13

File Name to Write: /etc/hosts
^G Get Help           M-D DOS Format        M-A Append        M-B Backup File
^C Cancel            M-M Mac Format        M-P Prepend

```

For save: ctrl+o enter
For exit: ctrl+x

Step: 5 Ping all the given IP address in the hosts file.
Command: \$ ping frontend

```

File Edit View Search Preferences Tabs Help

lo      Link encap:Local Loopback
        inet addr:127.0.0.1 Mask:255.0.0.0
        inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING MTU:65536 Metric:1
          RX packets:76584 errors:0 dropped:0 overruns:0 frame:0
          TX packets:76584 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:1503302877 (1.5 GB)  TX bytes:1503302877 (1.5 GB)

virbr0   Link encap:Ethernet HWaddr 76:fc:2e:ce:b9:7e
        inet addr:192.168.122.1 Bcast:192.168.122.255 Mask:255.255.255.0
          UP BROADCAST MULTICAST MTU:1500 Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

root@ubuntu:~# nano /etc/hosts
root@ubuntu:~# ping frontend
PING frontend (192.168.0.10) 56(84) bytes of data.
64 bytes from frontend (192.168.0.10): icmp_seq=1 ttl=64 time=0.060 ms
64 bytes from frontend (192.168.0.10): icmp_seq=2 ttl=64 time=0.046 ms
64 bytes from frontend (192.168.0.10): icmp_seq=3 ttl=64 time=0.037 ms
64 bytes from frontend (192.168.0.10): icmp_seq=4 ttl=64 time=0.052 ms
64 bytes from frontend (192.168.0.10): icmp_seq=5 ttl=64 time=0.066 ms
^C
--- frontend ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 3997ms
rtt min/avg/max/mdev = 0.037/0.052/0.066/0.011 ms
root@ubuntu:~

```

Command: \$ ping node11

```

File Edit View Search Preferences Tabs Help

TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:0
RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

root@ubuntu:~# nano /etc/hosts
root@ubuntu:~# ping frontend
PING frontend (192.168.0.10) 56(84) bytes of data.
64 bytes from frontend (192.168.0.10): icmp_seq=1 ttl=64 time=0.060 ms
64 bytes from frontend (192.168.0.10): icmp_seq=2 ttl=64 time=0.046 ms
64 bytes from frontend (192.168.0.10): icmp_seq=3 ttl=64 time=0.037 ms
64 bytes from frontend (192.168.0.10): icmp_seq=4 ttl=64 time=0.052 ms
64 bytes from frontend (192.168.0.10): icmp_seq=5 ttl=64 time=0.066 ms
^C
--- frontend ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 3997ms
rtt min/avg/max/mdev = 0.037/0.052/0.066/0.011 ms
root@ubuntu:~#
root@ubuntu:~# ping node11
PING node11 (192.168.0.11) 56(84) bytes of data.
64 bytes from node11 (192.168.0.11): icmp_seq=1 ttl=64 time=0.224 ms
64 bytes from node11 (192.168.0.11): icmp_seq=2 ttl=64 time=0.276 ms
64 bytes from node11 (192.168.0.11): icmp_seq=3 ttl=64 time=0.289 ms
64 bytes from node11 (192.168.0.11): icmp_seq=4 ttl=64 time=0.282 ms
64 bytes from node11 (192.168.0.11): icmp_seq=5 ttl=64 time=0.287 ms
64 bytes from node11 (192.168.0.11): icmp_seq=6 ttl=64 time=0.282 ms
^C
--- node11 ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 4997ms
rtt min/avg/max/mdev = 0.224/0.273/0.289/0.026 ms
root@ubuntu:~|

```

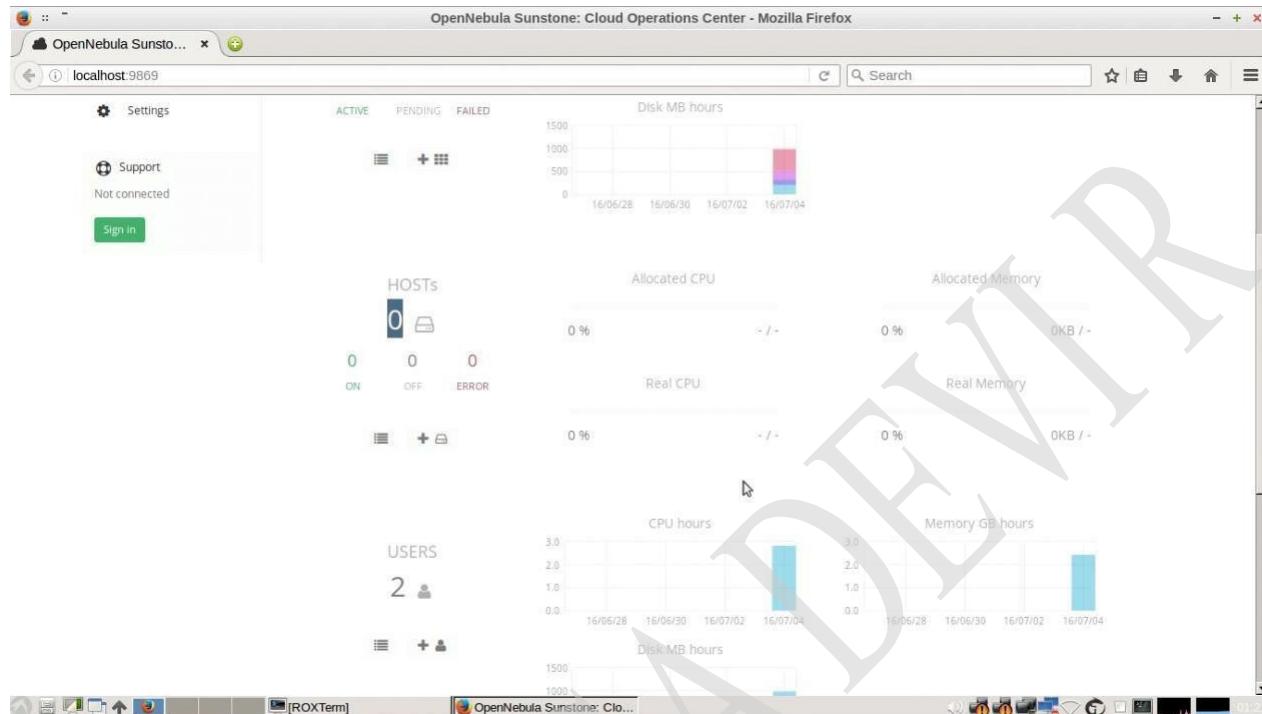
Command: \$ ping node12

```
File Edit View Search Preferences Tabs Help
--- frontend ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 3997ms
rtt min/avg/max/mdev = 0.037/0.052/0.066/0.011 ms
root@ubuntu:#
root@ubuntu:~#
root@ubuntu:~# ping node11
PING node11 (192.168.0.11) 56(84) bytes of data.
64 bytes from node11 (192.168.0.11): icmp_seq=1 ttl=64 time=0.224 ms
64 bytes from node11 (192.168.0.11): icmp_seq=2 ttl=64 time=0.276 ms
64 bytes from node11 (192.168.0.11): icmp_seq=3 ttl=64 time=0.289 ms
64 bytes from node11 (192.168.0.11): icmp_seq=4 ttl=64 time=0.282 ms
64 bytes from node11 (192.168.0.11): icmp_seq=5 ttl=64 time=0.287 ms
64 bytes from node11 (192.168.0.11): icmp_seq=6 ttl=64 time=0.282 ms
^C
--- node11 ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 4997ms
rtt min/avg/max/mdev = 0.224/0.273/0.289/0.026 ms
root@ubuntu:~
root@ubuntu:~# ping node12
PING node12 (192.168.0.12) 56(84) bytes of data.
64 bytes from node12 (192.168.0.12): icmp_seq=1 ttl=64 time=0.284 ms
64 bytes from node12 (192.168.0.12): icmp_seq=2 ttl=64 time=0.268 ms
64 bytes from node12 (192.168.0.12): icmp_seq=3 ttl=64 time=0.300 ms
64 bytes from node12 (192.168.0.12): icmp_seq=4 ttl=64 time=0.348 ms
64 bytes from node12 (192.168.0.12): icmp_seq=5 ttl=64 time=0.283 ms
64 bytes from node12 (192.168.0.12): icmp_seq=6 ttl=64 time=0.289 ms
^C
--- node12 ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 4997ms
rtt min/avg/max/mdev = 0.268/0.295/0.348/0.029 ms
root@ubuntu:~#
```

Command: \$ ping node13

```
File Edit View Search Preferences Tabs Help
^C
--- node11 ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 4997ms
rtt min/avg/max/mdev = 0.224/0.273/0.289/0.026 ms
root@ubuntu:~
root@ubuntu:~# ping node12
PING node12 (192.168.0.12) 56(84) bytes of data.
64 bytes from node12 (192.168.0.12): icmp_seq=1 ttl=64 time=0.284 ms
64 bytes from node12 (192.168.0.12): icmp_seq=2 ttl=64 time=0.268 ms
64 bytes from node12 (192.168.0.12): icmp_seq=3 ttl=64 time=0.300 ms
64 bytes from node12 (192.168.0.12): icmp_seq=4 ttl=64 time=0.348 ms
64 bytes from node12 (192.168.0.12): icmp_seq=5 ttl=64 time=0.283 ms
64 bytes from node12 (192.168.0.12): icmp_seq=6 ttl=64 time=0.289 ms
^C
--- node12 ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 4997ms
rtt min/avg/max/mdev = 0.268/0.295/0.348/0.029 ms
root@ubuntu:~
root@ubuntu:~# ping node13
PING node13 (192.168.0.13) 56(84) bytes of data.
64 bytes from node13 (192.168.0.13): icmp_seq=1 ttl=64 time=0.590 ms
64 bytes from node13 (192.168.0.13): icmp_seq=2 ttl=64 time=0.544 ms
64 bytes from node13 (192.168.0.13): icmp_seq=3 ttl=64 time=0.492 ms
64 bytes from node13 (192.168.0.13): icmp_seq=4 ttl=64 time=0.537 ms
64 bytes from node13 (192.168.0.13): icmp_seq=5 ttl=64 time=0.505 ms
64 bytes from node13 (192.168.0.13): icmp_seq=6 ttl=64 time=0.501 ms
^C
--- node13 ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 5001ms
rtt min/avg/max/mdev = 0.492/0.528/0.590/0.036 ms
root@ubuntu:~#
```

Step: 6 Open the Open-nebula dashboard and view the number of host present in the Hosts. (Initially it would be 0).



Step: 7 Login into one admin

Command: \$ su - oneadmin

```
File Edit View Search Preferences Tabs Help
gcclab@gcc-server:~$ sudo bash
root@gcc-server:~# su - oneadmin
oneadmin@gcc-server:~$
```

Step: 8 To View the number of hosts already created

Command: \$onehost list

```

File Edit View Search Preferences Tabs Help
ROXTerm
64 bytes from node12 (192.168.0.12): icmp_seq=2 ttl=64 time=0.268 ms
64 bytes from node12 (192.168.0.12): icmp_seq=3 ttl=64 time=0.300 ms
64 bytes from node12 (192.168.0.12): icmp_seq=4 ttl=64 time=0.348 ms
64 bytes from node12 (192.168.0.12): icmp_seq=5 ttl=64 time=0.283 ms
64 bytes from node12 (192.168.0.12): icmp_seq=6 ttl=64 time=0.289 ms
^C
--- node12 ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 4997ms
rtt min/avg/max/mdev = 0.268/0.295/0.348/0.029 ms
root@ubuntu:~#
root@ubuntu:~# ping node13
PING node13 (192.168.0.13) 56(84) bytes of data.
64 bytes from node13 (192.168.0.13): icmp_seq=1 ttl=64 time=0.590 ms
64 bytes from node13 (192.168.0.13): icmp_seq=2 ttl=64 time=0.544 ms
64 bytes from node13 (192.168.0.13): icmp_seq=3 ttl=64 time=0.492 ms
64 bytes from node13 (192.168.0.13): icmp_seq=4 ttl=64 time=0.537 ms
64 bytes from node13 (192.168.0.13): icmp_seq=5 ttl=64 time=0.505 ms
64 bytes from node13 (192.168.0.13): icmp_seq=6 ttl=64 time=0.501 ms
^C
--- node13 ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 5001ms
rtt min/avg/max/mdev = 0.492/0.528/0.590/0.036 ms
root@ubuntu:~#
root@ubuntu:~#
root@ubuntu:~# su - oneadmin
oneadmin@ubuntu:~$ onehost list
  ID  NAME      CLUSTER   RVM    ALLOCATED_CPU    ALLOCATED_MEM STAT
oneadmin@ubuntu:~$ |

```

Step: 9 To create the host

Command:

```

$ onehost create frontend -i kvm -v kvm -n dummy $  

onehost create node11 -i kvm -v kvm -n dummy $  

onehost create node12 -i kvm -v kvm -n dummy $  

onehost create node13 -i kvm -v kvm -n dummy

```

```

File Edit View Search Preferences Tabs Help
ROXTerm
rtt min/avg/max/mdev = 0.268/0.295/0.348/0.029 ms
root@ubuntu:~#
root@ubuntu:~# ping node13
PING node13 (192.168.0.13) 56(84) bytes of data.
64 bytes from node13 (192.168.0.13): icmp_seq=1 ttl=64 time=0.590 ms
64 bytes from node13 (192.168.0.13): icmp_seq=2 ttl=64 time=0.544 ms
64 bytes from node13 (192.168.0.13): icmp_seq=3 ttl=64 time=0.492 ms
64 bytes from node13 (192.168.0.13): icmp_seq=4 ttl=64 time=0.537 ms
64 bytes from node13 (192.168.0.13): icmp_seq=5 ttl=64 time=0.505 ms
64 bytes from node13 (192.168.0.13): icmp_seq=6 ttl=64 time=0.501 ms
^C
--- node13 ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 5001ms
rtt min/avg/max/mdev = 0.492/0.528/0.590/0.036 ms
root@ubuntu:~#
root@ubuntu:~#
root@ubuntu:~# su - oneadmin
oneadmin@ubuntu:~$ onehost list
  ID  NAME      CLUSTER   RVM    ALLOCATED_CPU    ALLOCATED_MEM STAT
oneadmin@ubuntu:~$ onehost create frontend -i kvm -v kvm -n dummy
ID: 4
oneadmin@ubuntu:~$ onehost create node11 -i kvm -v kvm -n dummy
ID: 5
oneadmin@ubuntu:~$ onehost create node12 -i kvm -v kvm -n dummy
ID: 6
oneadmin@ubuntu:~$ onehost create node13 -i kvm -v kvm -n dummy
ID: 7
oneadmin@ubuntu:~$ |

```

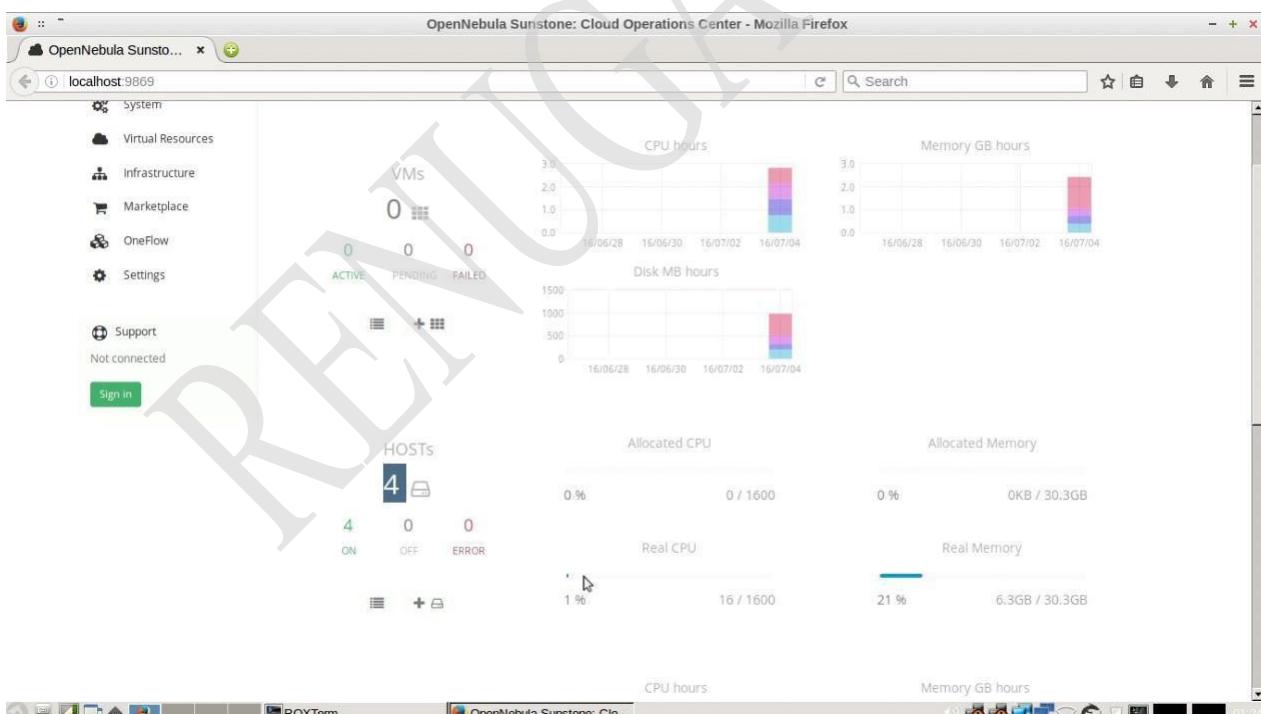
Step: 10 Now list the host and check the status of all hosts

Command: \$ onehost list

```
File Edit View Preferences Tabs Help
ROXTerm
6 packets transmitted, 6 received, 0% packet loss, time 5001ms
rtt min/avg/max/mdev = 0.492/0.528/0.590/0.036 ms
root@ubuntu:#
root@ubuntu:~#
root@ubuntu:~# su -
oneadmin@ubuntu:~$ onehost list
  ID NAME      CLUSTER   RVM     ALLOCATED_CPU     ALLOCATED_MEM_STAT
oneadmin@ubuntu:~$ onehost create frontend -i kvm -v kvm -n dummy
ID: 4
oneadmin@ubuntu:~$ onehost create node11 -i kvm -v kvm -n dummy
ID: 5
oneadmin@ubuntu:~$ onehost create node12 -i kvm -v kvm -n dummy
ID: 6
oneadmin@ubuntu:~$ onehost create node13 -i kvm -v kvm -n dummy
ID: 7
oneadmin@ubuntu:~$ onehost list
  ID NAME      CLUSTER   RVM     ALLOCATED_CPU     ALLOCATED_MEM_STAT
  4 frontend    -        0       0 / 400 (0%)    0K / 7.5G (0%) on
  5 node11     -        0       0 / 400 (0%)    0K / 7.7G (0%) on
  6 node12     -        0       0 / 400 (0%)    0K / 7.5G (0%) on
  7 node13     -        0       -                  - init
oneadmin@ubuntu:~$ onehost list
  ID NAME      CLUSTER   RVM     ALLOCATED_CPU     ALLOCATED_MEM_STAT
  4 frontend    -        0       0 / 400 (0%)    0K / 7.5G (0%) on
  5 node11     -        0       0 / 400 (0%)    0K / 7.7G (0%) on
  6 node12     -        0       0 / 400 (0%)    0K / 7.5G (0%) on
  7 node13     -        0       0 / 400 (0%)    0K / 7.7G (0%) on
oneadmin@ubuntu:~$
```

Step: 11 open dashboard and view host.

Click on host.(It shows the hosts that are created along with its specification).



OpenNebula Sunstone: Cloud Operations Center - Mozilla Firefox

OpenNebula Sunstone x

localhost:9869

Search

oneadmin OpenNebula

OpenNebula

- Dashboard
- System
- Virtual Resources
- Infrastructure
- Marketplace
- OneFlow
- Settings
- Support
- Not connected

Hosts

	ID	Name	Cluster	RVMs	Allocated CPU	Allocated MEM	Status
<input type="checkbox"/>	7	node13	-	0	0 / 400 (0%)	0KB / 7.7GB (0%)	ON
<input type="checkbox"/>	6	node12	-	0	0 / 400 (0%)	0KB / 7.5GB (0%)	ON
<input type="checkbox"/>	5	node11	-	0	0 / 400 (0%)	0KB / 7.7GB (0%)	ON
<input type="checkbox"/>	4	frontend	-	0	0 / 400 (0%)	0KB / 7.5GB (0%)	ON

Showing 1 to 4 of 4 entries

4 TOTAL 4 ON 0 OFF 0 ERROR

OpenNebula 4.14.2 by OpenNebula Systems.

Step:12 List the host

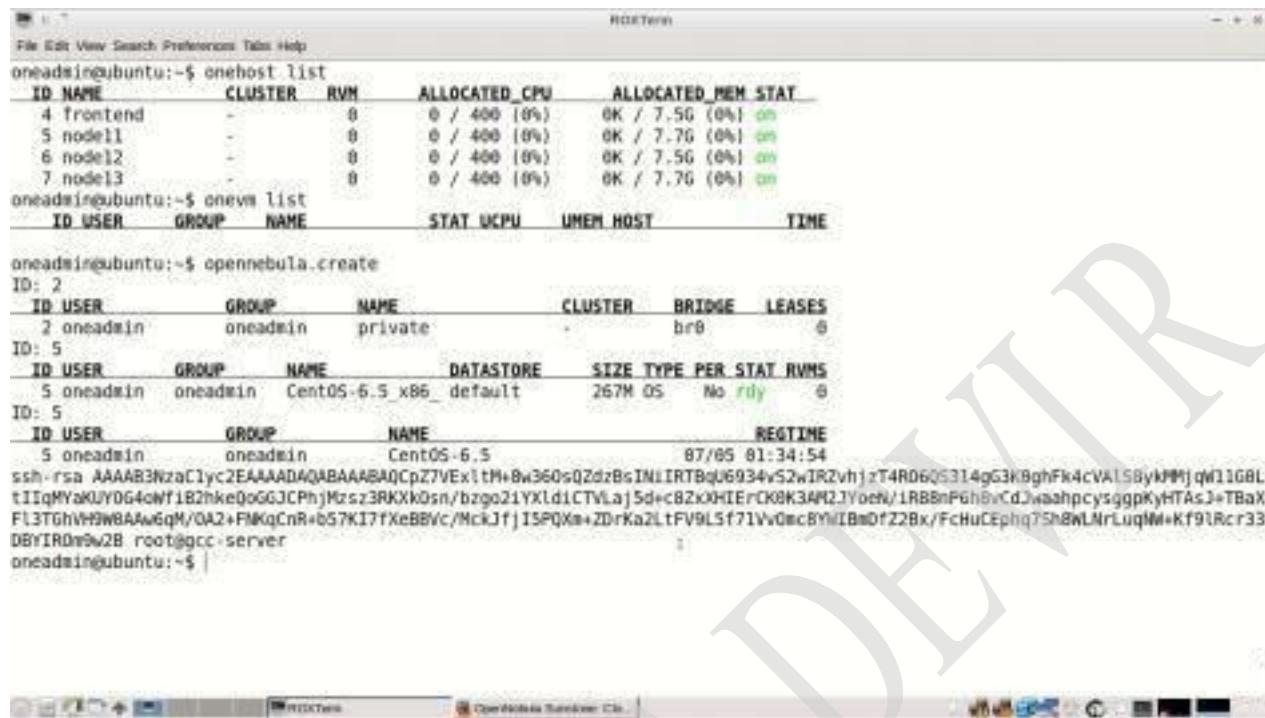
Command: \$ onehost list

```
File Edit View Search Preferences Tabs Help
ROXTerm
oneadmin@ubuntu:~$ onehost list
  ID NAME CLUSTER RVM ALLOCATED_CPU ALLOCATED_MEM STAT
  4 frontend - 0 0 / 400 (0%) 0K / 7.5G (0%) on
  5 node11 - 0 0 / 400 (0%) 0K / 7.7G (0%) on
  6 node12 - 0 0 / 400 (0%) 0K / 7.5G (0%) on
  7 node13 - 0 0 / 400 (0%) 0K / 7.7G (0%) on
oneadmin@ubuntu:~$ onevm list
  ID USER GROUP NAME STAT UCPU UMEM HOST TIME
oneadmin@ubuntu:~$ opennebula.create
ID: 2
```



Step: 13 create open nebula

Command:\$ opennebula.create



```
File Edit View Search Preferences Tools Help
oneadmin@ubuntu:~$ onehost list
ID NAME CLUSTER RVM ALLOCATED_CPU ALLOCATED_MEM_STAT
4 Frontend - 0 0 / 400 (0%) OK / 7.5G (0%) on
5 node11 - 0 0 / 400 (0%) OK / 7.7G (0%) on
6 node12 - 0 0 / 400 (0%) OK / 7.5G (0%) on
7 node13 - 0 0 / 400 (0%) OK / 7.7G (0%) on
oneadmin@ubuntu:~$ onevm list
ID USER GROUP NAME STAT UCPU UMEM HOST TIME
oneadmin@ubuntu:~$ opennebula.create
ID: 2
ID_USER GROUP NAME CLUSTER BRIDGE LEASES
2 oneadmin oneadmin private - br0 0
ID: 5
ID_USER GROUP NAME DATASTORE SIZE TYPE PER_STAT RVMs
5 oneadmin oneadmin CentOS-6.5 x86_default 267M OS No rdy 0
ID: 5
ID_USER GROUP NAME REGTIME
5 oneadmin oneadmin CentOS-6.5 87/85 81:34:54
ssh-rsa AAAAB3NzaC1yc2EAAAQABAAQCPz7VExltM+Bw360sQ2dzBsINLIRTBqU6934vS2wIR2vhjzT4R0605314gG3KBghFk4cVALSBYkHMjqW11GBL
tIIqMVakUY0G4ewf1B2hke0oGG3CPPhjMzsZ3RKXk0sn/bzgo21YXld1CTVLaj5d+e82x0HIErCK8K3AM2JYoen/1RB8nF6h8vCdJwaahpcysggpKyHTAsJ+TBaX
FL3TGHV9WBAAwGqM/0A2+FMKqCnR+b57K17fxEBBc/MckJfj1SP0Xa+ZDrKa2LtFV9Lsf71Vv0mcBYhIBaOfZ2Bx/FcHuCEphq75h8wLNrLuqNM+Kf91Rcr33
DBYIRDm9w2B root@gcc-server
oneadmin@ubuntu:~$ |
```

Note: Once you create Opennebula you will get ssh-rsa key. Copy the ssh rsa part and goto open nebula dashboard

Step: 13 Open settings and click on the public ssh key and paste the copied ssh rsa code.

Step: 14 List the virtual machines created

Command:\$ onevm list

```

File Edit View Preferences Tabs Help
File Edit View Preferences Tabs Help
ROXTerm
oneadmin@ubuntu:~$ onehost list
  ID NAME CLUSTER RVM ALLOCATED_CPU ALLOCATED_MEM_STAT
  4 frontend - 0 0 / 400 (0%) 0K / 7.5G (0%) on
  5 node11 - 0 0 / 400 (0%) 0K / 7.7G (0%) on
  6 node12 - 0 0 / 400 (0%) 0K / 7.5G (0%) on
  7 node13 - 0 0 / 400 (0%) 0K / 7.7G (0%) on
oneadmin@ubuntu:~$ onevm list
  ID USER GROUP NAME STAT UCPU UMEM HOST TIME
oneadmin@ubuntu:~$ opennebula.create
ID: 2
  ID USER GROUP NAME CLUSTER BRIDGE LEASES
  2 oneadmin oneadmin private - br0 0
ID: 5
  ID USER GROUP NAME DATASTORE SIZE TYPE PER_STAT RVMS
  5 oneadmin oneadmin CentOS-6.5_x86 default 267M OS No rdy 0
ID: 5
  ID USER GROUP NAME REGTIME
  5 oneadmin oneadmin CentOS-6.5 07/05 01:34:54
ssh-rsa AAAAB3NzaC1yc2EAAAQABAAQCPz7VExltM+8w360sQZdzBsINiIRTBqU6934vS2wIRZvhjzT4R06QS314gG3K0ghFk4cVAlS8ykMMjqW11G0L
tIIqMYaUYOG4oWfiB2hke0GGJCPhjMzsZ3RKXk0sn/bzgo2iYXldiCTVLaj5d+c8ZXHIErCK0K3AM2JYoeN/1R88nP6h8vCdJwaahpcysggpKyHTAsJ+TBaX
Fl3TGhVh9W0AAw6qM/0A2+FNKqCnR+b57KI7fxEBBvC/MckJfjIS5PQXm+ZDrKa2LtFV9L5f71Vv0mc8YWIbmdfZ2Bx/FcHuCEphq7Sh8WLNrLuqNW+Kf9lRcr33
DBYIROM9w2B root@gcc-server
oneadmin@ubuntu:~$ onevm list
  ID USER GROUP NAME STAT UCPU UMEM HOST TIME
oneadmin@ubuntu:~$ onetemplate instantiate "CentOS-6.5" --name "CentOS 6.5 (64-Bit) Virtual Machine"
VM ID: 5
oneadmin@ubuntu:~$ |

```

Step: 15 Instantiate the template

Command:\$onetemplate instantiate “Centos-6.5” --name “Centos-6.5 (64-Bit) Virtual achine ”

```

File Edit View Search Preferences Tabs Help ROXTerm
oneadmin@ubuntu:~$ onehost list
  ID NAME      CLUSTER   RVM    ALLOCATED_CPU    ALLOCATED_MEM_STAT
  4 frontend     -        0    0 / 400 (0%)    OK / 7.5G (0%) on
  5 node11     -        0    0 / 400 (0%)    OK / 7.7G (0%) on
  6 node12     -        0    0 / 400 (0%)    OK / 7.5G (0%) on
  7 node13     -        0    0 / 400 (0%)    OK / 7.7G (0%) on
oneadmin@ubuntu:~$ onevm list
  ID USER      GROUP      NAME      STAT UCPU    UMEM HOST      TIME
  ID USER      GROUP      NAME      DATASTORE      SIZE TYPE PER_STAT RVMS
  ID USER      GROUP      NAME      REGTIME
  ID USER      GROUP      NAME      REGTIME
ssh-rsa AAAAB3NzaC1yc2EAAAQABAAQCPz7VExltM+8w360sQZdzBsINiIRTBqU6934vS2wIRZhjzT4R06QS314gG3K0ghFk4cVals8ykMMjqW11G0L
tIIqMYaKUYOG4oWfiB2hke0GGJCPbjMzs23RKXk0sn/bzgo2iYXldiCTVLaj5d+c8ZxXHIErCK0K3AM2JYoeN/iR88nP6h8vCdJwaahpcysggpKyHTAsJ+TBaX
Fl3TGhVH9W0AAw6qM/0A2+FNKqCnR+b57KI7fxEBBvC/MckJfjI5PQXm+ZDrKa2LtFV9L5f71Vv0mc8YWIBmDfZ2Bx/FcHuCEphq7Sh8WLNrLuqNW+Kf9lRcr33
DBYIR0m9w2B root@gcc-server
oneadmin@ubuntu:~$ onevm list
  ID USER      GROUP      NAME      STAT UCPU    UMEM HOST      TIME
  oneadmin@ubuntu:~$ onetemplate instantiate "CentOS-6.5" --name "CentOS 6.5 (64-Bit) Virtual Machine"
VM ID: 5
oneadmin@ubuntu:~$ |

```

Step: 16 List the virtual machines created until the host connected gets into running state.

Command:\$ onevm list

```

File Edit View Search Preferences Tabs Help ROXTerm
oneadmin@ubuntu:~$ opennebula.create
ID: 2
  ID USER      GROUP      NAME      CLUSTER   BRIDGE   LEASES
  2 oneadmin     oneadmin     private      -        br0        0
ID: 5
  ID USER      GROUP      NAME      DATASTORE      SIZE TYPE PER_STAT RVMS
  5 oneadmin     oneadmin     CentOS-6.5_x86_default 267M OS      No ready  0
ID: 5
  ID USER      GROUP      NAME      REGTIME
  5 oneadmin     oneadmin     CentOS-6.5      07/05 01:34:54
ssh-rsa AAAAB3NzaC1yc2EAAAQABAAQCPz7VExltM+8w360sQZdzBsINiIRTBqU6934vS2wIRZhjzT4R06QS314gG3K0ghFk4cvals8ykMMjqW11G0L
tIIqMYaKUYOG4oWfiB2hke0GGJCPbjMzs23RKXk0sn/bzgo2iYXldiCTVLaj5d+c8ZxXHIErCK0K3AM2JYoeN/iR88nP6h8vCdJwaahpcysggpKyHTAsJ+TBaX
Fl3TGhVH9W0AAw6qM/0A2+FNKqCnR+b57KI7fxEBBvC/MckJfjI5PQXm+ZDrKa2LtFV9L5f71Vv0mc8YWIBmDfZ2Bx/FcHuCEphq7Sh8WLNrLuqNW+Kf9lRcr33
DBYIR0m9w2B root@gcc-server
oneadmin@ubuntu:~$ onevm list
  ID USER      GROUP      NAME      STAT UCPU    UMEM HOST      TIME
  5 oneadmin     oneadmin     CentOS 6.5 (64- pend    0      OK      0d 00h00
oneadmin@ubuntu:~$ onevm list
  ID USER      GROUP      NAME      STAT UCPU    UMEM HOST      TIME
  5 oneadmin     oneadmin     CentOS 6.5 (64- pend    0      OK      0d 00h00
oneadmin@ubuntu:~$ onevm list
  ID USER      GROUP      NAME      STAT UCPU    UMEM HOST      TIME
  5 oneadmin     oneadmin     CentOS 6.5 (64- prol    0      OK node13    0d 00h00
oneadmin@ubuntu:~$ |

```

```

File Edit View Search Preferences Tabs Help
5 oneadmin oneadmin CentOS-6.5_x86_default      267M OS  No rdy  0
ID: 5
ID USER GROUP NAME REGTIME
5 oneadmin oneadmin CentOS-6.5 07/05 01:34:54
ssh-rsa AAAAB3NzaC1yc2EAAAQABAAQ0CpZ7ExltM+8w360sQZdzBsINiIRTBqU6934vS2wIRZvhjzT4R06QS314gG3K0ghFk4cVAL58ykMMjqW11G0L
tIIqMYaKUY0G4oWfiB2hkeQoGGJCPhjMzsZ3RKXk0sn/bzgo2iYXldiCTVLaj5d+c8ZxXHIErCK0K3AM2JYoeN/iR88nP6h8vCdJwaahpcysggpKyHTAsJ+TBaX
FL3TGhVH9W0AAw6gM/0A2+FNKqCnR+b57KI7fxeBBVc/MckJfjI5PQXm+ZDrKa2LtFV9L5f71Vv0mc8YWIBmDfZ2Bx/FcHuCEphq7Sh8WLNrLuqNW+Kf9lRcr33
DBYIR0m9w2B root@gcc-server
oneadmin@ubuntu:~$ onevm list
ID USER GROUP NAME STAT UCPU UMEM HOST TIME
oneadmin@ubuntu:~$ onetemplate instantiate "CentOS-6.5" --name "CentOS 6.5 (64-Bit) Virtual Machine"
VM ID: 5
oneadmin@ubuntu:~$ onevm list
ID USER GROUP NAME STAT UCPU UMEM HOST TIME
5 oneadmin oneadmin CentOS 6.5 (64- pend 0 OK 0d 00h00
oneadmin@ubuntu:~$ onevm list
ID USER GROUP NAME STAT UCPU UMEM HOST TIME
5 oneadmin oneadmin CentOS 6.5 (64- pend 0 OK 0d 00h00
oneadmin@ubuntu:~$ onevm list
ID USER GROUP NAME STAT UCPU UMEM HOST TIME
5 oneadmin oneadmin CentOS 6.5 (64- prol 0 OK node13 0d 00h00
oneadmin@ubuntu:~$ onevm list
ID USER GROUP NAME STAT UCPU UMEM HOST TIME
5 oneadmin oneadmin CentOS 6.5 (64- prol 0 OK node13 0d 00h00
oneadmin@ubuntu:~$ onevm list
ID USER GROUP NAME STAT UCPU UMEM HOST TIME
5 oneadmin oneadmin CentOS 6.5 (64- fail 0 OK node13 0d 00h00
oneadmin@ubuntu:~$
```

Step: 17 Display the Contents of the Log File .

Command:\$ cat /var/log/one/5.log

```

File Edit View Search Preferences Tabs Help
ROXTerm
oneadmin@ubuntu:~$ onevm list
      ID USER  GROUP   NAME    STAT UCPU  UMEM HOST        TIME
      5 oneadmin oneadmin CentOS 6.5 (64- pend    0     0K       0d 00h00
oneadmin@ubuntu:~$ onevm list
      ID USER  GROUP   NAME    STAT UCPU  UMEM HOST        TIME
      5 oneadmin oneadmin CentOS 6.5 (64- prol    0     0K node13  0d 00h00
oneadmin@ubuntu:~$ onevm list
      ID USER  GROUP   NAME    STAT UCPU  UMEM HOST        TIME
      5 oneadmin oneadmin CentOS 6.5 (64- prol    0     0K node13  0d 00h00
oneadmin@ubuntu:~$ onevm list
      ID USER  GROUP   NAME    STAT UCPU  UMEM HOST        TIME
      5 oneadmin oneadmin CentOS 6.5 (64- fail    0     0K node13  0d 00h00
oneadmin@ubuntu:~$ cat /var/log/one/5.log
Tue Jul 5 01:36:27 2016 [Z0][VM][I]: New state is ACTIVE
Tue Jul 5 01:36:27 2016 [Z0][VM][I]: New LCM state is PROLOG
Tue Jul 5 01:36:49 2016 [Z0][VM][I]: New LCM state is BOOT
Tue Jul 5 01:36:49 2016 [Z0][VMM][I]: Generating deployment file: /var/lib/one/vms/5/deployment.0
Tue Jul 5 01:36:49 2016 [Z0][VMM][I]: ExitCode: 0
Tue Jul 5 01:36:49 2016 [Z0][VMM][I]: Successfully execute network driver operation: pre.
Tue Jul 5 01:36:50 2016 [Z0][VMM][I]: Command execution fail: cat << EOT | /var/tmp/one/vmm/kvm/deploy '/var/lib/one//data
stores/0/5/deployment.0' 'node13' 5 node13
Tue Jul 5 01:36:50 2016 [Z0][VMM][I]: error: Failed to create domain from /var/lib/one//datastores/0/5/deployment.0
Tue Jul 5 01:36:50 2016 [Z0][VMM][I]: error: unsupported configuration: Domain requires KVM, but it is not available. Chec
k that virtualization is enabled in the host BIOS, and host configuration is setup to load the kvm modules.
Tue Jul 5 01:36:50 2016 [Z0][VMM][E]: Could not create domain from /var/lib/one//datastores/0/5/deployment.0
Tue Jul 5 01:36:50 2016 [Z0][VMM][I]: ExitCode: 255
Tue Jul 5 01:36:50 2016 [Z0][VMM][I]: Failed to execute virtualization driver operation: deploy.
Tue Jul 5 01:36:50 2016 [Z0][VMM][E]: Error deploying virtual machine: Could not create domain from /var/lib/one//datastor
es/0/5/deployment.0
Tue Jul 5 01:36:50 2016 [Z0][VM][I]: New LCM state is BOOT_FAILURE
oneadmin@ubuntu:~$
```

Note: Node13 will not run on the virtual machine, because virtualization is not enabled. We should enable the Virtualization extension in the BIOS and the virtual machine will automatically run in the node13.

Step: 18 Again list the virtual machine

Command:\$onevm list

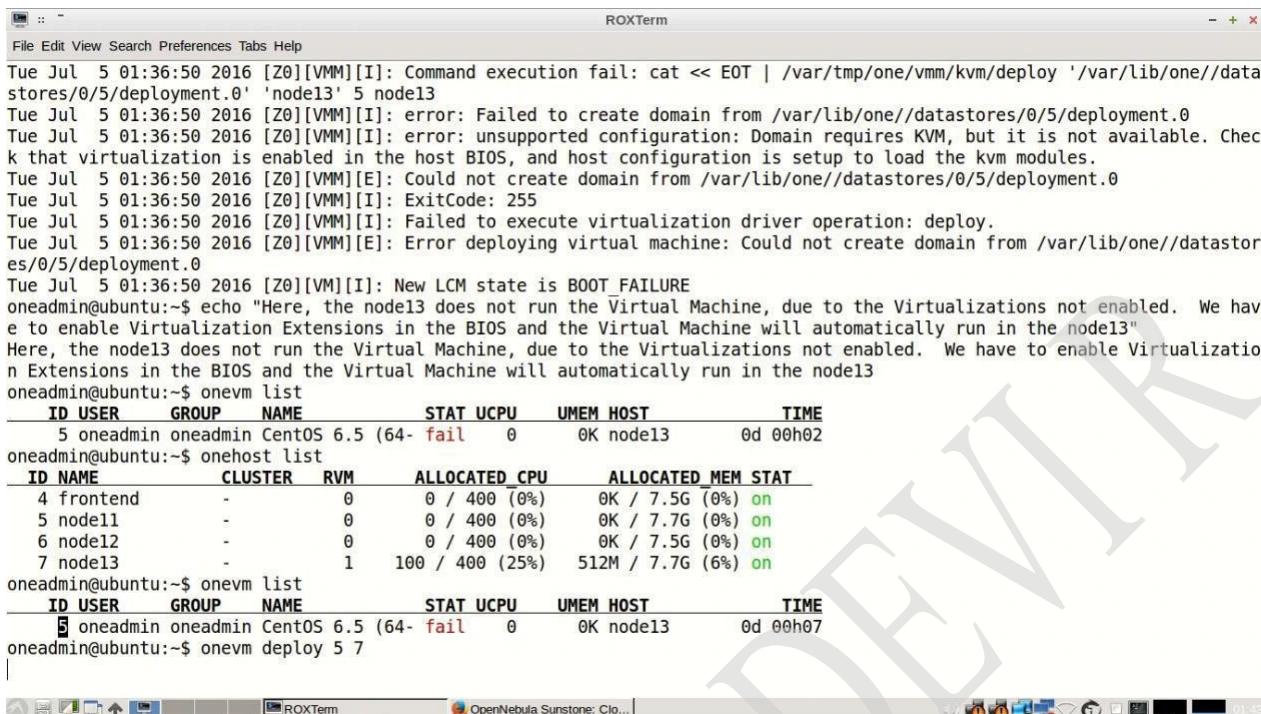
```

File Edit View Search Preferences Tabs Help
ROXTerm
oneadmin@ubuntu:~$ onevm list
      ID USER  GROUP   NAME    STAT UCPU  UMEM HOST        TIME
      5 oneadmin oneadmin CentOS 6.5 (64- fail    0     0K node13  0d 00h00
oneadmin@ubuntu:~$ cat /var/log/one/5.log
Tue Jul 5 01:36:27 2016 [Z0][VM][I]: New state is ACTIVE
Tue Jul 5 01:36:27 2016 [Z0][VM][I]: New LCM state is PROLOG
Tue Jul 5 01:36:49 2016 [Z0][VM][I]: New LCM state is BOOT
Tue Jul 5 01:36:49 2016 [Z0][VMM][I]: Generating deployment file: /var/lib/one/vms/5/deployment.0
Tue Jul 5 01:36:49 2016 [Z0][VMM][I]: ExitCode: 0
Tue Jul 5 01:36:49 2016 [Z0][VMM][I]: Successfully execute network driver operation: pre.
Tue Jul 5 01:36:50 2016 [Z0][VMM][I]: Command execution fail: cat << EOT | /var/tmp/one/vmm/kvm/deploy '/var/lib/one//data
stores/0/5/deployment.0' 'node13' 5 node13
Tue Jul 5 01:36:50 2016 [Z0][VMM][I]: error: Failed to create domain from /var/lib/one//datastores/0/5/deployment.0
Tue Jul 5 01:36:50 2016 [Z0][VMM][I]: error: unsupported configuration: Domain requires KVM, but it is not available. Chec
k that virtualization is enabled in the host BIOS, and host configuration is setup to load the kvm modules.
Tue Jul 5 01:36:50 2016 [Z0][VMM][E]: Could not create domain from /var/lib/one//datastores/0/5/deployment.0
Tue Jul 5 01:36:50 2016 [Z0][VMM][I]: ExitCode: 255
Tue Jul 5 01:36:50 2016 [Z0][VMM][I]: Failed to execute virtualization driver operation: deploy.
Tue Jul 5 01:36:50 2016 [Z0][VMM][E]: Error deploying virtual machine: Could not create domain from /var/lib/one//datastor
es/0/5/deployment.0
Tue Jul 5 01:36:50 2016 [Z0][VM][I]: New LCM state is BOOT_FAILURE
oneadmin@ubuntu:~$ echo "Here, the node13 does not run the Virtual Machine, due to the Virtualizations not enabled. We hav
e to enable Virtualization Extensions in the BIOS and the Virtual Machine will automatically run in the node13"
Here, the node13 does not run the Virtual Machine, due to the Virtualizations not enabled. We have to enable Virtualizatio
n Extensions in the BIOS and the Virtual Machine will automatically run in the node13
oneadmin@ubuntu:~$ onevm list
      ID USER  GROUP   NAME    STAT UCPU  UMEM HOST        TIME
      5 oneadmin oneadmin CentOS 6.5 (64- fail    0     0K node13  0d 00h02
oneadmin@ubuntu:~$ |
```

Step: 19 List the host along with the node connected and its state. And list the virtual machines *R. RENUGA DEVI/IT/ANNA_UNIVERSITY_BIT_CAMPUS_TRICHY*

created.

Command: \$ onehost list
\$ onevm list



```
Tue Jul 5 01:36:50 2016 [Z0][VMM][I]: Command execution fail: cat << EOT | /var/tmp/one/vmm/kvm/deploy '/var/lib/one//data stores/0/5/deployment.0' 'node13' 5 node13
Tue Jul 5 01:36:50 2016 [Z0][VMM][I]: error: Failed to create domain from /var/lib/one//datastores/0/5/deployment.0
Tue Jul 5 01:36:50 2016 [Z0][VMM][I]: error: unsupported configuration: Domain requires KVM, but it is not available. Check that virtualization is enabled in the host BIOS, and host configuration is setup to load the kvm modules.
Tue Jul 5 01:36:50 2016 [Z0][VMM][E]: Could not create domain from /var/lib/one//datastores/0/5/deployment.0
Tue Jul 5 01:36:50 2016 [Z0][VMM][I]: ExitCode: 255
Tue Jul 5 01:36:50 2016 [Z0][VMM][I]: Failed to execute virtualization driver operation: deploy.
Tue Jul 5 01:36:50 2016 [Z0][VMM][E]: Error deploying virtual machine: Could not create domain from /var/lib/one//datastores/0/5/deployment.0
Tue Jul 5 01:36:50 2016 [Z0][VM][I]: New LCM state is BOOT_FAILURE
oneadmin@ubuntu:~$ echo "Here, the node13 does not run the Virtual Machine, due to the Virtualizations not enabled. We have to enable Virtualization Extensions in the BIOS and the Virtual Machine will automatically run in the node13"
Here, the node13 does not run the Virtual Machine, due to the Virtualizations not enabled. We have to enable Virtualization Extensions in the BIOS and the Virtual Machine will automatically run in the node13
oneadmin@ubuntu:~$ onevm list
  ID USER GROUP NAME      STAT UCPU   UMEM HOST      TIME
  5 oneadmin oneadmin Centos 6.5 (64- fail    0     OK node13  0d 00h02
oneadmin@ubuntu:~$ onehost list
  ID NAME      CLUSTER RVM      ALLOCATED_CPU  ALLOCATED_MEM STAT
  4 frontend      -       0      0 / 400 (0%)  0K / 7.5G (0%) on
  5 node11      -       0      0 / 400 (0%)  0K / 7.7G (0%) on
  6 node12      -       0      0 / 400 (0%)  0K / 7.5G (0%) on
  7 node13      -       1     100 / 400 (25%) 512M / 7.7G (6%) on
oneadmin@ubuntu:~$ onevm list
  ID USER GROUP NAME      STAT UCPU   UMEM HOST      TIME
  5 oneadmin oneadmin Centos 6.5 (64- fail    0     OK node13  0d 00h07
oneadmin@ubuntu:~$ onevm deploy 5 7
```

Step: 20 Try to deploy host with VM. If not deployed, try to resume the VM. Even if resume is not possible, then delete that VM created.

Command: \$onevm deploy 5 7
\$ onevm resume 5
\$ onevm delete 5

```

ROTerm
File Edit View Search Preferences Tabs Help
Tue Jul 5 01:36:50 2016 [Z0][VMM][E]: Could not create domain from /var/lib/one//datastores/0/5/deployment.0
Tue Jul 5 01:36:50 2016 [Z0][VMM][I]: ExitCode: 255
Tue Jul 5 01:36:50 2016 [Z0][VMM][I]: Failed to execute virtualization driver operation: deploy.
Tue Jul 5 01:36:50 2016 [Z0][VMM][E]: Error deploying virtual machine: Could not create domain from /var/lib/one//datastores/0/5/deployment.0
Tue Jul 5 01:36:50 2016 [Z0][VM][I]: New LCM state is BOOT_FAILURE
oneadmin@ubuntu:~$ echo "Here, the node13 does not run the Virtual Machine, due to the Virtualizations not enabled. We have to enable Virtualization Extensions in the BIOS and the Virtual Machine will automatically run in the node13"
Here, the node13 does not run the Virtual Machine, due to the Virtualizations not enabled. We have to enable Virtualization Extensions in the BIOS and the Virtual Machine will automatically run in the node13
oneadmin@ubuntu:~$ onevm list
  ID USER GROUP NAME      STAT UCPU   UMEM HOST      TIME
  5 oneadmin oneadmin CentOS 6.5 (64- fail     0    OK node13  0d 00h02
oneadmin@ubuntu:~$ onehost list
  ID NAME      CLUSTER RVM      ALLOCATED_CPU      ALLOCATED_MEM STAT
  4 frontend      -       0    0 / 400 (0%)      0K / 7.5G (0%) on
  5 node11      -       0    0 / 400 (0%)      0K / 7.7G (0%) on
  6 node12      -       0    0 / 400 (0%)      0K / 7.5G (0%) on
  7 node13      -       1    100 / 400 (25%)  512M / 7.7G (6%) on
oneadmin@ubuntu:~$ onevm list
  ID USER GROUP NAME      STAT UCPU   UMEM HOST      TIME
  5 oneadmin oneadmin CentOS 6.5 (64- fail     0    OK node13  0d 00h07
oneadmin@ubuntu:~$ onevm deploy 5 7
[VirtualMachineDeploy] Deploy action is not available for state BOOT_FAILURE
oneadmin@ubuntu:~$ onevm resume 5
[VirtualMachineAction] Error performing action "resume" on virtual machine [5]. This action is not available for state BOOT_FAILURE
oneadmin@ubuntu:~$ onevm delete 5
oneadmin@ubuntu:~$ onevm instantiate "CentOS-6.5" --name "CentOS 6.5 (64-Bit) Virtual Machine"

```

Step: 21 Instantiate a new Centos VM and instantiate new Template and list all vm until they are in running state.

Command:\$onevm instantiate “Centos-6.5” --name “Centos 6.5 (64-Bit) Virtual Machine” \$onetemplate instantiate “Centos-6.5” --name “Centos 6.5 (64-Bit) Virtual Machine” \$onevm list

```

ROTerm
File Edit View Search Preferences Tabs Help
a copy of the License at http://www.apache.org/licenses/LICENSE-2.0
oneadmin@ubuntu:~$ onetemplate instantiate "CentOS-6.5" --name "CentOS 6.5 (64-Bit) Virtual Machine"
VM ID: 6
oneadmin@ubuntu:~$ onevm list
  ID USER GROUP NAME      STAT UCPU   UMEM HOST      TIME
  6 oneadmin oneadmin CentOS 6.5 (64- pend     0    OK          0d 00h00
oneadmin@ubuntu:~$ onevm list
  ID USER GROUP NAME      STAT UCPU   UMEM HOST      TIME
  6 oneadmin oneadmin CentOS 6.5 (64- prol     0    OK node13  0d 00h00
oneadmin@ubuntu:~$ onevm list
  ID USER GROUP NAME      STAT UCPU   UMEM HOST      TIME
  6 oneadmin oneadmin CentOS 6.5 (64- prol     0    OK node13  0d 00h00
oneadmin@ubuntu:~$ onevm list
  ID USER GROUP NAME      STAT UCPU   UMEM HOST      TIME
  6 oneadmin oneadmin CentOS 6.5 (64- prol     0    OK node13  0d 00h00
oneadmin@ubuntu:~$ onevm list
  ID USER GROUP NAME      STAT UCPU   UMEM HOST      TIME
  6 oneadmin oneadmin CentOS 6.5 (64- boot     0    OK node13  0d 00h00
oneadmin@ubuntu:~$ onevm list
  ID USER GROUP NAME      STAT UCPU   UMEM HOST      TIME
  6 oneadmin oneadmin CentOS 6.5 (64- runn     0    OK node13  0d 00h00
oneadmin@ubuntu:~$ echo "Now, our CentOS-6.5 Virtual Machine successfully deployed in node13 after enabling virtualization extensions in the BIOS"
Now, our CentOS-6.5 Virtual Machine successfully deployed in node13 after enabling virtualization extensions in the BIOS
oneadmin@ubuntu:~$ 
oneadmin@ubuntu:~$ "
> ^C
oneadmin@ubuntu:~$ echo "Now, we will create more Virtual Machines for other Linux D"

```

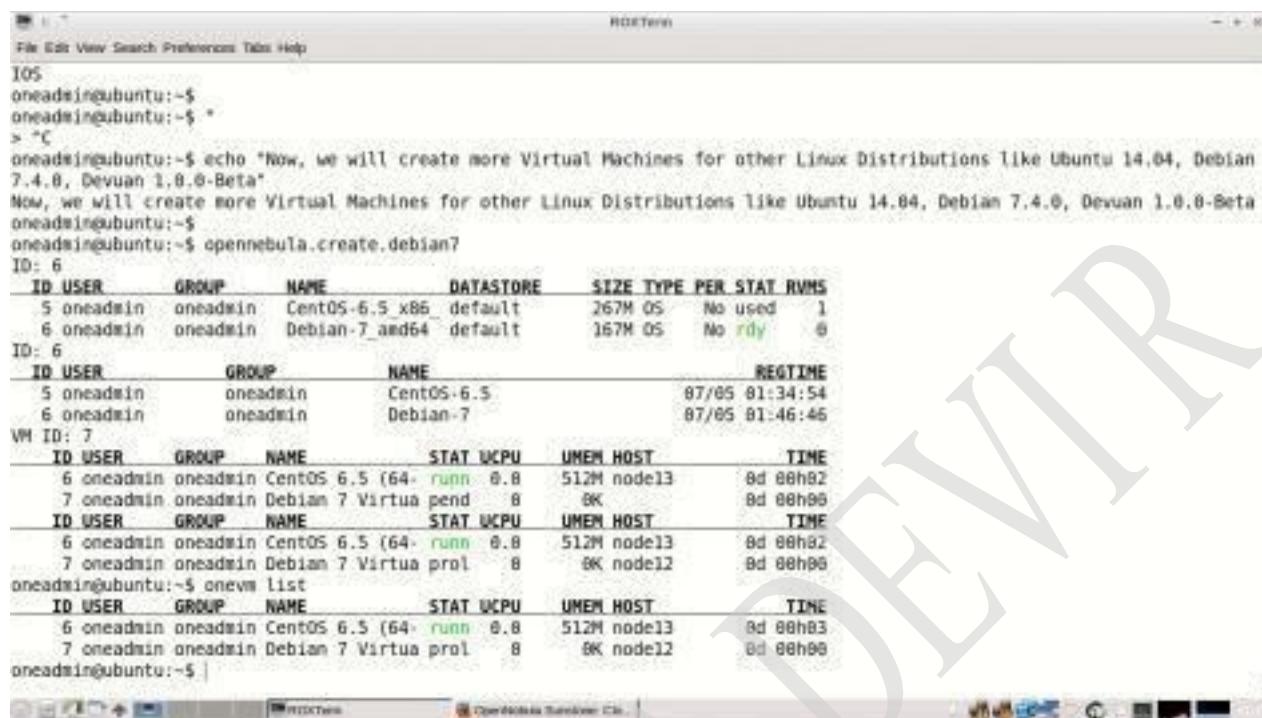
Note1: Here, Centos VM successfully deployed node13 after enabling the virtualization.

Note2: We can also create virtual machines for other OS as follows.

RENUGADEVIR

Step: 22 Creating different virtual machines.

1. Command:\$opennebula.create.debian7



The screenshot shows a terminal window titled 'HOST01' with the following command history and output:

```
File Edit View Preferences Tabs Help
105
oneadmin@ubuntu:~$ 
oneadmin@ubuntu:~$ 
> "C
oneadmin@ubuntu:~$ echo "Now, we will create more Virtual Machines for other Linux Distributions like Ubuntu 14.04, Debian 7.4.0, Devuan 1.0.0-Beta"
Now, we will create more Virtual Machines for other Linux Distributions like Ubuntu 14.04, Debian 7.4.0, Devuan 1.0.0-Beta
oneadmin@ubuntu:~$ 
oneadmin@ubuntu:~$ opennebula.create.debian7
ID: 6
  ID_USER  GROUP   NAME      DATASTORE      SIZE TYPE PER_STAT_RVMS
  5 oneadmin  oneadmin  CentOS-6.5_x86  default    267M OS  No used   1
  6 oneadmin  oneadmin  Debian-7_amd64 default    167M OS  No rdy    0
ID: 6
  ID_USER  GROUP   NAME      REGTIME
  5 oneadmin  oneadmin  CentOS-6.5      07/05 01:34:54
  6 oneadmin  oneadmin  Debian-7       07/05 01:46:45
VM ID: 7
  ID_USER  GROUP   NAME      STAT UCPU  UMEM HOST      TIME
  6 oneadmin  oneadmin  CentOS 6.5 (64-bit) runn  0.8  512M node13  0d 00h00
  7 oneadmin  oneadmin  Debian 7 Virtua pend  8     8K          0d 00h00
  ID_USER  GROUP   NAME      STAT UCPU  UMEM HOST      TIME
  6 oneadmin  oneadmin  CentOS 6.5 (64-bit) runn  0.8  512M node13  0d 00h00
  7 oneadmin  oneadmin  Debian 7 Virtua prol  8     8K node12    0d 00h00
oneadmin@ubuntu:~$ onevm list
  ID_USER  GROUP   NAME      STAT UCPU  UMEM HOST      TIME
  6 oneadmin  oneadmin  CentOS 6.5 (64-bit) runn  0.8  512M node13  0d 00h00
  7 oneadmin  oneadmin  Debian 7 Virtua prol  8     8K node12    0d 00h00
oneadmin@ubuntu:~$
```

2. Command:\$opennebula.create.ubuntu1404

```

ROXTerm
File Edit View Search Preferences Tabs Help
7 oneadmin oneadmin Debian 7 Virtua pend 0 OK 0d 00h00
ID USER GROUP NAME STAT UCPU UMEM HOST TIME
6 oneadmin oneadmin CentOS 6.5 (64- runn 0.0 512M node13 0d 00h02
7 oneadmin oneadmin Debian 7 Virtua prol 0 OK node12 0d 00h00
oneadmin@ubuntu:~$ onevm list
ID USER GROUP NAME STAT UCPU UMEM HOST TIME
6 oneadmin oneadmin CentOS 6.5 (64- runn 0.0 512M node13 0d 00h03
7 oneadmin oneadmin Debian 7 Virtua prol 0 OK node12 0d 00h00
oneadmin@ubuntu:~$ opennebula.create.ubuntu1404
ID: 7
ID USER GROUP NAME DATASTORE SIZE TYPE PER_STAT RVMS
5 oneadmin oneadmin CentOS-6.5_x86 default 267M OS No used 1
6 oneadmin oneadmin Debian-7_amd64 default 167M OS No used 1
7 oneadmin oneadmin Ubuntu-14.04_am default 287M OS No lock 0
ID: 7
ID USER GROUP NAME REGTIME
5 oneadmin oneadmin CentOS-6.5 07/05 01:34:54
6 oneadmin oneadmin Debian-7 07/05 01:46:46
7 oneadmin oneadmin Ubuntu-14.04 07/05 01:47:58
VM ID: 8
ID USER GROUP NAME STAT UCPU UMEM HOST TIME
6 oneadmin oneadmin CentOS 6.5 (64- runn 0.0 512M node13 0d 00h03
7 oneadmin oneadmin Debian 7 Virtua runn 37.4 512M node12 0d 00h01
8 oneadmin oneadmin Ubuntu 14.04 Vi prol 0 OK node11 0d 00h00
ID USER GROUP NAME STAT UCPU UMEM HOST TIME
6 oneadmin oneadmin CentOS 6.5 (64- runn 0.0 512M node13 0d 00h03
7 oneadmin oneadmin Debian 7 Virtua runn 0.0 512M node12 0d 00h01
8 oneadmin oneadmin Ubuntu 14.04 Vi prol 0 OK node11 0d 00h00
oneadmin@ubuntu:~$ 

```

3. Command:\$opennebula.create.devuan

```

ROXTerm
File Edit View Search Preferences Tabs Help
ID USER GROUP NAME STAT UCPU UMEM HOST TIME
6 oneadmin oneadmin CentOS 6.5 (64- runn 0.0 512M node13 0d 00h03
7 oneadmin oneadmin Debian 7 Virtua runn 0.0 512M node12 0d 00h01
8 oneadmin oneadmin Ubuntu 14.04 Vi prol 0 OK node11 0d 00h00
oneadmin@ubuntu:~$ opennebula.create.devuan
ID: 8
ID USER GROUP NAME DATASTORE SIZE TYPE PER_STAT RVMS
5 oneadmin oneadmin CentOS-6.5_x86 default 267M OS No used 1
6 oneadmin oneadmin Debian-7_amd64 default 167M OS No used 1
7 oneadmin oneadmin Ubuntu-14.04_am default 287M OS No used 1
8 oneadmin oneadmin Devuan-1.0.0_am default 686M OS No rdy 0
ID: 8
ID USER GROUP NAME REGTIME
5 oneadmin oneadmin CentOS-6.5 07/05 01:34:54
6 oneadmin oneadmin Debian-7 07/05 01:46:46
7 oneadmin oneadmin Ubuntu-14.04 07/05 01:47:58
8 oneadmin oneadmin Devuan-1.0.0 07/05 01:48:58
VM ID: 9
ID USER GROUP NAME STAT UCPU UMEM HOST TIME
6 oneadmin oneadmin CentOS 6.5 (64- runn 0.0 512M node13 0d 00h04
7 oneadmin oneadmin Debian 7 Virtua runn 0.0 512M node12 0d 00h02
8 oneadmin oneadmin Ubuntu 14.04 Vi runn 107. 512M node11 0d 00h01
9 oneadmin oneadmin Devuan 1.0.0-Be prol 0 OK frontend 0d 00h00
ID USER GROUP NAME STAT UCPU UMEM HOST TIME
6 oneadmin oneadmin CentOS 6.5 (64- runn 0.5 512M node13 0d 00h05
7 oneadmin oneadmin Debian 7 Virtua runn 0.0 512M node12 0d 00h02
8 oneadmin oneadmin Ubuntu 14.04 Vi runn 1.0 512M node11 0d 00h01
9 oneadmin oneadmin Devuan 1.0.0-Be prol 0 OK frontend 0d 00h00
oneadmin@ubuntu:~$ 

```

Step: 23 List the VM

Command:\$onevm list

```

ROXTerm
File Edit View Search Preferences Tabs Help
ID USER GROUP NAME DATASTORE SIZE TYPE PER STAT RVMS
5 oneadmin oneadmin CentOS-6.5_x86_ default 267M OS No used 1
6 oneadmin oneadmin Debian-7_amd64 default 167M OS No used 1
7 oneadmin oneadmin Ubuntu-14.04_am default 287M OS No used 1
8 oneadmin oneadmin Devuan-1.0.0_am default 686M OS No rdy 0
ID: 8
ID USER GROUP NAME REGTIME
5 oneadmin oneadmin CentOS-6.5 07/05 01:34:54
6 oneadmin oneadmin Debian-7 07/05 01:46:46
7 oneadmin oneadmin Ubuntu-14.04 07/05 01:47:58
8 oneadmin oneadmin Devuan-1.0.0 07/05 01:48:58
VM ID: 9
ID USER GROUP NAME STAT UCPU UMEM HOST TIME
6 oneadmin oneadmin CentOS 6.5 (64- runn 0.0 512M node13 0d 00h04
7 oneadmin oneadmin Debian 7 Virtua runn 0.0 512M node12 0d 00h02
8 oneadmin oneadmin Ubuntu 14.04 Vi runn 107. 512M node11 0d 00h01
9 oneadmin oneadmin Devuan 1.0.0-Be prol 0 OK frontend 0d 00h00
ID USER GROUP NAME STAT UCPU UMEM HOST TIME
6 oneadmin oneadmin CentOS 6.5 (64- runn 0.5 512M node13 0d 00h05
7 oneadmin oneadmin Debian 7 Virtua runn 0.0 512M node12 0d 00h02
8 oneadmin oneadmin Ubuntu 14.04 Vi runn 1.0 512M node11 0d 00h01
9 oneadmin oneadmin Devuan 1.0.0-Be prol 0 OK frontend 0d 00h00
oneadmin@ubuntu:~$ onevm list
ID USER GROUP NAME STAT UCPU UMEM HOST TIME
6 oneadmin oneadmin CentOS 6.5 (64- runn 0.0 512M node13 0d 00h05
7 oneadmin oneadmin Debian 7 Virtua runn 0.0 512M node12 0d 00h02
8 oneadmin oneadmin Ubuntu 14.04 Vi runn 1.0 512M node11 0d 00h01
9 oneadmin oneadmin Devuan 1.0.0-Be runn 0 OK frontend 0d 00h00
oneadmin@ubuntu:~$ echo "Now, all the 4 Virtual Machines are running in different |
```

Note1: All the four VM are running in different hosts node13, node12, node11, frontend respectively.

Note2: We can do live migration of running virtual machine as follows.

Step: 24 List the host

Command:\$ onehost list

```

ROXTerm
File Edit View Search Preferences Tabs Help
ID USER GROUP NAME STAT UCPU UMEM HOST TIME
6 oneadmin oneadmin CentOS 6.5 (64- runn 0.0 512M node13 0d 00h04
7 oneadmin oneadmin Debian 7 Virtua runn 0.0 512M node12 0d 00h02
8 oneadmin oneadmin Ubuntu 14.04 Vi runn 107. 512M node11 0d 00h01
9 oneadmin oneadmin Devuan 1.0.0-Be prol 0 OK frontend 0d 00h00
ID USER GROUP NAME STAT UCPU UMEM HOST TIME
6 oneadmin oneadmin CentOS 6.5 (64- runn 0.5 512M node13 0d 00h05
7 oneadmin oneadmin Debian 7 Virtua runn 0.0 512M node12 0d 00h02
8 oneadmin oneadmin Ubuntu 14.04 Vi runn 1.0 512M node11 0d 00h01
9 oneadmin oneadmin Devuan 1.0.0-Be prol 0 OK frontend 0d 00h00
oneadmin@ubuntu:~$ onevm list
ID USER GROUP NAME STAT UCPU UMEM HOST TIME
6 oneadmin oneadmin CentOS 6.5 (64- runn 0.0 512M node13 0d 00h05
7 oneadmin oneadmin Debian 7 Virtua runn 0.0 512M node12 0d 00h02
8 oneadmin oneadmin Ubuntu 14.04 Vi runn 1.0 512M node11 0d 00h01
9 oneadmin oneadmin Devuan 1.0.0-Be runn 0 OK frontend 0d 00h00
oneadmin@ubuntu:~$ echo "Now, all the 4 Virtual Machines are running in different host, node13, node12, node11, frontend"
Now, all the 4 Virtual Machines are running in different host, node13, node12, node11, frontend
oneadmin@ubuntu:~$
oneadmin@ubuntu:~$ echo "Now, we will do live migration of running Virtual Machines"
Now, we will do live migration of running Virtual Machines
oneadmin@ubuntu:~$
oneadmin@ubuntu:~$ onehost list
ID NAME CLUSTER RVM ALLOCATED_CPU ALLOCATED_MEM_STAT
4 frontend - 1 100 / 400 (25%) 2G / 7.5G (26%) on
5 node11 - 1 100 / 400 (25%) 512M / 7.7G (6%) on
6 node12 - 1 100 / 400 (25%) 512M / 7.5G (6%) on
7 node13 - 1 100 / 400 (25%) 512M / 7.7G (6%) on
oneadmin@ubuntu:~$ o|
```

Step: 25 Doing VM migration and list the VM

Command: \$ onevm migration 9 7
\$ onevm migration 8 7
\$onevm list

```
File Edit View Preferences Help
oneadmin@ubuntu:~$ onevm migration 9 7
oneadmin@ubuntu:~$ onevm migration 8 7
oneadmin@ubuntu:~$ onevm list
  ID USER GROUP NAME      STAT UCPU UMEM HOST      TIME
  6 oneadmin oneadmin CentOS 6.5 (64-bit) runn 0.8 512M node13 0d 00h05
  7 oneadmin oneadmin Debian 7 Virtua runn 0.8 512M node12 0d 00h02
  8 oneadmin oneadmin Ubuntu 14.04 Vi runn 1.0 512M node11 0d 00h01
  9 oneadmin oneadmin Devuan 1.0.0-Be runn 0.5 2G node13 0d 00h00
oneadmin@ubuntu:~$ echo "Now, all the 4 Virtual Machines are running in different host, node13, node12, node11, frontend"
Now, all the 4 Virtual Machines are running in different host, node13, node12, node11, frontend
oneadmin@ubuntu:~$ echo "Now, we will do live migration of running Virtual Machines"
Now, we will do live migration of running Virtual Machines
oneadmin@ubuntu:~$ onehost list
  ID NAME CLUSTER RVM ALLOCATED_CPU ALLOCATED_MEM_STAT
  4 frontend - 1 100 / 400 (25%) 2G / 7.5G (26%) on
  5 node11 - 1 100 / 400 (25%) 512M / 7.7G (6%) on
  6 node12 - 1 100 / 400 (25%) 512M / 7.5G (6%) on
  7 node13 - 1 100 / 400 (25%) 512M / 7.7G (6%) on
oneadmin@ubuntu:~$ onevm migrate 9 7
oneadmin@ubuntu:~$ onevm migrate 8 7
oneadmin@ubuntu:~$ onevm list
  ID USER GROUP NAME      STAT UCPU UMEM HOST      TIME
  6 oneadmin oneadmin CentOS 6.5 (64-bit) runn 0.8 512M node13 0d 00h07
  7 oneadmin oneadmin Debian 7 Virtua runn 0.8 512M node12 0d 00h05
  8 oneadmin oneadmin Ubuntu 14.04 Vi migr 0.8 8G node13 0d 00h03
  9 oneadmin oneadmin Devuan 1.0.0-Be runn 0.5 2G node13 0d 00h02
oneadmin@ubuntu:~$
```

Note: Here the VM id 8 and 9 is migrated to node having id 7(node13).

Step: 26 Power off all the enabled VM and list VM until all get powered off.

Command:\$onevm poweroff 6,7,8,9
\$onevm list

```

File Edit View Search Preferences Tabs Help ROXTerm
9 oneadmin oneadmin Devuan 1.0.0-Be runn 0.5 2G node13 0d 00h02
oneadmin@ubuntu:~$ echo "Now, we have migrated the Virtual Machines (ID) 8 and 9 to node13 having ID 7"
Now, we have migrated the Virtual Machines (ID) 8 and 9 to node13 having ID 7
oneadmin@ubuntu:~$ onevm poweroff 6,7,8,9
oneadmin@ubuntu:~$ onevm list


| ID | USER     | GROUP    | NAME            | STAT | UCPU | UMEM | HOST   | TIME     |
|----|----------|----------|-----------------|------|------|------|--------|----------|
| 6  | oneadmin | oneadmin | CentOS 6.5 (64- | shut | 0.0  | 512M | node13 | 0d 00h08 |
| 7  | oneadmin | oneadmin | Debian 7 Virtua | shut | 0.0  | 512M | node12 | 0d 00h06 |
| 8  | oneadmin | oneadmin | Ubuntu 14.04 Vi | shut | 0.0  | 512M | node13 | 0d 00h05 |
| 9  | oneadmin | oneadmin | Devuan 1.0.0-Be | shut | 0.5  | 2G   | node13 | 0d 00h04 |


oneadmin@ubuntu:~$ onevm list


| ID | USER     | GROUP    | NAME            | STAT | UCPU | UMEM | HOST   | TIME     |
|----|----------|----------|-----------------|------|------|------|--------|----------|
| 6  | oneadmin | oneadmin | CentOS 6.5 (64- | poff | 0.0  | OK   | node13 | 0d 00h09 |
| 7  | oneadmin | oneadmin | Debian 7 Virtua | poff | 0.0  | OK   | node12 | 0d 00h06 |
| 8  | oneadmin | oneadmin | Ubuntu 14.04 Vi | poff | 0.0  | OK   | node13 | 0d 00h05 |
| 9  | oneadmin | oneadmin | Devuan 1.0.0-Be | shut | 0.5  | 2G   | node13 | 0d 00h04 |


oneadmin@ubuntu:~$ onevm list


| ID | USER     | GROUP    | NAME            | STAT | UCPU | UMEM | HOST   | TIME     |
|----|----------|----------|-----------------|------|------|------|--------|----------|
| 6  | oneadmin | oneadmin | CentOS 6.5 (64- | poff | 0.0  | OK   | node13 | 0d 00h09 |
| 7  | oneadmin | oneadmin | Debian 7 Virtua | poff | 0.0  | OK   | node12 | 0d 00h06 |
| 8  | oneadmin | oneadmin | Ubuntu 14.04 Vi | poff | 0.0  | OK   | node13 | 0d 00h05 |
| 9  | oneadmin | oneadmin | Devuan 1.0.0-Be | poff | 0.0  | OK   | node13 | 0d 00h04 |


oneadmin@ubuntu:~$ echo "Now, all the Virt"

```

Result:

Thus, the VM migration done successfully based on certain condition from one node to other .

EXP 12: Procedure to install Storage Controller and interact with OpenNebula for creating Disk images

AIM:

To find procedure to install storage controller and interact with OpenNebula for creating disk images.

PROCEDURE:

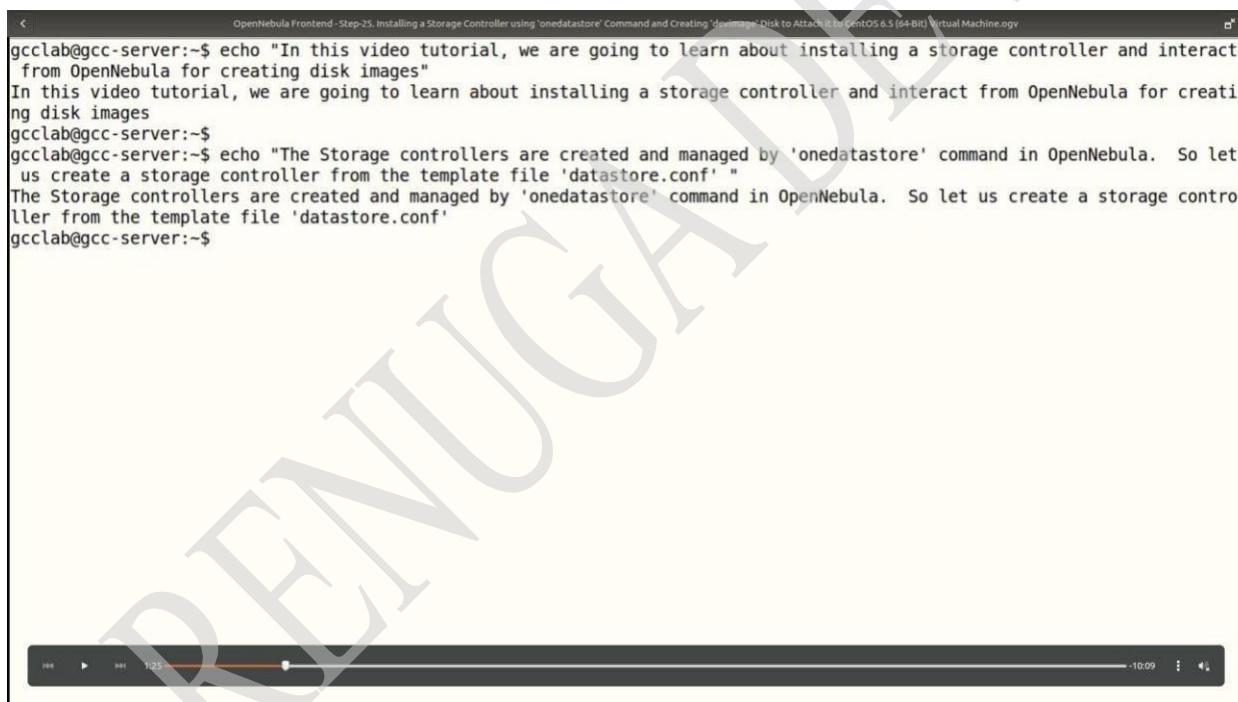
Step: 1 To open Terminal:

Press Alt+Ctrl+T, Initially it will be in gcclab username. Then, We have to switch into root user



```
File Edit View Preferences Tabs Help
gcclab@gcc-server:~$
```

Step: 2 The storage controllers are created and managed by “onedatastore” command in Open-nebula. So, Let us create a storage controller from the template file “datastore.conf”.



```
OpenNebula Frontend - Step-25. Installing a Storage Controller using 'onedatastore' Command and Creating 'diskimage' Disk to Attach it to CentOS 6.5 (64-Bit) Virtual Machine.ovf
gcclab@gcc-server:~$ echo "In this video tutorial, we are going to learn about installing a storage controller and interact from OpenNebula for creating disk images"
In this video tutorial, we are going to learn about installing a storage controller and interact from OpenNebula for creating disk images
gcclab@gcc-server:~$ echo "The Storage controllers are created and managed by 'onedatastore' command in OpenNebula. So let us create a storage controller from the template file 'datastore.conf' "
The Storage controllers are created and managed by 'onedatastore' command in OpenNebula. So let us create a storage controller from the template file 'datastore.conf'
gcclab@gcc-server:~$
```

Step: 3 To list out the files :

Command: \$ ls -l

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```
File Edit View Search Preferences Tabs Help
gcclab@gcc-server:~$ echo "In this video tutorial, we are going to learn about installing a storage controller and interact from OpenNebula for creating disk images"
In this video tutorial, we are going to learn about installing a storage controller and interact from OpenNebula for creating disk images
gcclab@gcc-server:~$ echo "The Storage controllers are created and managed by 'onedatastore' command in OpenNebula. So let us create a storage controller from the template file 'datastore.conf' "
The Storage controllers are created and managed by 'onedatastore' command in OpenNebula. So let us create a storage controller from the template file 'datastore.conf'
gcclab@gcc-server:~$ 
gcclab@gcc-server:~$ 
gcclab@gcc-server:~$ ls -l
total 32
drwxr-xr-x 6 gcclab gcclab 4096 Jul  9 15:21 Desktop
drwxr-xr-x 2 gcclab gcclab 4096 Jun 14 11:49 Documents
drwxr-xr-x 2 gcclab gcclab 4096 Jun 14 11:49 Downloads
drwxr-xr-x 2 gcclab gcclab 4096 Jun 14 11:49 Music
drwxr-xr-x 3 gcclab gcclab 4096 Jun 14 13:13 Pictures
drwxr-xr-x 2 gcclab gcclab 4096 Jun 14 11:49 Public
drwxr-xr-x 2 gcclab gcclab 4096 Jun 14 11:49 Templates
drwxr-xr-x 2 gcclab gcclab 4096 Jun 14 11:49 Videos
```

Step: 4 Command to switch from gcclab user to root user:

Command: \$ sudo bash

```
File Edit View Search Preferences Tabs Help
gcclab@gcc-server:~$ sudo bash
root@gcc-server:~#
```

Step: 5 Login as one-admin

Command: \$ su – oneadmin

```
File Edit View Search Preferences Tabs Help
gcclab@gcc-server:~$ sudo bash
root@gcc-server:~# su - oneadmin
oneadmin@gcc-server:~$
```

Step: 6 To check Open Nebula home directory

Command: \$ pwd

```
File Edit View Search Preferences Tabs Help
gcclab@gcc-server:~$ sudo bash
root@gcc-server:~# su - oneadmin
oneadmin@gcc-server:~$ pwd
/var/lib/one
oneadmin@gcc-server:~$ |
```

Step: 6 To list the files in oneadmin login

Command: \$ ls -l

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```

OpenNebula Frontend - Step-25. Installing a Storage Controller using 'onedatastore' Command and Creating 'devimage' Disk to Attach It to CentOS 6.5 (64-Bit) Virtual Machine.ogv

gcclab@gcc-server:~$ echo "The Storage controllers are created and managed by 'onedatastore' command in OpenNebula. So let us create a storage controller from the template file 'datastore.conf' "
The Storage controllers are created and managed by 'onedatastore' command in OpenNebula. So let us create a storage controller from the template file 'datastore.conf'
gcclab@gcc-server:~$ 
gcclab@gcc-server:~$ ls -l
total 32
drwxr-xr-x 6 gcclab gcclab 4096 Jul  9 15:21 Desktop
drwxr-xr-x 2 gcclab gcclab 4096 Jun 14 11:49 Documents
drwxr-xr-x 2 gcclab gcclab 4096 Jun 14 11:49 Downloads
drwxr-xr-x 2 gcclab gcclab 4096 Jun 14 11:49 Music
drwxr-xr-x 3 gcclab gcclab 4096 Jun 14 13:13 Pictures
drwxr-xr-x 2 gcclab gcclab 4096 Jun 14 11:49 Public
drwxr-xr-x 2 gcclab gcclab 4096 Jun 14 11:49 Templates
drwxr-xr-x 2 gcclab gcclab 4096 Jun 14 11:49 Videos
gcclab@gcc-server:~$ sudo bash
root@gcc-server:~# su - oneadmin
oneadmin@gcc-server:~$ pwd
/var/lib/one
oneadmin@gcc-server:~$ ls -l
total 2012
-rw-rw-r-- 1 oneadmin oneadmin 3339 Jul 17 16:00 config
-rw-r--r-- 1 oneadmin oneadmin 76 Jul 16 16:17 datastore.conf
drwxr-xr-x 6 oneadmin oneadmin 4096 Jul 17 14:45 datastores
-rw-r--r-- 1 oneadmin oneadmin 91 Jul  9 15:43 mynetwork.one
-rw-r--r-- 1 oneadmin oneadmin 2026496 Jul 17 16:06 one.db
drwxr-xr-x 9 oneadmin oneadmin 4096 Jun 14 01:55 remotes
drwxrwxr-x 2 oneadmin oneadmin 4096 Jul 17 15:02 sunstone vnc tokens
drwxr-xr-x 6 oneadmin oneadmin 4096 Jul 17 14:53 vms
oneadmin@gcc-server:~$ 

```

Step: 7 To list the onedatastore files in oneadmin login

Command: \$ onedatastore list

```

File Edit View Search Preferences Tabs Help
gcclab@gcc-server:~$ 
gcclab@gcc-server:~$ ls -l
total 32
drwxr-xr-x 6 gcclab gcclab 4096 Jul  9 15:21 Desktop
drwxr-xr-x 2 gcclab gcclab 4096 Jun 14 11:49 Documents
drwxr-xr-x 2 gcclab gcclab 4096 Jun 14 11:49 Downloads
drwxr-xr-x 2 gcclab gcclab 4096 Jun 14 11:49 Music
drwxr-xr-x 3 gcclab gcclab 4096 Jun 14 13:13 Pictures
drwxr-xr-x 2 gcclab gcclab 4096 Jun 14 11:49 Public
drwxr-xr-x 2 gcclab gcclab 4096 Jun 14 11:49 Templates
drwxr-xr-x 2 gcclab gcclab 4096 Jun 14 11:49 Videos
gcclab@gcc-server:~$ sudo bash
root@gcc-server:~# su - oneadmin
oneadmin@gcc-server:~$ pwd
/var/lib/one
oneadmin@gcc-server:~$ ls -l
total 2012
-rw-rw-r-- 1 oneadmin oneadmin 3339 Jul 17 16:00 config
-rw-r--r-- 1 oneadmin oneadmin 76 Jul 16 16:17 datastore.conf
drwxr-xr-x 6 oneadmin oneadmin 4096 Jul 17 14:45 datastores
-rw-r--r-- 1 oneadmin oneadmin 91 Jul  9 15:43 mynetwork.one
-rw-r--r-- 1 oneadmin oneadmin 2026496 Jul 17 16:06 one.db
drwxr-xr-x 9 oneadmin oneadmin 4096 Jun 14 01:55 remotes
drwxrwxr-x 2 oneadmin oneadmin 4096 Jul 17 15:02 sunstone_vnc_tokens
drwxr-xr-x 6 oneadmin oneadmin 4096 Jul 17 14:53 vms
oneadmin@gcc-server:~$ onedatastore list

```

ID	NAME	SIZE	AVAIL	CLUSTER	IMAGES	TYPE	DS	TM	STAT
0	system	65.3G	37%	-	0	sys	-	shared	on
1	default	65.3G	37%	-	4	img	fs	shared	on
2	files	65.3G	37%	-	0	fil	fs	ssh	on

```

oneadmin@gcc-server:~| 
```

Step: 8 Now, we are going to create a new datastore using the “datastore.conf” template file.

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Step: 9 Display the contents of the “datastore.conf” file using cat command.

Command: cat datastore.conf

```
File Edit View Search Preferences Tabs Help
drwxr-xr-x 2 gcclab gcclab 4096 Jun 14 11:49 Videos
gcclab@gcc-server:~$ sudo bash
root@gcc-server:~# su - oneadmin
oneadmin@gcc-server:~$ pwd
/var/lib/one
oneadmin@gcc-server:~$ ls -l
total 2012
-rw-rw-r-- 1 oneadmin oneadmin 3339 Jul 17 16:00 config
-rw-r--r-- 1 oneadmin oneadmin 76 Jul 16 16:17 datastore.conf
drwxr-xr-x 6 oneadmin oneadmin 4096 Jul 17 14:45 datastores
-rw-r--r-- 1 oneadmin oneadmin 91 Jul 9 15:43 mynetwork.one
-rw-r--r-- 1 oneadmin oneadmin 2026496 Jul 17 16:06 one.db
drwxr-xr-x 9 oneadmin oneadmin 4096 Jun 14 01:55 remotes
drwxrwxr-x 2 oneadmin oneadmin 4096 Jul 17 15:02 sunstone_vnc_tokens
drwxr-xr-x 6 oneadmin oneadmin 4096 Jul 17 14:53 vms
oneadmin@gcc-server:~$ onedatastore list
  ID NAME          SIZE AVAIL CLUSTER      IMAGES TYPE DS      TM      STAT
  0 system        65.3G 37%   -           0 sys -    shared on
  1 default       65.3G 37%   -           4 img fs    shared on
  2 files         65.3G 37%   -           0 fil fs    ssh    on
oneadmin@gcc-server:~$ echo "Now, we are going to create a new datastore using the 'datastore.conf' template file"
Now, we are going to create a new datastore using the 'datastore.conf' template file
oneadmin@gcc-server:~$ cat datastore.conf
NAME=devstorage
DISK_TYPE="BLOCK"
DS_MAD="dev"
TM_MAD="dev"
TYPE="IMAGE_DS"
oneadmin@gcc-server:~$ |
```

Step: 10 Creating datastore in “datastore.conf” file .

Command: onedatastore create datastore.conf

```
File Edit View Search Preferences Tabs Help
root@gcc-server:~# su - oneadmin
oneadmin@gcc-server:~$ pwd
/var/lib/one
oneadmin@gcc-server:~$ ls -l
total 2012
-rw-rw-r-- 1 oneadmin oneadmin 3339 Jul 17 16:00 config
-rw-r--r-- 1 oneadmin oneadmin 76 Jul 16 16:17 datastore.conf
drwxr-xr-x 6 oneadmin oneadmin 4096 Jul 17 14:45 datastores
-rw-r--r-- 1 oneadmin oneadmin 91 Jul 9 15:43 mynetwork.one
-rw-r--r-- 1 oneadmin oneadmin 2026496 Jul 17 16:06 one.db
drwxr-xr-x 9 oneadmin oneadmin 4096 Jun 14 01:55 remotes
drwxrwxr-x 2 oneadmin oneadmin 4096 Jul 17 15:02 sunstone_vnc_tokens
drwxr-xr-x 6 oneadmin oneadmin 4096 Jul 17 14:53 vms
oneadmin@gcc-server:~$ onedatastore list
  ID NAME          SIZE AVAIL CLUSTER      IMAGES TYPE DS      TM      STAT
  0 system        65.3G 37%   -           0 sys -    shared on
  1 default       65.3G 37%   -           4 img fs    shared on
  2 files         65.3G 37%   -           0 fil fs    ssh    on
oneadmin@gcc-server:~$ echo "Now, we are going to create a new datastore using the 'datastore.conf' template file"
Now, we are going to create a new datastore using the 'datastore.conf' template file
oneadmin@gcc-server:~$ cat datastore.conf
NAME=devstorage
DISK_TYPE="BLOCK"
DS_MAD="dev"
TM_MAD="dev"
TYPE="IMAGE_DS"
oneadmin@gcc-server:~$ onedatastore create datastore.conf
ID: 101
oneadmin@gcc-server:~$ |
```

Step: 11 List the onedatastore.

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Command: \$ onedatastore list

```

File Edit View Search Preferences Tabs Help
drwxr-xr-x 9 oneadmin oneadmin 4096 Jun 14 01:55 remotes
drwxrwxr-x 2 oneadmin oneadmin 4096 Jul 17 15:02 sunstone_vnc_tokens
drwxr-xr-x 6 oneadmin oneadmin 4096 Jul 17 14:53 vms
oneadmin@gcc-server:~$ onedatastore list


| ID | NAME    | SIZE  | AVAIL | CLUSTER | IMAGES | TYPE | DS | TM     | STAT |
|----|---------|-------|-------|---------|--------|------|----|--------|------|
| 0  | system  | 65.3G | 37%   | -       | 0      | sys  | -  | shared | on   |
| 1  | default | 65.3G | 37%   | -       | 4      | img  | fs | shared | on   |
| 2  | files   | 65.3G | 37%   | -       | 0      | fil  | fs | ssh    | on   |


oneadmin@gcc-server:~$ echo "Now, we are going to create a new datastore using the 'datastore.conf' template file"
Now, we are going to create a new datastore using the 'datastore.conf' template file
oneadmin@gcc-server:~$ oneadmin@gcc-server:~$ cat datastore.conf
NAME=devstorage
DISK_TYPE="BLOCK"
DS_MAD="dev"
TM_MAD="dev"
TYPE="IMAGE_DS"
oneadmin@gcc-server:~$ onedatastore create datastore.conf
ID: 101
oneadmin@gcc-server:~$ onedatastore list
No command 'onedatastore' found, did you mean:
Command 'onedatastore' from package 'opennebula-tools' (universe)
onedatastore: command not found
oneadmin@gcc-server:~$ onedatastore list


| ID  | NAME       | SIZE  | AVAIL | CLUSTER | IMAGES | TYPE | DS  | TM     | STAT |
|-----|------------|-------|-------|---------|--------|------|-----|--------|------|
| 0   | system     | 65.3G | 37%   | -       | 0      | sys  | -   | shared | on   |
| 1   | default    | 65.3G | 37%   | -       | 4      | img  | fs  | shared | on   |
| 2   | files      | 65.3G | 37%   | -       | 0      | fil  | fs  | ssh    | on   |
| 101 | devstorage | 1M    | 100%  | -       | 0      | img  | dev | dev    | on   |


oneadmin@gcc-server:~$
```

Step: 12 A new datastore named as “devstorage” has been created through the template file. Next, we have to attach a physical block device i,e Hard disk through “oneimage” command to the “devstorage id” (i,e 101). We, are going to attach a physical harddisk of capacity 120GB and make it as storage controller in Open-Nebula.

Step: 13 Exit from oneadmin, Switch to gcclab user, then switch to root user

Command: \$ exit

```
gcclab@gcc-server:$ sudo bash
root @gcc-server: $
```

```

File Edit View Search Preferences Tabs Help
1. ROXTerm
gcclab@gcc-server:~$ sudo bash
root@gcc-server:~# fdisk -l /dev/sda

Disk /dev/sda: 80.0 GB, 80026361856 bytes
255 heads, 63 sectors/track, 9729 cylinders, total 156301488 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x1c111c10

      Device Boot   Start     End   Blocks Id System
/dev/sda1    *      2048   976895   487424  83 Linux
/dev/sda2        978942 156301311 77661185   5 Extended
/dev/sda5        978944 16977919 7999488  82 Linux swap / Solaris
/dev/sda6       16979968 156301311 69660672  83 Linux
root@gcc-server:~#
root@gcc-server:~|
```

Step: 14 Check the Physical disk partition table in /dev/sda , then partition it

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Command: \$ fdisk -l /dev/sda

The screenshot shows two terminal windows side-by-side. Both windows have a title bar with 'File Edit View Search Preferences Tabs Help' and a close button. The left window is titled '1. ROXTerm' and the right one is '2. ROXTerm'. The terminal session in both windows is identical, displaying the output of the command 'fdisk -l /dev/sda'. The output shows details about the disk /dev/sda, including its size (80.0 GB), sectors per track, cylinders, and total sectors. It also lists the partitions: /dev/sda1 (primary, type 83, Linux), /dev/sda2 (extended, type 5, containing swap and Solaris partitions), and /dev/sda5, /dev/sda6 (logical partitions). The disk identifier is listed as 0xlc111c10.

```
File Edit View Search Preferences Tabs Help
1. ROXTerm
gcclab@gcc-server:~$ sudo bash
root@gcc-server:~# fdisk -l /dev/sda

Disk /dev/sda: 80.0 GB, 80026361856 bytes
255 heads, 63 sectors/track, 9729 cylinders, total 156301488 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0xlc111c10

Device Boot Start End Blocks Id System
/dev/sda1 * 2048 976895 487424 83 Linux
/dev/sda2 978942 156301311 77661185 5 Extended
/dev/sda5 978944 16977919 7999488 82 Linux swap / Solaris
/dev/sda6 16979968 156301311 69660672 83 Linux
root@gcc-server:~#
root@gcc-server:~#
```

Step: 14 Check the Physical disk partition table in /dev/sdb , then partition it

Command: \$ fdisk -l /dev/sdb

The screenshot shows two terminal windows side-by-side. Both windows have a title bar with 'File Edit View Search Preferences Tabs Help' and a close button. The left window is titled '1. ROXTerm' and the right one is '2. ROXTerm'. The terminal session in both windows is identical, displaying the output of the command 'fdisk -l /dev/sdb'. The output shows details about the disk /dev/sdb, including its size (120.0 GB), sectors per track, cylinders, and total sectors. It also lists the partitions: /dev/sda1 (primary, type 83, Linux), /dev/sda2 (extended, type 5, containing swap and Solaris partitions), and /dev/sda5, /dev/sda6 (logical partitions). The disk identifier is listed as 0x00078f09. A large black redaction box covers the bottom portion of the terminal output, obscuring the creation of new partitions.

```
File Edit View Search Preferences Tabs Help
1. ROXTerm
gcclab@gcc-server:~$ sudo bash
root@gcc-server:~# fdisk -l /dev/sda

Disk /dev/sda: 80.0 GB, 80026361856 bytes
255 heads, 63 sectors/track, 9729 cylinders, total 156301488 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0xlc111c10

Device Boot Start End Blocks Id System
/dev/sda1 * 2048 976895 487424 83 Linux
/dev/sda2 978942 156301311 77661185 5 Extended
/dev/sda5 978944 16977919 7999488 82 Linux swap / Solaris
/dev/sda6 16979968 156301311 69660672 83 Linux
root@gcc-server:#
root@gcc-server:~# fdisk -l /dev/sdb

Disk /dev/sdb: 120.0 GB, 120034123776 bytes
255 heads, 63 sectors/track, 14593 cylinders, total 234441648 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x00078f09

Device Boot Start End Blocks Id System
root@gcc-server:~#
```

Step: 15 The physical disk “/dev/sdb” does not contain a valid partition tables. So, we are going to create partition in “/dev/sdb”

Command: \$ fdisk -l /dev/sdb

Command (m for help): p

Command (m for help):n then, select primary using command “p”

Command (m for help):p , partition number:1

Command (m for help):p

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File Edit View Search Preferences Tabs Help

1. ROXTerm x 2. ROXTerm x

```

root@gcc-server:~#
root@gcc-server:~# fdisk -l /dev/sdb

Disk /dev/sdb: 120.0 GB, 120034123776 bytes
255 heads, 63 sectors/track, 14593 cylinders, total 234441648 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x00078f09

Device Boot Start End Blocks Id System
root@gcc-server:~# echo "This PHYSICAL DISK '/dev/sdb' does not contain a valid partition tables. So, now we are going to
create partition in /dev/sdb"
This PHYSICAL DISK '/dev/sdb' does not contain a valid partition tables. So, now we are going to create partition in /dev
/sdb
root@gcc-server:~#
root@gcc-server:~# fdisk /dev/sdb

Command (m for help): p

Disk /dev/sdb: 120.0 GB, 120034123776 bytes
255 heads, 63 sectors/track, 14593 cylinders, total 234441648 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x00078f09

Device Boot Start End Blocks Id System
Command (m for help):
```

File Edit View Search Preferences Tabs Help

1. ROXTerm x 2. ROXTerm x

```

root@gcc-server:~# echo "This PHYSICAL DISK '/dev/sdb' does not contain a valid partition tables. So, now we are going to
create partition in /dev/sdb"
This PHYSICAL DISK '/dev/sdb' does not contain a valid partition tables. So, now we are going to create partition in /dev
/sdb
root@gcc-server:~#
root@gcc-server:~# fdisk /dev/sdb

Command (m for help): p

Disk /dev/sdb: 120.0 GB, 120034123776 bytes
255 heads, 63 sectors/track, 14593 cylinders, total 234441648 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x00078f09

Device Boot Start End Blocks Id System
Command (m for help): n
Partition type:
 p primary (0 primary, 0 extended, 4 free)
 e extended
Select (default p): p
Partition number (1-4, default 1): 1
First sector (2048-234441647, default 2048):
Using default value 2048
Last sector, +sectors or +size{K,M,G} (2048-234441647, default 234441647):
Using default value 234441647

Command (m for help):
```

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```

File Edit View Search Preferences Tabs Help
1. ROXTerm x 2. ROXTerm x
p primary (0 primary, 0 extended, 4 free)
e extended
Select (default p): p
Partition number (1-4, default 1): 1
First sector (2048-234441647, default 2048):
Using default value 2048
Last sector, +sectors or +size{K,M,G} (2048-234441647, default 234441647):
Using default value 234441647

Command (m for help): p

Disk /dev/sdb: 120.0 GB, 120034123776 bytes
255 heads, 63 sectors/track, 14593 cylinders, total 234441648 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x00078f09

Device Boot Start End Blocks Id System
/dev/sdb1 2048 234441647 117219800 83 Linux

Command (m for help): w
The partition table has been altered!

Calling ioctl() to re-read partition table.
Syncing disks.
root@gcc-server:# echo "Now, we are going to format the partition /dev/sdb1, and later we can attach this as a storage controller to OpenNebula"
Now, we are going to format the partition /dev/sdb1, and later we can attach this as a storage controller to OpenNebula
root@gcc-server:#

```

Step: 16 Now, we are going to format the partition /dev/sdb1, later we can attach this as a storage controller to Open-nebula.

Command: \$ mkfs.ext4 /dev/sdb1

```

File Edit View Search Preferences Tabs Help
1. ROXTerm x 2. ROXTerm x
The partition table has been altered!

Calling ioctl() to re-read partition table.
Syncing disks.
root@gcc-server:~# echo "Now, we are going to format the partition /dev/sdb1, and later we can attach this as a storage controller to OpenNebula"
Now, we are going to format the partition /dev/sdb1, and later we can attach this as a storage controller to OpenNebula
root@gcc-server:#
root@gcc-server:~# mkfs.ext4 /dev/sdb1
mke2fs 1.42.9 (4-Feb-2014)
Filesystem label=
OS type: Linux
Block size=4096 (log=2)
Fragment size=4096 (log=2)
Stride=0 blocks, Stripe width=0 blocks
7331840 inodes, 29304950 blocks
1465247 blocks (5.00%) reserved for the super user
First data block=0
Maximum filesystem blocks=4294967296
895 block groups
32768 blocks per group, 32768 fragments per group
8192 inodes per group
Superblock backups stored on blocks:
    32768, 98304, 163840, 229376, 294912, 819200, 884736, 1605632, 2654208,
    4096000, 7962624, 11239424, 20480000, 23887872

Allocating group tables: done
Writing inode tables: done
Creating journal (32768 blocks): done
Writing superblocks and filesystem accounting information: |

```

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Step: 17 Now, the physical hard disk of 120 GB has been formatted, and now it can be used as a storage controller in Open-Nebula. Now, we will switch back to oneadmin user and create an image from this storage controller.

Step: 18 To list an oneimage

Command: \$ oneimage list

```
File Edit View Search Preferences Tabs Help
1. ROXTerm x | 2. ROXTerm x | 
onedatastore: command not found
oneadmin@gcc-server:~$ onedatastore list


| ID  | NAME       | SIZE  | AVAIL | CLUSTER | IMAGES | TYPE | DS  | TM     | STAT |
|-----|------------|-------|-------|---------|--------|------|-----|--------|------|
| 0   | system     | 65.3G | 37%   | -       | 0      | sys  | -   | shared | on   |
| 1   | default    | 65.3G | 37%   | -       | 4      | img  | fs  | shared | on   |
| 2   | files      | 65.3G | 37%   | -       | 0      | fil  | fs  | ssh    | on   |
| 101 | devstorage | 1M    | 100%  | -       | 0      | img  | dev | dev    | on   |


oneadmin@gcc-server:~$ echo "A new datastore named 'devstorage' has been created through the Template file"
A new datastore named 'devstorage' has been created through the Template file
oneadmin@gcc-server:~$ 
oneadmin@gcc-server:~$ echo "Next, we have to attach a PHYSICAL BLOCK DEVICE (i.e. HARD DISK) through 'oneimage' command to this 'devstorage' ID (i.e. 101)"
Next, we have to attach a PHYSICAL BLOCK DEVICE (i.e. HARD DISK) through 'oneimage' command to this 'devstorage' ID (i.e. 101)
oneadmin@gcc-server:~$ 
oneadmin@gcc-server:~$ echo "For this example, we are going to ATTACH a PHYSICAL HARD DISK of capacity 120 GB and make it a storage controller in OpenNebula"
For this example, we are going to ATTACH a PHYSICAL HARD DISK of capacity 120 GB and make it as a storage controller in OpenNebula
oneadmin@gcc-server:~$ 
oneadmin@gcc-server:~$ oneimage list


| ID | USER     | GROUP    | NAME            | DATASTORE | SIZE | TYPE | PER | STAT | RVMs |
|----|----------|----------|-----------------|-----------|------|------|-----|------|------|
| 0  | oneadmin | oneadmin | CentOS-6.5_x86_ | default   | 267M | OS   | No  | used | 1    |
| 1  | oneadmin | oneadmin | Debian-7_amd64_ | default   | 167M | OS   | No  | used | 1    |
| 2  | oneadmin | oneadmin | Devuan-1.0.0_am | default   | 686M | OS   | No  | used | 1    |
| 3  | oneadmin | oneadmin | Ubuntu-14.04_am | default   | 287M | OS   | No  | used | 1    |


oneadmin@gcc-server:~$ oneimage create -d 101 --name devimage --path /dev/sdb1 --type DATABLOCK --prefix sd --description "An example for Creating Devices Datastore in OpenNebula"
ID: 6
oneadmin@gcc-server:~$ |
```

Step: 19 To create an oneimage

Command: \$ oneimage create -d 101 --name devimage --path /dev/sdb1 --type DATABLOCK --prefix sd --description "An example for creating Devices Datastore in Open-nebula"

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```

File Edit View Search Preferences Tabs Help
1. ROXTerm x | 2. ROXTerm x | 
onedatastore: command not found
oneadmin@gcc-server:~$ onedatastore list


| ID  | NAME       | SIZE  | AVAIL | CLUSTER | IMAGES | TYPE | DS  | TM     | STAT |
|-----|------------|-------|-------|---------|--------|------|-----|--------|------|
| 0   | system     | 65.3G | 37%   | -       | 0      | sys  | -   | shared | on   |
| 1   | default    | 65.3G | 37%   | -       | 4      | img  | fs  | shared | on   |
| 2   | files      | 65.3G | 37%   | -       | 0      | fil  | fs  | ssh    | on   |
| 101 | devstorage | 1M    | 100%  | -       | 0      | img  | dev | dev    | on   |


oneadmin@gcc-server:~$ echo "A new datastore named 'devstorage' has been created through the Template file"
A new datastore named 'devstorage' has been created through the Template file
oneadmin@gcc-server:~$ 
oneadmin@gcc-server:~$ echo "Next, we have to attach a PHYSICAL BLOCK DEVICE (i.e. HARD DISK) through 'oneimage' command to this 'devstorage' ID (i.e. 101)"
Next, we have to attach a PHYSICAL BLOCK DEVICE (i.e. HARD DISK) through 'oneimage' command to this 'devstorage' ID (i.e. 101)
oneadmin@gcc-server:~$ 
oneadmin@gcc-server:~$ echo "For this example, we are going to ATTACH a PHYSICAL HARD DISK of capacity 120 GB and make it a storage controller in OpenNebula"
For this example, we are going to ATTACH a PHYSICAL HARD DISK of capacity 120 GB and make it as a storage controller in OpenNebula
oneadmin@gcc-server:~$ 
oneadmin@gcc-server:~$ oneimage list


| ID | USER     | GROUP    | NAME            | DATASTORE | SIZE | TYPE | PER | STAT | RVMS |
|----|----------|----------|-----------------|-----------|------|------|-----|------|------|
| 0  | oneadmin | oneadmin | CentOS-6.5_x86  | default   | 267M | OS   | No  | used | 1    |
| 1  | oneadmin | oneadmin | Debian-7_amd64  | default   | 167M | OS   | No  | used | 1    |
| 2  | oneadmin | oneadmin | Devuan-1.0.0_am | default   | 686M | OS   | No  | used | 1    |
| 3  | oneadmin | oneadmin | Ubuntu-14.04_am | default   | 287M | OS   | No  | used | 1    |


oneadmin@gcc-server:~$ oneimage create -d 101 --name devimage --path /dev/sdb1 --type DATABLOCK --prefix sd --description "An example for Creating Devices Datastore in OpenNebula"
ID: 6
oneadmin@gcc-server:~$ 

```

Step: 20 To list an oneimage:

Command: \$ oneimage list

```

File Edit View Search Preferences Tabs Help
1. ROXTerm x | 2. ROXTerm x | 
A new datastore named 'devstorage' has been created through the Template file
oneadmin@gcc-server:~$ 
oneadmin@gcc-server:~$ echo "Next, we have to attach a PHYSICAL BLOCK DEVICE (i.e. HARD DISK) through 'oneimage' command to this 'devstorage' ID (i.e. 101)"
Next, we have to attach a PHYSICAL BLOCK DEVICE (i.e. HARD DISK) through 'oneimage' command to this 'devstorage' ID (i.e. 101)
oneadmin@gcc-server:~$ 
oneadmin@gcc-server:~$ echo "For this example, we are going to ATTACH a PHYSICAL HARD DISK of capacity 120 GB and make it a storage controller in OpenNebula"
For this example, we are going to ATTACH a PHYSICAL HARD DISK of capacity 120 GB and make it as a storage controller in OpenNebula
oneadmin@gcc-server:~$ 
oneadmin@gcc-server:~$ oneimage list


| ID | USER     | GROUP    | NAME            | DATASTORE | SIZE | TYPE | PER | STAT | RVMS |
|----|----------|----------|-----------------|-----------|------|------|-----|------|------|
| 0  | oneadmin | oneadmin | CentOS-6.5_x86  | default   | 267M | OS   | No  | used | 1    |
| 1  | oneadmin | oneadmin | Debian-7_amd64  | default   | 167M | OS   | No  | used | 1    |
| 2  | oneadmin | oneadmin | Devuan-1.0.0_am | default   | 686M | OS   | No  | used | 1    |
| 3  | oneadmin | oneadmin | Ubuntu-14.04_am | default   | 287M | OS   | No  | used | 1    |


oneadmin@gcc-server:~$ oneimage create -d 101 --name devimage --path /dev/sdb1 --type DATABLOCK --prefix sd --description "An example for Creating Devices Datastore in OpenNebula"
ID: 6
oneadmin@gcc-server:~$ 
oneadmin@gcc-server:~$ oneimage list


| ID | USER     | GROUP    | NAME            | DATASTORE  | SIZE | TYPE | PER | STAT | RVMS |
|----|----------|----------|-----------------|------------|------|------|-----|------|------|
| 0  | oneadmin | oneadmin | CentOS-6.5_x86  | default    | 267M | OS   | No  | used | 1    |
| 1  | oneadmin | oneadmin | Debian-7_amd64  | default    | 167M | OS   | No  | used | 1    |
| 2  | oneadmin | oneadmin | Devuan-1.0.0_am | default    | 686M | OS   | No  | used | 1    |
| 3  | oneadmin | oneadmin | Ubuntu-14.04_am | default    | 287M | OS   | No  | used | 1    |
| 6  | oneadmin | oneadmin | devimage        | devstorage | 0M   | DB   | No  | rdy  | 0    |


oneadmin@gcc-server:~$ 

```

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Result:

Thus, we have successfully installed Storage Controller and created an image in “devstorage” as “devimage” in Open-nebula.

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Ex.No : 13 Procedure to set up the Single-node hadoop cluster

AIM:

To install a single-node Hadoop cluster backed by the Hadoop Distributed File System on Ubuntu.

PREREQUISITES:

- **OPERATING SYSTEM:** You can install Hadoop on Linux based operating systems. Ubuntu and CentOS are very commonly used. Here, we are using Ubuntu 16.04.
- **JAVA:** You need to install the Java (jdk1.7.0_79) package on your system.
- **HADOOP:** You require Hadoop 2.6.4 package.

PROCEDURE:

Step: 1 Creating a Hadoop user for accessing HDFS and MapReduce:

Create a new group in the name of Hadoop to access and to deal with all Hadoop related activities. It will ask for password after hitting the below command

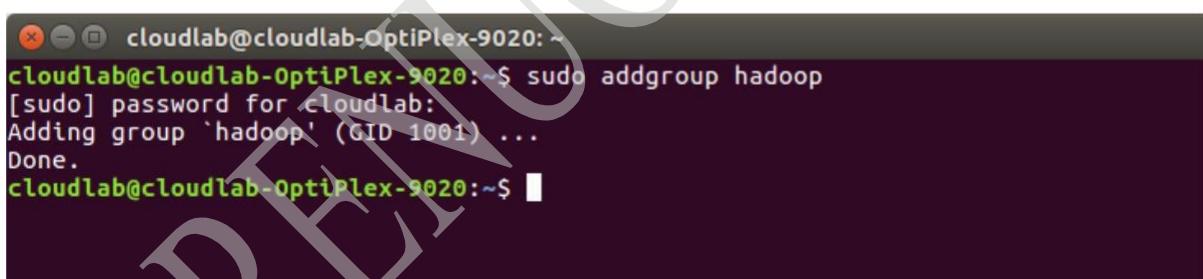
Command: \$ sudo addgroup hadoop.

Also, adding hduser to in-group hadoop and provide admin privilege to both the user and the group by hitting command

Command: \$ sudo adduser ingroup hadoop



```
cloudbl@cloudbl-OptiPlex-9020: ~
```



```
cloudbl@cloudbl-OptiPlex-9020: ~$ sudo addgroup hadoop
[sudo] password for cloudbl:
Adding group `hadoop' (GID 1001) ...
Done.
```

```
cloudbl@cloudbl-OptiPlex-9020:~  
cloudbl@cloudbl-OptiPlex-9020:~$ sudo addgroup hadoop  
[sudo] password for cloudbl:  
Adding group `hadoop' (GID 1001) ...  
Done.  
cloudbl@cloudbl-OptiPlex-9020:~$ sudo adduser --ingroup hadoop  
adduser: Only one or two names allowed.  
cloudbl@cloudbl-OptiPlex-9020:~$ sudo adduser --ingroup hadoop hduser  
Adding user `hduser' ...  
Adding new user `hduser' (1001) with group `hadoop' ...  
Creating home directory `/home/hduser' ...  
Copying files from `/etc/skel' ...  
Enter new UNIX password:  
Retype new UNIX password:  
passwd: password updated successfully  
Changing the user information for hduser  
Enter the new value, or press ENTER for the default  
    Full Name []:  
    Room Number []:  
    Work Phone []:  
    Home Phone []:  
    Other []:  
Is the information correct? [Y/n] y  
cloudbl@cloudbl-OptiPlex-9020:~$
```

```
cloudbl@cloudbl-OptiPlex-9020:~  
Done.  
cloudbl@cloudbl-OptiPlex-9020:~$ sudo adduser --ingroup hadoop  
adduser: Only one or two names allowed.  
cloudbl@cloudbl-OptiPlex-9020:~$ sudo adduser --ingroup hadoop hduser  
Adding user `hduser' ...  
Adding new user `hduser' (1001) with group `hadoop' ...  
Creating home directory `/home/hduser' ...  
Copying files from `/etc/skel' ...  
Enter new UNIX password:  
Retype new UNIX password:  
passwd: password updated successfully  
Changing the user information for hduser  
Enter the new value, or press ENTER for the default  
    Full Name []:  
    Room Number []:  
    Work Phone []:  
    Home Phone []:  
    Other []:  
Is the information correct? [Y/n] y  
cloudbl@cloudbl-OptiPlex-9020:~$ sudo adduser hduser sudo  
Adding user `hduser' to group `sudo' ...  
Adding user hduser to group sudo  
Done.  
cloudbl@cloudbl-OptiPlex-9020:~$
```

Step: 2 Installing SSH

Install SSH to allow hadoop to access other nodes to start and manage all HDFS and Map Reduce Daemons.

Command:\$ sudo apt-get install openssh-server

```
cloudbl@cloudbl-OptiPlex-9020:~  
Creating home directory `/home/hduser' ...  
Copying files from `/etc/skel' ...  
Enter new UNIX password:  
Retype new UNIX password:  
passwd: password updated successfully  
Changing the user information for hduser  
Enter the new value, or press ENTER for the default  
    Full Name []:  
    Room Number []:  
    Work Phone []:  
    Home Phone []:  
    Other []:  
Is the information correct? [Y/n] y  
cloudbl@cloudbl-OptiPlex-9020:~$ sudo adduser hduser sudo  
Adding user `hduser' to group `sudo' ...  
Adding user hduser to group sudo  
Done.  
cloudbl@cloudbl-OptiPlex-9020:~$ sudo apt-get install openssh-server  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
openssh-server is already the newest version (1:7.2p2-4ubuntu2.8).  
0 upgraded, 0 newly installed, 0 to remove and 245 not upgraded.  
cloudbl@cloudbl-OptiPlex-9020:~$
```

Step: 3 Configuring SSH

1. Login with „hduser“
2. Generate ssh key for the user account
3. Copy the generated ssh key to the authorized keys from hduser

Commands:

```
cloudbl@cloudbl...9020:~$sudo su hduser  
hduser@cloudbl...9020:~$ssh-keygen -t rsa -P ""  
hduser@cloudbl...9020:~$cat $HOME/.ssh/id_rsa.pub >> $HOME/.ssh/authorized_keys
```

```
hduser@cloudlab-OptiPlex-9020: /home/cloudlab
passwd: password updated successfully
Changing the user information for hduser
Enter the new value, or press ENTER for the default
    Full Name []:
    Room Number []:
    Work Phone []:
    Home Phone []:
    Other []:
Is the information correct? [Y/n] y
cloudlab@cloudlab-OptiPlex-9020:~$ sudo adduser hduser sudo
Adding user `hduser' to group `sudo' ...
Adding user hduser to group sudo
Done.
cloudlab@cloudlab-OptiPlex-9020:~$ sudo apt-get install openssh-server
Reading package lists... Done
Building dependency tree
Reading state information... Done
openssh-server is already the newest version (1:7.2p2-4ubuntu2.8).
0 upgraded, 0 newly installed, 0 to remove and 245 not upgraded.
cloudlab@cloudlab-OptiPlex-9020:~$ sudo su hduser
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.
```

hduser@cloudlab-OptiPlex-9020:/home/cloudlab\$

```
hduser@cloudlab-OptiPlex-9020: /home/cloudlab
hduser@cloudlab-OptiPlex-9020: /home/cloudlab$ ssh-keygen -t rsa -P ""
Generating public/private rsa key pair.
Enter file in which to save the key (/home/hduser/.ssh/id_rsa):
Created directory '/home/hduser/.ssh'.
Your identification has been saved in /home/hduser/.ssh/id_rsa.
Your public key has been saved in /home/hduser/.ssh/id_rsa.pub.
The key fingerprint is:
SHA256:gdjKTbJAZMq2jRUqThGyJjf9Q0S/8/VlLwpNjdEcHR4 hduser@cloudlab-OptiPlex-9020
The key's randomart image is:
+---[RSA 2048]---+
|+==+o .o.oE.
|oB+.+o . .o...
|=*ooo.+ . . .
|B =+ * . o
| + .= . S .
| . o
| o o . o
| o . o o ..
| . o. ...
+---[SHA256]---+
hduser@cloudlab-OptiPlex-9020: /home/cloudlab$ cat $HOME/.ssh/id_rsa.pub >> $HOME/.ssh/authorized_keys
hduser@cloudlab-OptiPlex-9020: /home/cloudlab$
```

Step: 4 Disabling Ipv6

Using nano editor open /etc/sysctl.conf file and by adding the following line of codes at end of the file

Command: \$ sudo nano /etc/sysctl.conf

```
# disable ipv6 net.ipv6.conf.all.disable_ipv6 = 1 net.ipv6.conf.default.disable_ipv6 = 1
net.ipv6.conf.lo.disable_ipv6 = 1
```

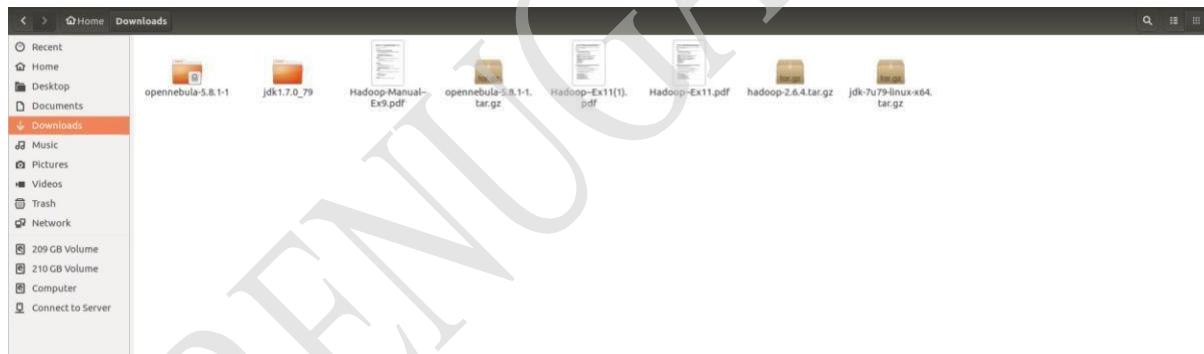
```

hduser@cloudlab-OptiPlex-9020: /home/cloudlab
Enter file in which to save the key (/home/hduser/.ssh/id_rsa):
Created directory '/home/hduser/.ssh'.
Your identification has been saved in /home/hduser/.ssh/id_rsa.
Your public key has been saved in /home/hduser/.ssh/id_rsa.pub.
The key fingerprint is:
SHA256:gdjKTbJAZMq2jRUqThGyJjF9Q6S/8/VlLwpNjdEcHR4 hduser@cloudlab-OptiPlex-9020
The key's randomart image is:
+---[RSA 2048]---+
|+==+o .o.oE. |
|oB+.+o . .o... |
|=*ooo.+ . . . . |
|B += * . o |
| + = . S . |
| . o |
| o o . o |
| o . o o.. |
| . o. ... |
+---[SHA256]---+
hduser@cloudlab-OptiPlex-9020:/home/cloudlab$ cat $HOME/.ssh/id_rsa.pub >> $HOME/.ssh/authorized_keys
hduser@cloudlab-OptiPlex-9020:/home/cloudlab$ nano /etc/sysctl.conf
hduser@cloudlab-OptiPlex-9020:/home/cloudlab$ 
hduser@cloudlab-OptiPlex-9020:/home/cloudlab$ sudo nano /etc/sysctl.conf
[sudo] password for hduser: [REDACTED]

```

Step: 5 Installing Java

1. Download “jdk-7u79-linux-x64.tar.gz” to the Downloads directory.
2. Extract the downloaded file.
3. The contents are extracted in a new directory “jdk1.7.0_79”.
4. Move the directory to the location “/usr/local/”.



```
hduser@cloudlab-OptiPlex-9020: /home/cloudlab/Downloads/jdk1.7.0_79
cloudlab@cloudlab-OptiPlex-9020:~$ sudo su hduser
[sudo] password for cloudlab:
hduser@cloudlab-OptiPlex-9020:/home/cloudlab$ cd Downloads
hduser@cloudlab-OptiPlex-9020:/home/cloudlab/Downloads$ ls
hadoop-2.6.4.tar.gz Hadoop-Manual--Ex9.pdf      opennebula-5.8.1-1
Hadoop--Ex11(1).pdf   jdk1.7.0_79                opennebula-5.8.1-1.tar.gz
Hadoop--Ex11.pdf      jdk-7u79-linux-x64.tar.gz
hduser@cloudlab-OptiPlex-9020:/home/cloudlab/Downloads$ cd jdk1.7.0_79/
hduser@cloudlab-OptiPlex-9020:/home/cloudlab/Downloads/jdk1.7.0_79$ sudo mv * /u
sr/local
[sudo] password for hduser:
hduser@cloudlab-OptiPlex-9020:/home/cloudlab/Downloads/jdk1.7.0_79$
```

5. Update the bashrc file of „hduser“ account with the following java environment variables.

```
export JAVA_HOME=/usr/local/jdk1.7.0_79
export PATH=$PATH:$JAVA_HOME/bin
```

```
hduser@cloudlab-OptiPlex-9020: /home/cloudlab
GNU nano 2.5.3          File: /home/hduser/.bashrc           Modified

if ! shopt -oq posix; then
  if [ -f /usr/share/bash-completion/bash_completion ]; then
    . /usr/share/bash-completion/bash_completion
  elif [ -f /etc/bash_completion ]; then
    . /etc/bash_completion
  fi
fi

export JAVA_HOME=/usr/local/jdk1.7.0_79
export PATH=$PATH:$JAVA_HOME/bin

^G Get Help  ^O Write Out  ^W Where Is  ^K Cut Text  ^J Justify  ^C Cur Pos
^X Exit     ^R Read File  ^\ Replace   ^U Uncut Text ^T To Spell  ^  Go To Line
```

6. Now, source the bashrc file.

```
hduser@cloudlab...9020:~$source $HOME/.bashrc
```

```

hduser@cloudlab-OptiPlex-9020: /home/cloudlab
Your public key has been saved in /home/hduser/.ssh/id_rsa.pub.
The key fingerprint is:
SHA256:gdjKTbJAZMq2jRUqThGyJjF9Q6S/8/VlLwpNJdEcHR4 hduser@cloudlab-OptiPlex-9020
The key's randomart image is:
+--[RSA 2048]---+
|+=+=o .o.oE.
|oB+.+o . o...
|=*ooo.+ . . .
|B += * . o
+ .= . S .
. o
o o . o
o . o o..
. o ...
+---[SHA256]---+
hduser@cloudlab-OptiPlex-9020:/home/cloudlab$ cat $HOME/.ssh/id_rsa.pub >> $HOME/.ssh/authorized_keys
hduser@cloudlab-OptiPlex-9020:/home/cloudlab$ nano /etc/sysctl.conf
hduser@cloudlab-OptiPlex-9020:/home/cloudlab$ sudo nano /etc/sysctl.conf
[sudo] password for hduser:
hduser@cloudlab-OptiPlex-9020:/home/cloudlab$ sudo nano $HOME/.bashrc
hduser@cloudlab-OptiPlex-9020:/home/cloudlab$ source $HOME/.bashrc
hduser@cloudlab-OptiPlex-9020:/home/cloudlab$ █

```

7. Check the installed Java version.

```

hduser@cloudlab-OptiPlex-9020: /home/cloudlab
hduser@cloudlab-OptiPlex-9020:/home/cloudlab$ java -version
java version "1.7.0_79"
Java(TM) SE Runtime Environment (build 1.7.0_79-b15)
Java HotSpot(TM) 64-Bit Server VM (build 24.79-b02, mixed mode)
hduser@cloudlab-OptiPlex-9020:/home/cloudlab$ █

```

Step: 6 Installing Hadoop

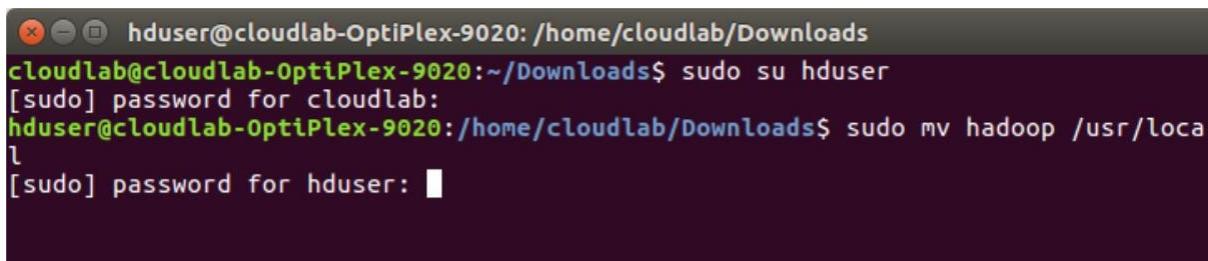
1. Download “hadoop-2.6.4.tar.gz” to the Downloads directory.
2. Extract the downloaded file.
3. The contents are extracted in a new directory “hadoop-2.6.4” and rename the directory name as hadoop
4. Move the contents of the directory “hadoop-2.6.4” to the location “/usr/local/”
5. Assign the Ownership of the directory “/usr/local/hadoop” to „hduser“
6. Create Hadoop temp directories for Namenode and Datanode
7. Again, assign Ownership of Hadoop Temp directories to „hduser“

```

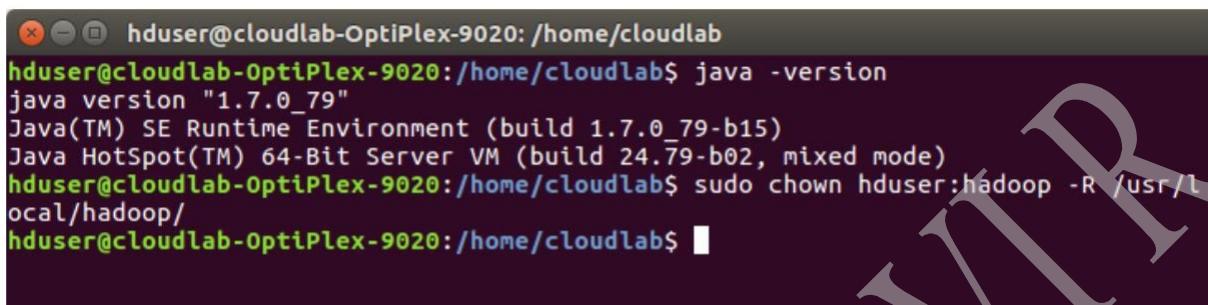
hduser@cloudlab...9020:~$cd Downloads
hduser@cloudlab...9020:~Downloads$tar -xvzf hadoop-2.6.4.tar.gz
hduser@cloudlab...9020:~Downloads$cd hadoop-2.6.4
hduser@cloudlab...9020:~Downloads/hadoop-2.6.4$sudo mv *
/usr/local/hadoop hduser@cloudlab...9020:~$sudo chown hduser:hadoop -R
/usr/local/hadoop/ hduser@cloudlab...9020:~$sudo mkdir -p
/usr/local/hadoop_tmp/hdfs/namenode hduser@cloudlab...9020:~$sudo mkdir -p

```

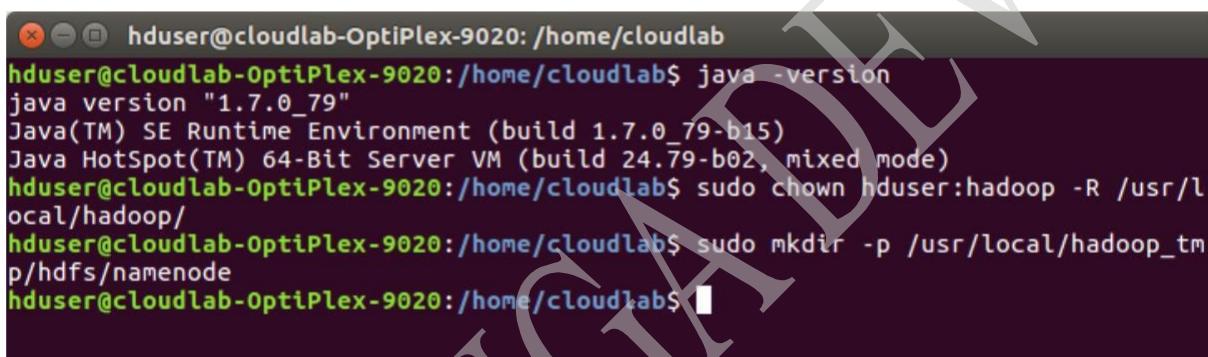
```
hduser@clouddlab...9020:~$sudo chown hduser:hadoop -R /usr/local/hadoop_tmp/
```



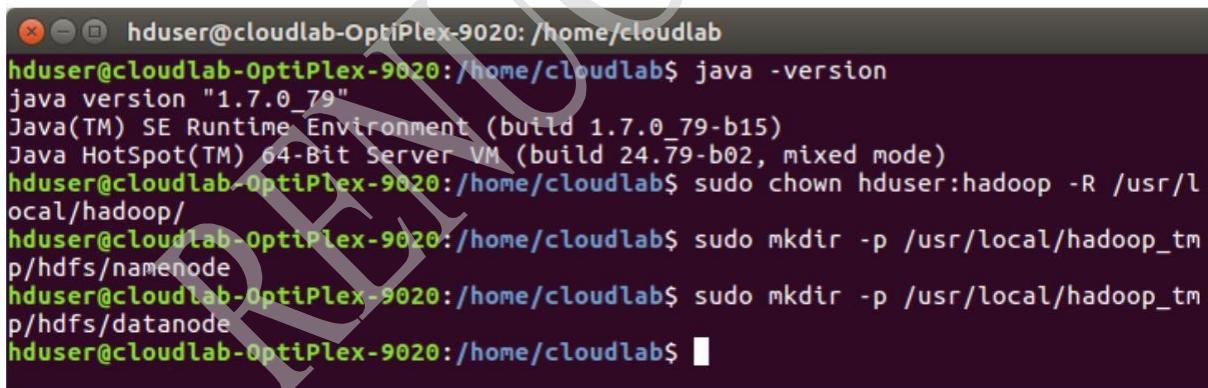
```
hduser@clouddlab-OptiPlex-9020:~/Downloads$ sudo su hduser
[sudo] password for clouddlab:
hduser@clouddlab-OptiPlex-9020:~/Downloads$ sudo mv hadoop /usr/local/
[sudo] password for hduser:
```



```
hduser@clouddlab-OptiPlex-9020:~/cloudlab$ java -version
java version "1.7.0_79"
Java(TM) SE Runtime Environment (build 1.7.0_79-b15)
Java HotSpot(TM) 64-Bit Server VM (build 24.79-b02, mixed mode)
hduser@clouddlab-OptiPlex-9020:~/cloudlab$ sudo chown hduser:hadoop -R /usr/local/hadoop/
hduser@clouddlab-OptiPlex-9020:~/cloudlab$
```



```
hduser@clouddlab-OptiPlex-9020:~/cloudlab$ java -version
java version "1.7.0_79"
Java(TM) SE Runtime Environment (build 1.7.0_79-b15)
Java HotSpot(TM) 64-Bit Server VM (build 24.79-b02, mixed mode)
hduser@clouddlab-OptiPlex-9020:~/cloudlab$ sudo chown hduser:hadoop -R /usr/local/hadoop/
hduser@clouddlab-OptiPlex-9020:~/cloudlab$ sudo mkdir -p /usr/local/hadoop_tmp/p/hdfs/namenode
hduser@clouddlab-OptiPlex-9020:~/cloudlab$
```



```
hduser@clouddlab-OptiPlex-9020:~/cloudlab$ java -version
java version "1.7.0_79"
Java(TM) SE Runtime Environment (build 1.7.0_79-b15)
Java HotSpot(TM) 64-Bit Server VM (build 24.79-b02, mixed mode)
hduser@clouddlab-OptiPlex-9020:~/cloudlab$ sudo chown hduser:hadoop -R /usr/local/hadoop/
hduser@clouddlab-OptiPlex-9020:~/cloudlab$ sudo mkdir -p /usr/local/hadoop_tmp/p/hdfs/namenode
hduser@clouddlab-OptiPlex-9020:~/cloudlab$ sudo mkdir -p /usr/local/hadoop_tmp/p/hdfs/datanode
hduser@clouddlab-OptiPlex-9020:~/cloudlab$
```

```
hduser@cloudlab-OptiPlex-9020:~/home/cloudlab$ java -version
java version "1.7.0_79"
Java(TM) SE Runtime Environment (build 1.7.0_79-b15)
Java HotSpot(TM) 64-Bit Server VM (build 24.79-b02, mixed mode)
hduser@cloudlab-OptiPlex-9020:~/home/cloudlab$ sudo chown hduser:hadoop -R /usr/local/hadoop/
hduser@cloudlab-OptiPlex-9020:~/home/cloudlab$ sudo mkdir -p /usr/local/hadoop_tm
p/hdfs/namenode
hduser@cloudlab-OptiPlex-9020:~/home/cloudlab$ sudo mkdir -p /usr/local/hadoop_tm
p/hdfs/datanode
hduser@cloudlab-OptiPlex-9020:~/home/cloudlab$ sudo chown hduser:hadoop -R /usr/local/hadoop_tmp/
hduser@cloudlab-OptiPlex-9020:~/home/cloudlab$
```

8. Update the bashrc file of „hduser“ account with the following Hadoop Environmental variables.

```
hduser@cloudlab-OptiPlex-9020:~/home/cloudlab$ nano .bashrc
GNU nano 2.5.3          File: /home/hduser/.bashrc      Modified

export PATH=$PATH:$JAVA_HOME/bin

# -- HADOOP ENVIRONMENT VARIABLES START -- #
export HADOOP_HOME=/usr/local/hadoop
export PATH=$PATH:$HADOOP_HOME/bin
export PATH=$PATH:$HADOOP_HOME/sbin
export HADOOP_MAPRED_HOME=$HADOOP_HOME
export HADOOP_COMMON_HOME=$HADOOP_HOME
export HADOOP_HDFS_HOME=$HADOOP_HOME
export YARN_HOME=$HADOOP_HOME
export HADOOP_COMMON_LIB_NATIVE_DIR=$HADOOP_HOME/lib/native
export HADOOP_OPTS="-Djava.library.path=$HADOOP_HOME/lib"
export HADOOP_CLASSPATH= $JAVA_HOME/lib/tools.jar
# -- HADOOP ENVIRONMENT VARIABLES END -- #
```

GNU nano 2.5.3

File: /home/hduser/.bashrc

Modified

^G Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify ^C Cur Pos

^X Exit ^R Read File ^\ Replace ^U Uncut Text ^T To Spell ^L Go To Line

9. Now, source the bashrc file.

```
hduser@cloudlab-OptiPlex-9020:~/home/cloudlab$ source $HOME/.bashrc
bash: export: `/usr/local/jdk1.7.0_79/lib/tools.jar': not a valid identifier
hduser@cloudlab-OptiPlex-9020:~/home/cloudlab$ sudo nano $HOME/.bashrc
hduser@cloudlab-OptiPlex-9020:~/home/cloudlab$ source $HOME/.bashrc
hduser@cloudlab-OptiPlex-9020:~/home/cloudlab$
```

10. Check the Hadoop version Installed.

```
hduser@cloudlab-OptiPlex-9020: /home/cloudlab
bash: export: `/usr/local/jdk1.7.0_79/lib/tools.jar': not a valid identifier
hduser@cloudlab-OptiPlex-9020: /home/cloudlab$ sudo nano $HOME/.bashrc
hduser@cloudlab-OptiPlex-9020: /home/cloudlab$ source $HOME/.bashrc
bash: export: `/usr/local/jdk1.7.0_79/lib/tools.jar': not a valid identifier
hduser@cloudlab-OptiPlex-9020: /home/cloudlab$ sudo nano $HOME/.bashrc
hduser@cloudlab-OptiPlex-9020: /home/cloudlab$ sudo nano $HOME/.bashrc
hduser@cloudlab-OptiPlex-9020: /home/cloudlab$ source $HOME/.bashrc
bash: export: `=/usr/local/jdk1.7.0_79': not a valid identifier
bash: export: `/usr/local/jdk1.7.0_79/lib/tools.jar': not a valid identifier
hduser@cloudlab-OptiPlex-9020: /home/cloudlab$ sudo nano $HOME/.bashrc
hduser@cloudlab-OptiPlex-9020: /home/cloudlab$ source $HOME/.bashrc
bash: export: `/usr/local/jdk1.7.0_79/lib/tools.jar': not a valid identifier
hduser@cloudlab-OptiPlex-9020: /home/cloudlab$ sudo nano $HOME/.bashrc
hduser@cloudlab-OptiPlex-9020: /home/cloudlab$ source $HOME/.bashrc
hduser@cloudlab-OptiPlex-9020: /home/cloudlab$ hadoop version
Hadoop 2.6.4
Subversion https://git-wip-us.apache.org/repos/asf/hadoop.git -r 5082c73637530b0
b7e115f9625ed7fac69f937e6
Compiled by jenkins on 2016-02-12T09:45Z
Compiled with protoc 2.5.0
From source with checksum 8dee2286ecdbbbc930a6c87b65cbc010
This command was run using /usr/local/hadoop/share/hadoop/common/hadoop-common-2.6.4.jar
hduser@cloudlab-OptiPlex-9020: /home/cloudlab$
```

Step: 7 Configuring hadoop-env.sh

1. Execute the below command to edit the file.

```
hduser@cloudlab-OptiPlex-9020: /usr/local/hadoop
hduser@cloudlab-OptiPlex-9020: /usr/local/hadoop$ sudo nano /usr/local/hadoop/etc
/hadoop/hadoop-env.sh
hduser@cloudlab-OptiPlex-9020: /usr/local/hadoop$
```

2. Update the file with the following Java Home variable, to save (Ctrl+o) and for exit(Ctrl+x).

```
hduser@cloudlab-OptiPlex-9020: /usr/local/hadoop
GNU nano 2.5.3  File: /usr/local/hadoop/etc/hadoop/hadoop-env.sh

# NOTE: this should be set to a directory that can only be written to by
#       the user that will run the hadoop daemons. Otherwise there is the
#       potential for a symlink attack.
export HADOOP_PID_DIR=${HADOOP_PID_DIR}
export HADOOP_SECURE_DN_PID_DIR=${HADOOP_PID_DIR}

# A string representing this instance of hadoop. $USER by default.
export HADOOP_IDENT_STRING=$USER

## Update JAVA_HOME variable,
export JAVA_HOME=/usr/local/jdk1.7.0_79

^G Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify ^C Cur Pos
^X Exit      ^R Read File ^\ Replace   ^U Uncut Text^T To Linter ^L Go To Line
```

Step: 8 Configuring core-site.xml

1. Execute the below command to edit the file.

```
hduser@cloudlab-OptiPlex-9020: /usr/local/hadoop
hduser@cloudlab-OptiPlex-9020: /usr/local/hadoop$ sudo nano /usr/local/hadoop/etc
/hadoop/hadoop-env.sh
hduser@cloudlab-OptiPlex-9020: /usr/local/hadoop$ sudo nano /usr/local/hadoop/etc
/hadoop/core-site.xml
hduser@cloudlab-OptiPlex-9020: /usr/local/hadoop$
```

2. Update the file with the following between the configuration tags, to save (Ctrl+o) and for exit (Ctrl+x).

```
hduser@cloudlab-OptiPlex-9020: /usr/local/hadoop
GNU nano 2.5.3  File: /usr/local/hadoop/etc/hadoop/core-site.xml

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See the License for the specific language governing permissions and
limitations under the License. See accompanying LICENSE file.

-->

<!-- Put site-specific property overrides in this file. -->

<configuration>
<property>
<name>fs.default.name</name>
<value>hdfs://localhost:9000</value>
</property>
</configuration>

^G Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify ^C Cur Pos
^X Exit      ^R Read File ^\ Replace   ^U Uncut Text ^T To Spell ^_ Go To Line
```

Step: 9 Configuring hdfs-site.xml

1. Execute the below command to edit the file.

```
core-site.xml
hduser@cloudlab-OptiPlex-9020:/usr/local/hadoop$ sudo nano /usr/local/hadoop/etc/hadoop/hdfs-site.xml
hduser@cloudlab-OptiPlex-9020:/usr/local/hadoop$
```

2. Update the file with the following between the configuration tags, to save (Ctrl+o) and for exit (Ctrl+x)..

The screenshot shows a terminal window titled "hduser@cloudblab-OptiPlex-9020: /usr/local/hadoop". The file being edited is "/usr/local/hadoop/etc/hadoop/hdfs-site.xml". The content of the file is as follows:

```
<!-- Put site-specific property overrides in this file. -->
<configuration>
<property>
<name>dfs.replication</name>
<value>1</value>
</property>
<property>
<name>dfs.namenode.name.dir</name>
<value>file:/usr/local/hadoop_tmp/hdfs/namenode</value>
</property>
<property>
<name>dfs.datanode.data.dir</name>
<value>file:/usr/local/hadoop_tmp/hdfs/datanode</value>
</property>
</configuration>
```

The terminal also displays a menu bar at the bottom with various keyboard shortcuts for editing.

Step: 10 Configuring yarn-site.xml

1. Execute the below command to edit the file.

```
hduser@CloudLab-OptiPlex-9020:/usr/local/hadoop$ sudo nano /usr/local/hadoop/etc/hadoop/hdfs-site.xml
hduser@cloudblab-OptiPlex-9020:/usr/local/hadoop$ sudo nano /usr/local/hadoop/etc/hadoop/yarn-site.xml
hduser@cloudblab-OptiPlex-9020:/usr/local/hadoop$
```

2. Update the file with the following between the configuration tags, to save (Ctrl+o) and for exit (Ctrl+x).

```

hduser@cloudlab-OptiPlex-9020: /usr/local/hadoop
GNU nano 2.5.3      File: /usr/local/hadoop/etc/hadoop/yarn-site.xml

<?xml version="1.0"?>
<!--
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  you may not use this file except in compliance with the License.
  You may obtain a copy of the License at

    http://www.apache.org/licenses/LICENSE-2.0

  Unless required by applicable law or agreed to in writing, software
  distributed under the License is distributed on an "AS IS" BASIS,
  WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
  See the License for the specific language governing permissions and
  limitations under the License. See accompanying LICENSE file.
-->
<configuration>
<property>
<name>yarn.nodemanager.aux-services</name>
<value>mapreduce_shuffle</value>
</property>
<property> <name>yarn.nodemanager.aux-
services.mapreduce.shuffle.class</name>
<value>org.apache.hadoop.mapred.ShuffleHandler</value>
</property>
<property>
<name>dfs.datanode.data.dir</name>
<value>file:/usr/local/hadoop_tmp/hdfs/datanode</value>
</property>
<!-- Site specific YARN configuration properties -->
</configuration>

^G Get Help   ^O Write Out   ^W Where Is   ^K Cut Text   ^J Justify   ^C Cur Pos
^X Exit       ^R Read File   ^\ Replace    ^U Uncut Text  ^T To Spell   ^_ Go To Line

```

Step: 11 Configuring mapred-site.xml

1. Copy the template of mapred-site.xml.template to mapred-site.xml and edit the maprd- site.xml file as follows,

```

hduser@cloudlab-OptiPlex-9020:/usr/local/hadoop$ sudo nano /usr/local/hadoop/etc/hadoop/h
dfs-site.xml
hduser@cloudlab-OptiPlex-9020:/usr/local/hadoop$ sudo nano /usr/local/hadoop/etc/hadoop/y
arn-site.xml
hduser@cloudlab-OptiPlex-9020:/usr/local/hadoop$ sudo cp /usr/local/hadoop/etc/hadoop/map
red-site.xml.template /usr/local/hadoop/etc/hadoop/mapred-site.xml
hduser@cloudlab-OptiPlex-9020:/usr/local/hadoop$ █

```

```

hduser@cloudlab-OptiPlex-9020:/usr/local/hadoop$ sudo cp /usr/local/hadoop/etc/hadoop/map
red-site.xml.template /usr/local/hadoop/etc/hadoop/mapred-site.xml
hduser@cloudlab-OptiPlex-9020:/usr/local/hadoop$ sudo nano /usr/local/hadoop/etc/hadoop/m
apred-site.xml
hduser@cloudlab-OptiPlex-9020:/usr/local/hadoop$ █

```

2. Update the file with the following between the configuration tags, to save (Ctrl+o) and for exit (Ctrl+x).

```
hduser@cloudlab-OptiPlex-9020: /usr/local/hadoop
GNU nano 2.5.3      File: /usr/local/hadoop/etc/hadoop/mapred-site.xml

<?xml version="1.0"?>
<?xml-stylesheet type="text/xsl" href="configuration.xsl"?>
<!--
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  you may not use this file except in compliance with the License.
  You may obtain a copy of the License at

    http://www.apache.org/licenses/LICENSE-2.0

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  distributed under the License is distributed on an "AS IS" BASIS,
  WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
  See the License for the specific language governing permissions and
  limitations under the License. See accompanying LICENSE file.
-->

<!-- Put site-specific property overrides in this file. -->

<configuration>
<property>
<name>mapreduce.framework.name</name>
<value>yarn</value>
</property>
</configuration>

[[ Wrote 24 lines ]]

^G Get Help  ^O Write Out  ^W Where Is  ^K Cut Text  ^J Justify  ^C Cur Pos
^X Exit      ^R Read File  ^\ Replace   ^U Uncut Text ^T To Spell  ^  Go To Line
```

Step: 12 Format Namenode

```
hduser@cloudlab...9020:~$ hdfs namenode -format
```

```
hduser@cloudlab-OptiPlex-9020: /usr/local/hadoop$ sudo cp /usr/local/hadoop/etc/hadoop/map
red-site.xml.template /usr/local/hadoop/etc/hadoop/mapred-site.xml
hduser@cloudlab-OptiPlex-9020: /usr/local/hadoop$ sudo nano /usr/local/hadoop/etc/hadoop/m
apred-site.xml
hduser@cloudlab-OptiPlex-9020: /usr/local/hadoop$ hdfs namenode -format
19/08/30 23:53:56 INFO namenode.NameNode: STARTUP_MSG:
/*****
```

```

hduser@cloudblab-OptiPlex-9020: /usr/local/hadoop
    at org.apache.hadoop.conf.Configuration.loadResources(Configuration.java:2444)
    at org.apache.hadoop.conf.Configuration.getProps(Configuration.java:2361)
    at org.apache.hadoop.conf.Configuration.set(Configuration.java:1099)
    at org.apache.hadoop.conf.Configuration.set(Configuration.java:1071)
    at org.apache.hadoop.hdfs.server.namenode.NameNode.setStartupOption(NameNode.java:1306)
    at org.apache.hadoop.hdfs.server.namenode.NameNode.createNameNode(NameNode.java:1378)
    at org.apache.hadoop.hdfs.server.namenode.NameNode.main(NameNode.java:1507)
Caused by: org.xml.sax.SAXParseException; systemId: file:/usr/local/hadoop/etc/hadoop/core-site.xml; lineNumber: 23; columnNumber: 1; Content is not allowed in trailing section.
    at org.apache.xerces.parsers.DOMParser.parse(Unknown Source)
    at org.apache.xerces.xmlevents.DocumentBuilderImpl.parse(Unknown Source)
    at javax.xml.parsers.DocumentBuilder.parse(DocumentBuilder.java:150)
    at org.apache.hadoop.conf.Configuration.parse(Configuration.java:2432)
    at org.apache.hadoop.conf.Configuration.parse(Configuration.java:2420)
    at org.apache.hadoop.conf.Configuration.loadResource(Configuration.java:2491)
    ... 7 more
19/08/30 23:26:29 INFO util.ExitUtil: Exiting with status 1
19/08/30 23:26:29 INFO namenode.NameNode: SHUTDOWN_MSG:
*****SHUTDOWN_MSG: Shutting down NameNode at cloudblab-OptiPlex-9020/127.0.1.1*****
*****cd $SHADOOP_HOME
hduser@cloudblab-OptiPlex-9020:/home/cloudblab$ cd $SHADOOP_HOME
hduser@cloudblab-OptiPlex-9020:/usr/local/hadoop$ 

```

Step: 13 Start all Hadoop Daemons

```

hduser@cloudblab...9020:~$ cd $HADOOP_HOME
hduser@cloudblab...9020:~/usr/local/hadoop$ start-dfs.sh
hduser@cloudblab...9020:~/usr/local/hadoop$ start-yarn.sh

```

```

hduser@cloudblab-OptiPlex-9020: /usr/local/hadoop
*****SHUTDOWN_MSG: Shutting down NameNode at cloudblab-OptiPlex-9020/127.0.1.1*****
*****cd $SHADOOP_HOME
hduser@cloudblab-OptiPlex-9020:/home/cloudblab$ cd $SHADOOP_HOME
hduser@cloudblab-OptiPlex-9020:/usr/local/hadoop$ start-dfs.sh
19/08/30 23:39:37 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
Starting namenodes on [localhost]
localhost: starting namenode, logging to /usr/local/hadoop/logs/hadoop-hduser-na
menode-cloudblab-OptiPlex-9020.out
localhost: starting datanode, logging to /usr/local/hadoop/logs/hadoop-hduser-da
tanode-cloudblab-OptiPlex-9020.out
Starting secondary namenodes [0.0.0.0]
The authenticity of host '0.0.0.0 (0.0.0.0)' can't be established.
ECDSA key fingerprint is SHA256:NkfKSZmN44AhRkUVYAxMrF2Lqey0fHtghbaSlo07ZPI.
Are you sure you want to continue connecting (yes/no)? yes
0.0.0.0: Warning: Permanently added '0.0.0.0' (ECDSA) to the list of known hosts
.
0.0.0.0: starting secondarynamenode, logging to /usr/local/hadoop/logs/hadoop-hd
user-secondarynamenode_cloudblab-OptiPlex-9020.out
19/08/30 23:39:58 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
hduser@cloudblab-OptiPlex-9020:/usr/local/hadoop$ start-yarn.sh
starting yarn daemons

```

```

hduser@cloudlab-OptiPlex-9020: /usr/local/hadoop
ry for your platform... using builtin-java classes where applicable
Starting namenodes on [localhost]
localhost: starting namenode, logging to /usr/local/hadoop/logs/hadoop-hduser-na
menode-cloudlab-OptiPlex-9020.out
localhost: starting datanode, logging to /usr/local/hadoop/logs/hadoop-hduser-da
tanode-cloudlab-OptiPlex-9020.out
Starting secondary namenodes [0.0.0.0]
The authenticity of host '0.0.0.0 (0.0.0.0)' can't be established.
ECDSA key fingerprint is SHA256:NkfKSZmN44AhRkUVYAxMrF2Lqey0fHtghbaSlo07ZPI.
Are you sure you want to continue connecting (yes/no)? yes
0.0.0.0: Warning: Permanently added '0.0.0.0' (ECDSA) to the list of known hosts
.
0.0.0.0: starting secondarynamenode, logging to /usr/local/hadoop/logs/hadoop-hd
user-secondarynamenode-cloudlab-OptiPlex-9020.out
19/08/30 23:39:58 WARN util.NativeCodeLoader: Unable to load native-hadoop libra
ry for your platform... using builtin-java classes where applicable
hduser@cloudlab-OptiPlex-9020:/usr/local/hadoop$ start-yarn.sh
starting yarn daemons
starting resourcemanager, logging to /usr/local/hadoop/logs/yarn-hduser-resource
manager-cloudlab-OptiPlex-9020.out
localhost: starting nodemanager, logging to /usr/local/hadoop/logs/yarn-hduser-n
odemanager-cloudlab-OptiPlex-9020.out
hduser@cloudlab-OptiPlex-9020:/usr/local/hadoop$ jps
9686 Jps

```

Step: 14 Hit jps command to check whether all the daemons are running

```

hduser@cloudlab-OptiPlex-9020: /usr/local/hadoop
Starting secondary namenodes [0.0.0.0]
The authenticity of host '0.0.0.0 (0.0.0.0)' can't be established.
ECDSA key fingerprint is SHA256:NkfKSZmN44AhRkUVYAxMrF2Lqey0fHtghbaSlo07ZPI.
Are you sure you want to continue connecting (yes/no)? yes
0.0.0.0: Warning: Permanently added '0.0.0.0' (ECDSA) to the list of known hosts
.
0.0.0.0: starting secondarynamenode, logging to /usr/local/hadoop/logs/hadoop-hd
user-secondarynamenode-cloudlab-OptiPlex-9020.out
19/08/30 23:39:58 WARN util.NativeCodeLoader: Unable to load native-hadoop libra
ry for your platform... using builtin-java classes where applicable
hduser@cloudlab-OptiPlex-9020:/usr/local/hadoop$ start-yarn.sh
starting yarn daemons
starting resourcemanager, logging to /usr/local/hadoop/logs/yarn-hduser-resource
manager-cloudlab-OptiPlex-9020.out
localhost: starting nodemanager, logging to /usr/local/hadoop/logs/yarn-hduser-n
odemanager-cloudlab-OptiPlex-9020.out
hduser@cloudlab-OptiPlex-9020:/usr/local/hadoop$ jps
9686 Jps
8910 DataNode
9553 NodeManager
9089 SecondaryNameNode
9254 ResourceManager
8762 NameNode
hduser@cloudlab-OptiPlex-9020:/usr/local/hadoop$ 

```

Result:

Thus the Hadoop single node Cluster setup have been successfully done and all the hadoop daemons are verified to be running properly.

Exp:14 Hadoop Commands to use the API's of Hadoop to interact with it

AIM:

To learn some of the basic Hadoop Commands and execute them in a single node hadoop cluster.

PROCEDURE:

1. Login with hduser in the ubuntu machine which has the hadoop single node cluster setup.

Command: cloudb@cloudb...9020: \$su hduser

2. Navigate into the Hadoop Home Directory.

Command: hduser@cloudb..9020: \$cd

\$HADOOP_HOME 3. Start all the hadoop daemons.

Command: hduser@cloudb..9020: /usr/local/hadoop\$start-dfs.sh

Command: hduser@cloudb..9020: /usr/local/hadoop\$start-yarn.sh

4. Now, start executing the basic hadoop commands.

1. Command for creating a new directory

mkdir: similar to Unix mkdir command, it is used for creating directories in HDFS.

Syntax: \$ hadoop fs -mkdir [-p] <path>

Example Command: bin/hadoop fs -mkdir -p

/demo/day1 bin/hadoop fs -mkdir -p /demo/day2

2. Command for removing a directory

rm: It is used to remove a directory from hadoop file system.

Syntax: \$ hadoop fs -rm [-r] <path>

Example Command: bin/hadoop fs -rm -r /demo/day1

3. Command for listing directories in HDFS

ls: It is used for listing directories in HDFS. The -lsr command can be used for recursive listing.

Syntax: \$ hadoop fs -ls <path>

List the contents that match the specified file pattern. If path is not specified, the contents of /user/<currentUser> will be listed.

Example Command: bin/hadoop fs -ls /demo

4. Command for copying files from local file system to HDFS

put: Copying files from local file system to HDFS. This is similar to -copyFromLocal command.

Syntax: \$ hadoop fs -put [-f] [-p] <localsrc> ... <dst>

Copying fails if the file already exists, unless the -f flag is given. Passing -p preserves access and modification times, ownership and the mode. Passing -f overwrites the destination if it already exists.

Example Command: \$ hadoop fs -put usr/local/copy/welcome.txt /IT-B/demo

5. Command for copying files from HDFS system to local file system

get: Copying files from HDFS to local file system. This is similar to -copyToLocal command.

Syntax: \$ hadoop fs -get <source path> <destination path>

Example Command: \$ hadoop fs -get /IT-B/demo/hello.txt usr/local/it-b

6. Command for Displaying contents of a file

cat: similar to Unix cat command, it is used for displaying contents of a file.

Syntax: hadoop fs -cat <path>

Example Command: \$ hadoop fs -cat /user/data/sample.txt

7. Command for copying files from one directory to another directory within HDFS

cp: similar to Unix cp command, it is used for copying files from one directory to another within HDFS.

Syntax: \$ hadoop fs -cp <source path> <destination path>

Example Command: \$ hadoop fs -cp /user/data/sample.txt /user/hadoop

8. Command for moving files from one directory to another directory within HDFS mv:

It is used for moving a file from one directory to another within HDFS.

Syntax: \$ hadoop fs -mv <source path> <destination path>

Example Command: \$ hadoop fs -mv /user/hadoop/sample.txt /user/test/

9. Command for removing files from HDFS

rm: It is used for removing a file from HDFS. The command -r can be used for recursive delete.

Syntax: \$ hadoop fs -rm [-f] [-r|-R] [-skipTrash] <src>

-skipTrash ->option bypasses trash, if enabled, and immediately deletes <src>

-f -> If the file does not exist, do not display a diagnostic message or modify the exit status to reflect an error.

-[rR] ->Recursively deletes directories

Example Command: \$ hadoop fs -rm -r /user/test/sample.txt

10. Command for merging a list of files in one directory on HDFS system to local file system

getmerge: It is used for merging a list of files in one directory on HDFS into a single file on local file system.

Syntax: \$ hadoop fs -getmerge <path>

Example Command: \$ hadoop fs -getmerge /user/data/ merge.txt

11. Command for appending contents to the files in HDFS

appendToFile: Appends the contents of all the given local files to the given destination file on HDFS.

Syntax : \$ hadoop fs -appendToFile <local files separated by space> <hdfs destination file>

Example Command: \$hadoop fs -appendToFile /usr/local/it-b/hello.txt IT-B/demo/welcome.txt

12. Command for moving files from local file system to HDFS moveFromLocal: Moving files from local file system to HDFS.

Syntax: bin/hdfs dfs -moveFromLocal <localsrc> <dst>

Example Command: bin/hdfs dfs -moveFromLocal usr/local/copy/welcome.txt /IT-B/demo

13. Command for moving files from HDFS to local file system

moveToLocal: Moving files from HDFS to Local File System.

Syntax: bin/hdfs dfs -moveToLocal <src> <localdst>

Example Command: bin/hdfs dfs -moveToLocal /IT-B/demo/hello.txt usr/local/it-b

14. Command for copying files from local file system to HDFS

copyFromLocal: Similar to put command, except that the source is restricted to a local file reference.

Syntax: bin/hdfs dfs -copyFromLocal <localsrc> <dst>

Example Command: bin/hdfs dfs -copyFromLocal usr/local/copy/welcome.txt /IT-B/demo

15. Command for copying files from HDFS to local file system

copyToLocal: Similar to get command, except that the destination is restricted to a local file reference.

Syntax: bin/hdfs dfs -copyToLocal <src> <localdst>

Example Command: bin/hdfs dfs -copyToLocal /IT-B/demo/hello.txt usr/local/it-b

RESULT:

Thus, the basic Hadoop commands were executed and interacted with Hadoop API's successfully.

EX.NO:15 Compiling and Running a Word Count Program

AIM:

To write, compile and execute a Java Program for word count in a Hadoop Single Node Cluster using map reduce concept.

PROCEDURE:

1. Login With hduser in the Ubuntu machine which has the hadoop single node cluster setup.
2. Navigate into the Hadoop Home Directory.
3. Check if the hadoop daemons are running properly.
4. If Hadoop daemons are not running, start them all.

```
cloudlab@cloudlab-OptiPlex-9020:~$ su hduser
Password:
hduser@cloudlab-OptiPlex-9020:/home/cloudlab$ cd $HADOOP_HOME
hduser@cloudlab-OptiPlex-9020:/usr/local/hadoop$ jps 31061 Jps

hduser@cloudlab-OptiPlex-9020:/usr/local/hadoop$ start-dfs.sh
hduser@cloudlab-OptiPlex-9020:/usr/local/hadoop$ start-yarn.sh
hduser@cloudlab-OptiPlex-9020:/usr/local/hadoop$ jps
31468 DataNode
31657 SecondaryNameNode
31212 NameNode
32140 ResourceManager
32515 NodeManager
32747 Jps
```

Compiling Map Reduce Java Program and Creating the JAR file for Word Count Operation :

5. Make a new directory and navigate into the directory.
6. Create a new java file “WordCount.java”

```
hduser@cloudlab-OptiPlex-9020:/usr/local/hadoop$ mkdir mywordcount
hduser@cloudlab-OptiPlex-9020:/usr/local/hadoop$ cd mywordcount/
hduser@cloudlab-OptiPlex-9020:/usr/local/hadoop/mywordcount$ nano WordCount.java
```

7. Type the following Map Reduce program in the file “WordCount.java”.
8. After finished typing, Save and Quit the file.

```
//Java program for word count operation
import java.io.IOException;
import java.util.StringTokenizer;
import org.apache.hadoop.conf.Configuration;
import org.apache.hadoop.fs.Path;
import org.apache.hadoop.io.IntWritable;
import org.apache.hadoop.io.Text;
import org.apache.hadoop.mapreduce.Job; import
org.apache.hadoop.mapreduce.Mapper;
```

```

import org.apache.hadoop.mapreduce.Reducer;
import org.apache.hadoop.mapreduce.lib.input.FileInputFormat;
import org.apache.hadoop.mapreduce.lib.output.FileOutputFormat;

public class WordCount
{

    public static class TokenizerMapper
        extends Mapper<Object, Text, Text, IntWritable>
    {

        private final static IntWritable one = new
        IntWritable(1); private Text word = new Text();

        public void map(Object key, Text value,
                        Context context ) throws IOException,
                        InterruptedException
        {
            StringTokenizer itr = new
            StringTokenizer(value.toString()); while
            (itr.hasMoreTokens())
            {
                word.set(itr.nextToken());
                context.write(word, one);
            }
        }
    }

    public static class IntSumReducer
        extends Reducer<Text,IntWritable,Text,IntWritable>
    {
        private IntWritable result = new IntWritable();

        public void reduce(Text key, Iterable<IntWritable>
                          values, Context context) throws
                          IOException, InterruptedException
        {
            int sum = 0;
            for (IntWritable val : values)
            {
                sum += val.get();
            }
            result.set(sum);
            context.write(key, result);
        }
    }

    public static void main(String[] args) throws Exception
}

```

```

{
Configuration conf = new Configuration();
Job job = Job.getInstance(conf, "word count");
job.setJarByClass(WordCount.class);
job.setMapperClass(TokenizerMapper.class);
job.setCombinerClass(IntSumReducer.class);
job.setReducerClass(IntSumReducer.class);
job.setOutputKeyClass(Text.class);
job.setOutputValueClass(IntWritable.class);
FileInputFormat.addInputPath(job, new Path(args[0]));
FileOutputFormat.setOutputPath(job, new
Path(args[1]));
System.exit(job.waitForCompletion(true) ? 0 : 1);
}
}

//Press ctrl + o and enter to save and ctrl + x to quit the file.

```

9. Navigate back to the Hadoop Home Directory.
10. Compile “WordCount.java”

```

hduser@clo...9020:/usr/local/hadoop/mywordcount$ cd ..
hduser@...hadoop$ bin/hadoop com.sun.tools.javac.Main mywordcount/WordCount.java

```

11. Again Navigate into the directory in which “WordCount.java” is located.
12. List the files in the directory. Now, the directory will contain the compiled Map Reduce class files of “WordCount.java”
13. Create the jar file “wc.jar” with all the compiled classes of “WordCount.java”
14. Again list the files in the directory, to check if the newly created “wc.jar” is located.

```

hduser@cloudlab-OptiPlex-9020:/usr/local/hadoop$ cd mywordcount/
hduser@clo...9020:/usr/local/hadoop/mywordcount$ ls
WordCount$IntSumReducer.class
WordCount$TokenizerMapper.class WordCount.class
WordCount.java
hduser@clo....9020:/usr/local/hadoop/mywordcount$ jar cf wc.jar WordCount*.class
hduser@clo...9020:/usr/local/hadoop/mywordcount$ ls
wc.jar WordCount$IntSumReducer.class WordCount$TokenizerMapper.class
WordCount.class WordCount.java
hduser@cloudlab-OptiPlex-9020:/usr/local/hadoop/mywordcount$ cd ..

```

Running the Word Count Program in Hadoop :

15. Create a text file “sample.txt” and type some sample contents for Word Count Processing.
16. After finished typing, Save and Quit the file.
17. Navigate back to the Hadoop Home Directory.

```

hduser@cloudlab-OptiPlex-9020:/usr/local/hadoop/mywordcount$ nano sample.txt //Sample Contents
for Word Count Processing

```

This is a sample text file that is going to be used to test the word count program. It is important that this program work correctly, since it will be used on the exam. I need to know that all is fine with the code I am providing. The program keeps track of all the words in this file and how many times each has occurred.

//Press ctrl + o and enter to save and ctrl + x to quit the file.

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```
hduser@cloudlab-OptiPlex-9020:/usr/local/hadoop/mywordcount$ cd ..  
hduser@cloudlab-OptiPlex-9020:/usr/local/hadoop$
```

18. Create a new directory in the hdfs.
19. List the files in hdfs, to check if the directory is created.
20. Now, move “sample.txt” located in our local filesystem to the newly created directory in hdfs.

```
hduser@cloudlab-OptiPlex-9020:/usr/local/hadoop$ bin/hadoop fs -mkdir/mydemo  
hduser@cloudlab-OptiPlex-9020:/usr/local/hadoop$ bin/hadoop fs -ls /  
Found 2 items  
drwxr-xr-x - hduser supergroup 0 2016-09-30 16:06 /demo  
drwxr-xr-x - hduser supergroup  
hduser@clo...../hadoop$ bin/hdfs dfs -moveFromLocal mywordcount/sample.txt /mydemo
```

21. Now, execute the below hadoop command for processing “sample.txt” using “wc.jar”.

```
bin/hadoop jar mywordcount/wc.jar WordCount /mydemo/sample.txt /mydemo/output
```

22. In hdfs, a new directory named “output” will be created in the location /mydemo and the output file “part-r-00000” will be located in it, which contains the output of the Word Count operation.
23. Display the output using hadoop -cat command.
24. Stop.

OUTPUT:

```
hduser@cloudlab-OptiPlex-9020: /usr/local/hadoop
hduser@cloudLab-OptiPlex-9020:/usr/local/hadoop$ bin/hadoop fs -cat /mydemo/output/part-r-00000
16/10/08 13:39:41 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your pla
tform... using builtin-java classes where applicable
I      2
It     1
The    1
This   1
a      1
all    2
am    1
and    1
be    2
code   1
correctly,    1
count   1
each   1
exam.  1
file   2
```

RESULT:

Thus the Java Program for performing word count operation using map reduce concept have been created, compiled and executed successfully.

Ex.No:16

Installation guide of CentOS Linux in oracle VM VirtualBox on windows10

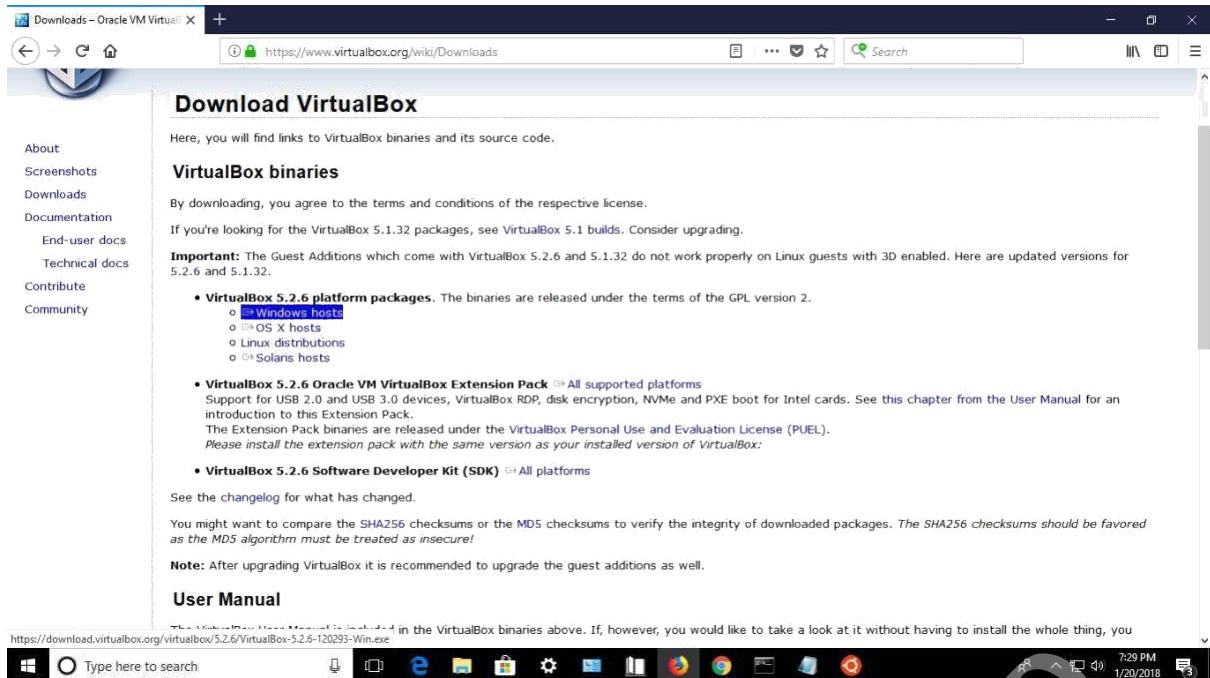
Installation steps:

Step1: Go to <https://www.virtualbox.org/> and download Virtualbox based on what OS you are using. i.e. Windows/Linux/OS X/Solaris and your architecture 32 bit or 64 bit.

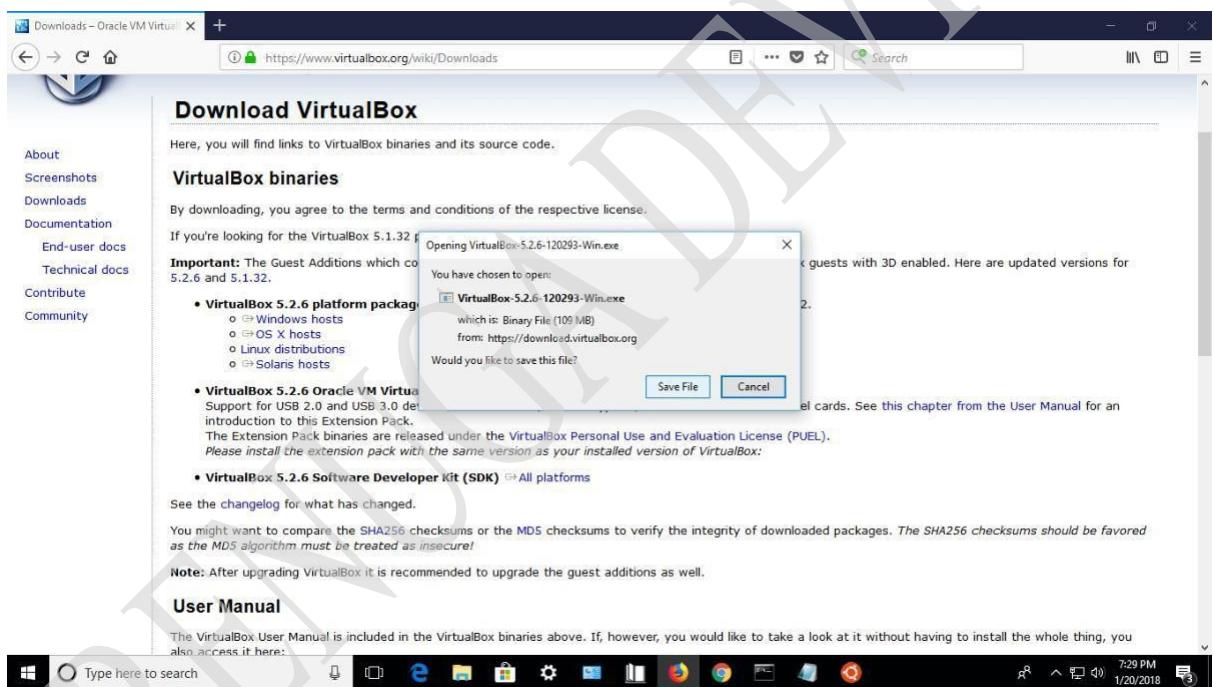


Step2: I am using windows 10 operating system and it's a 64 bit machine.
So I select „windows hosts“.

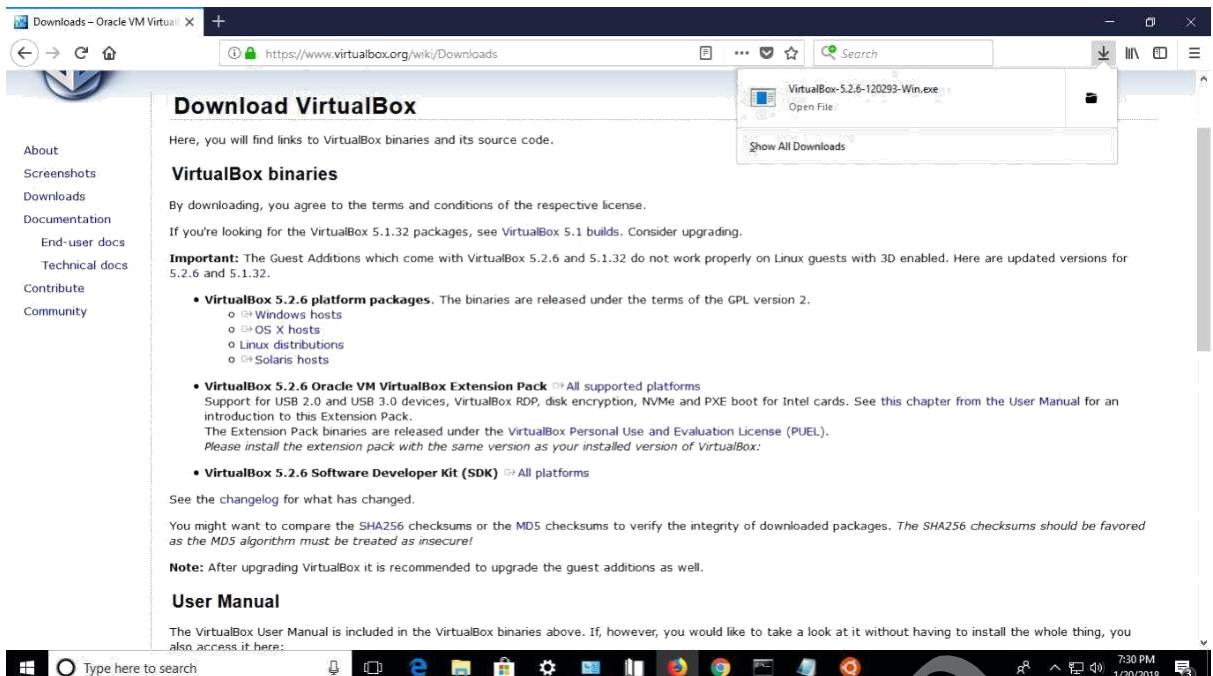
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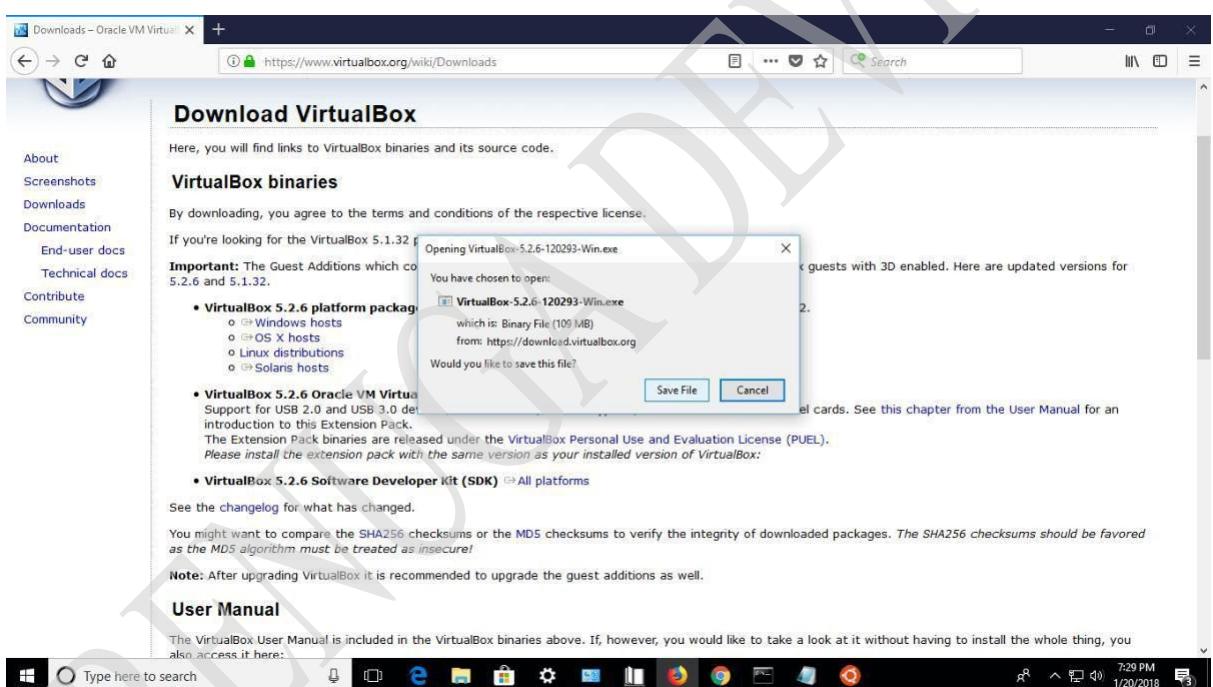
Step3: After selecting „windows hosts“ this dialogue box will appear. Select the „Save File“ option.



Step4: After completing the download process, go to the download option of the browser and open the file.



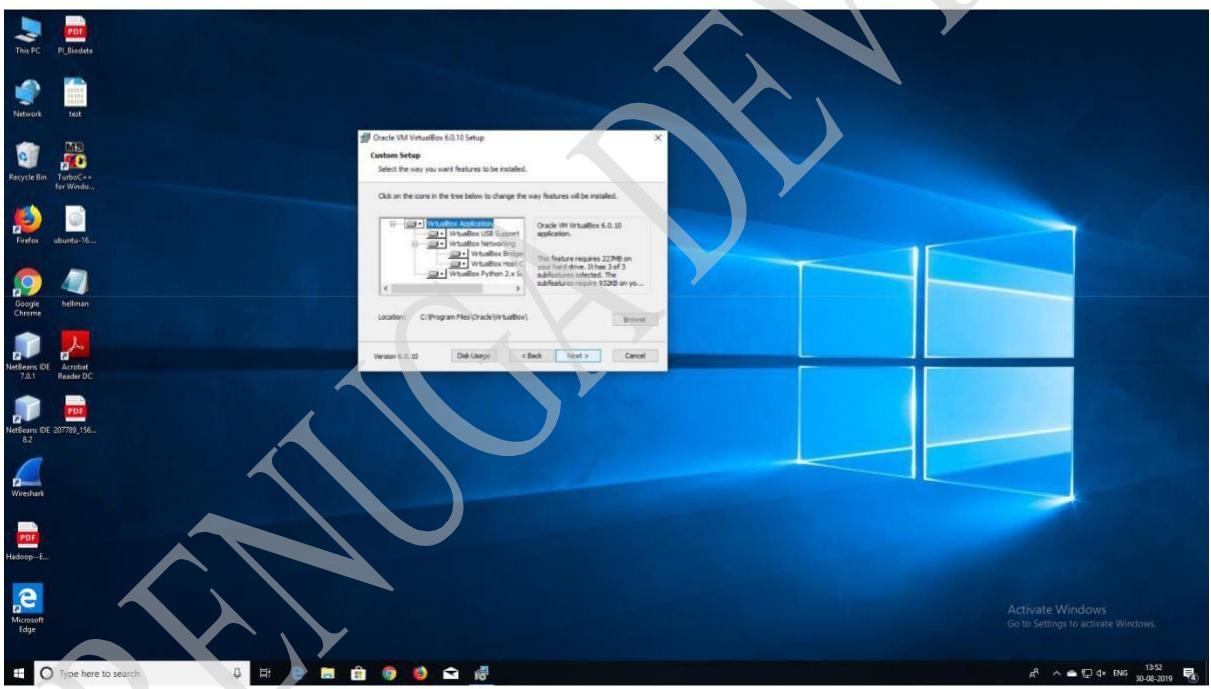
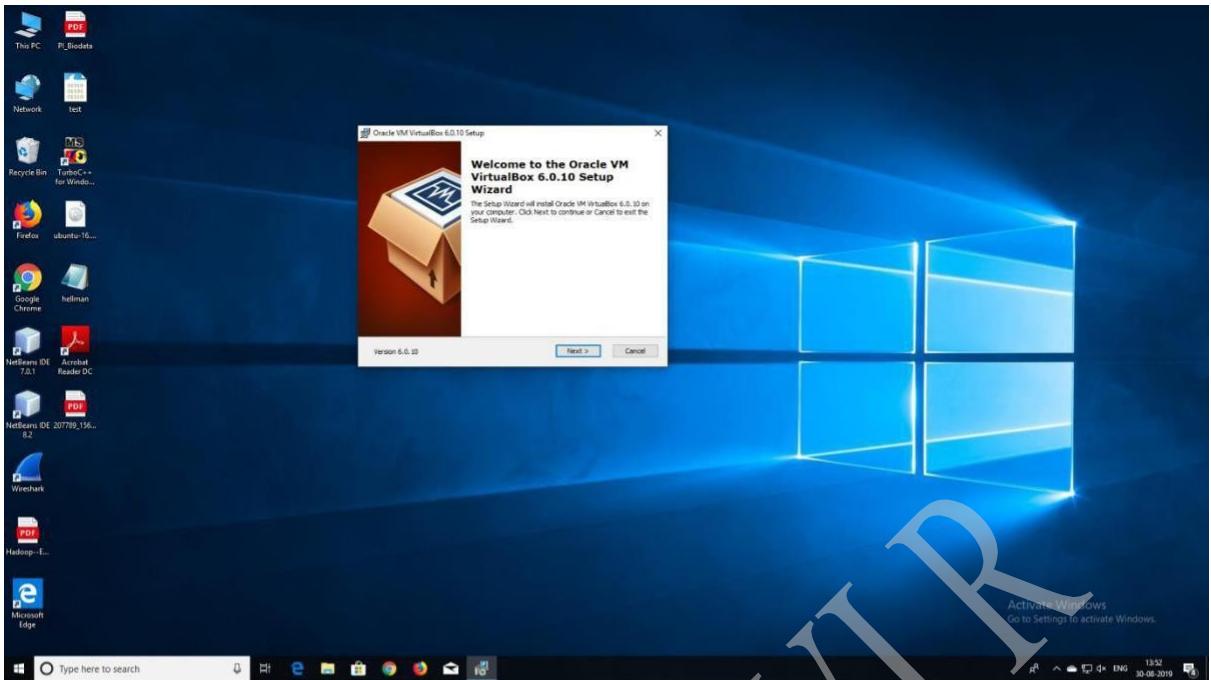
Step5: After opening the file you will see a dialogue box as seen below and click the „Run“ button.

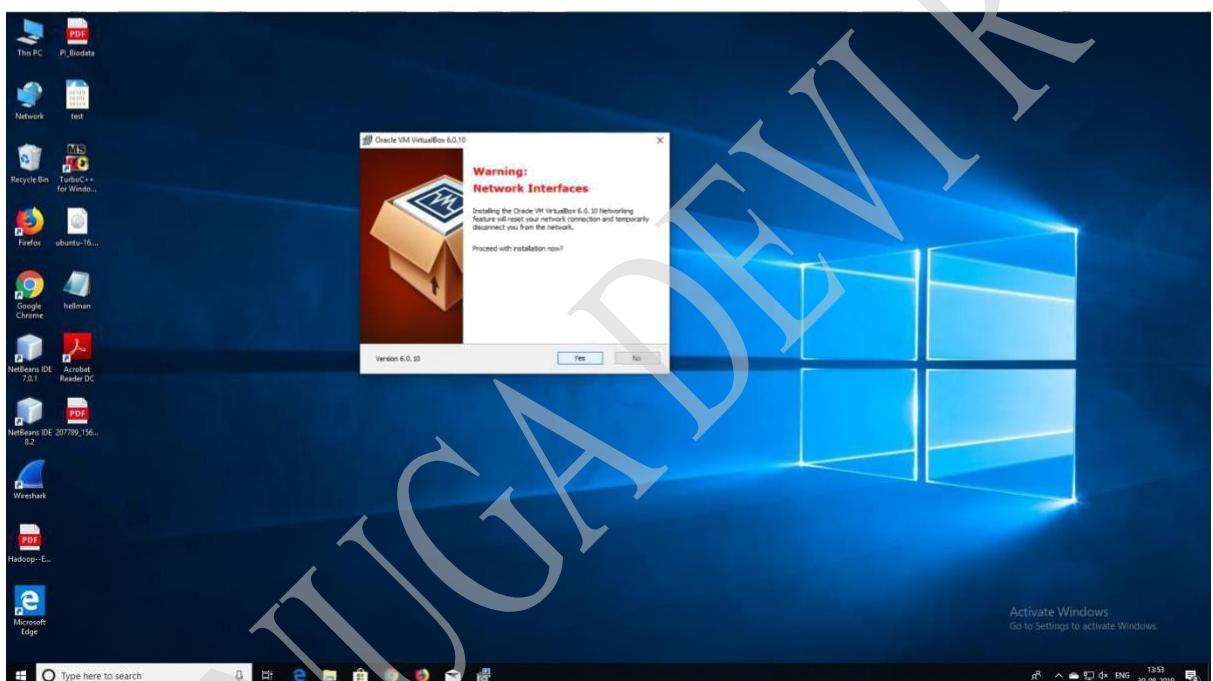
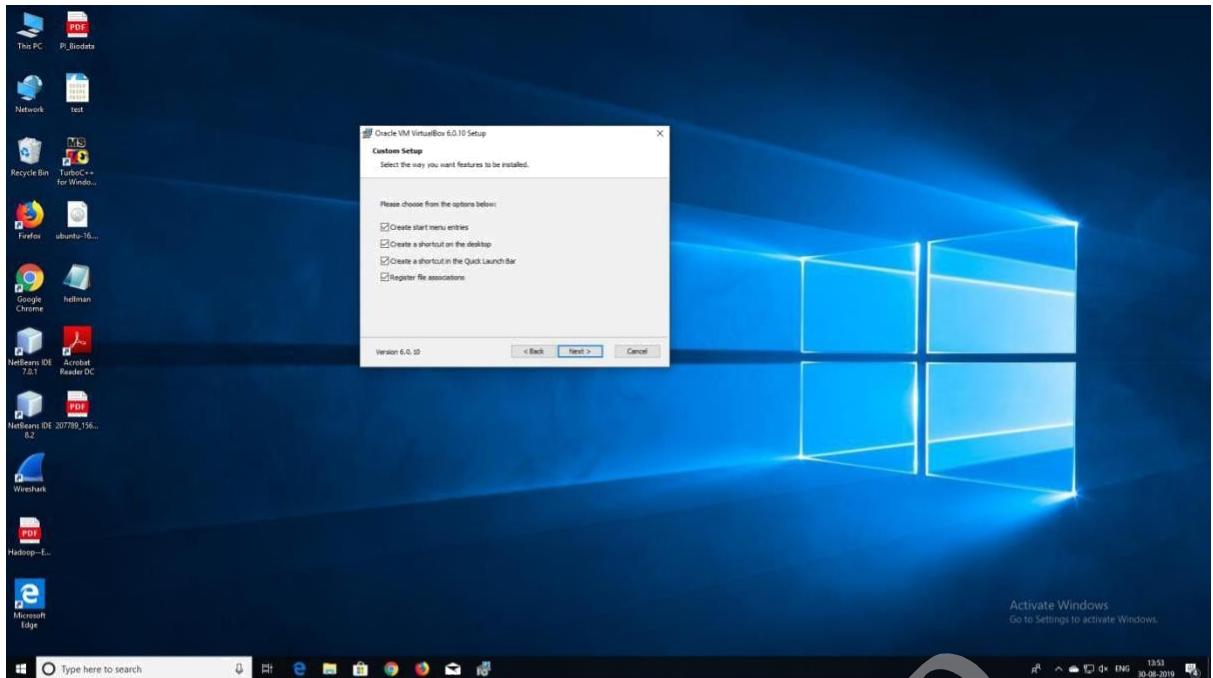


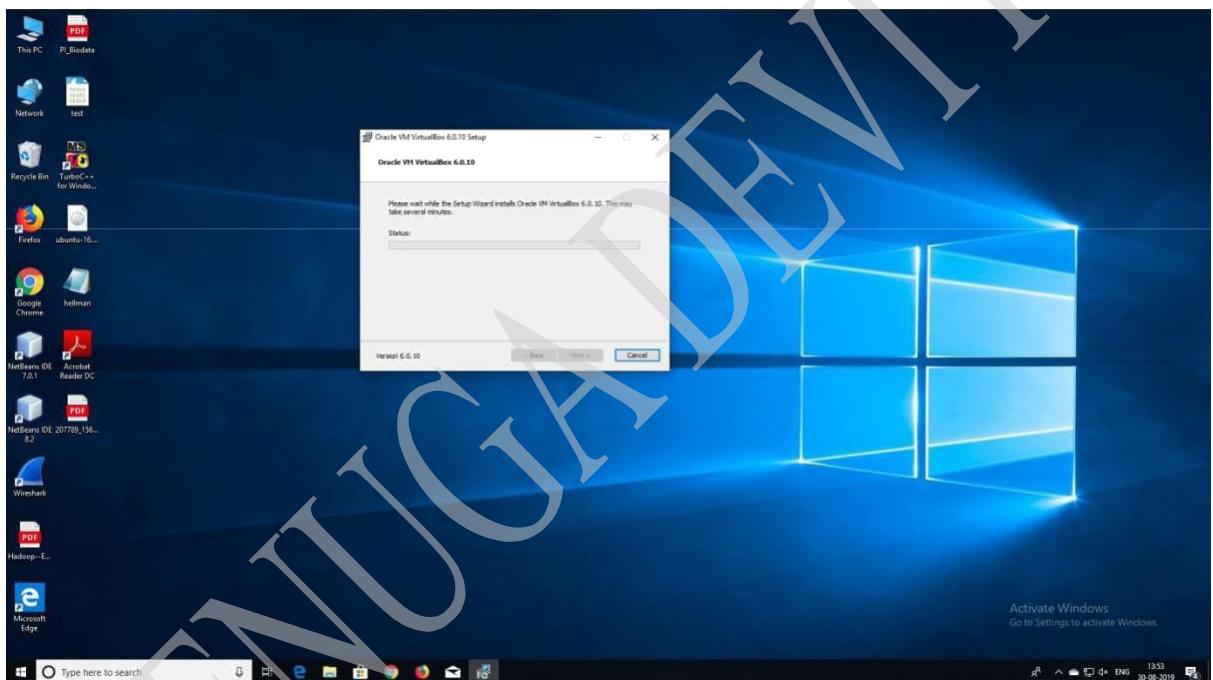
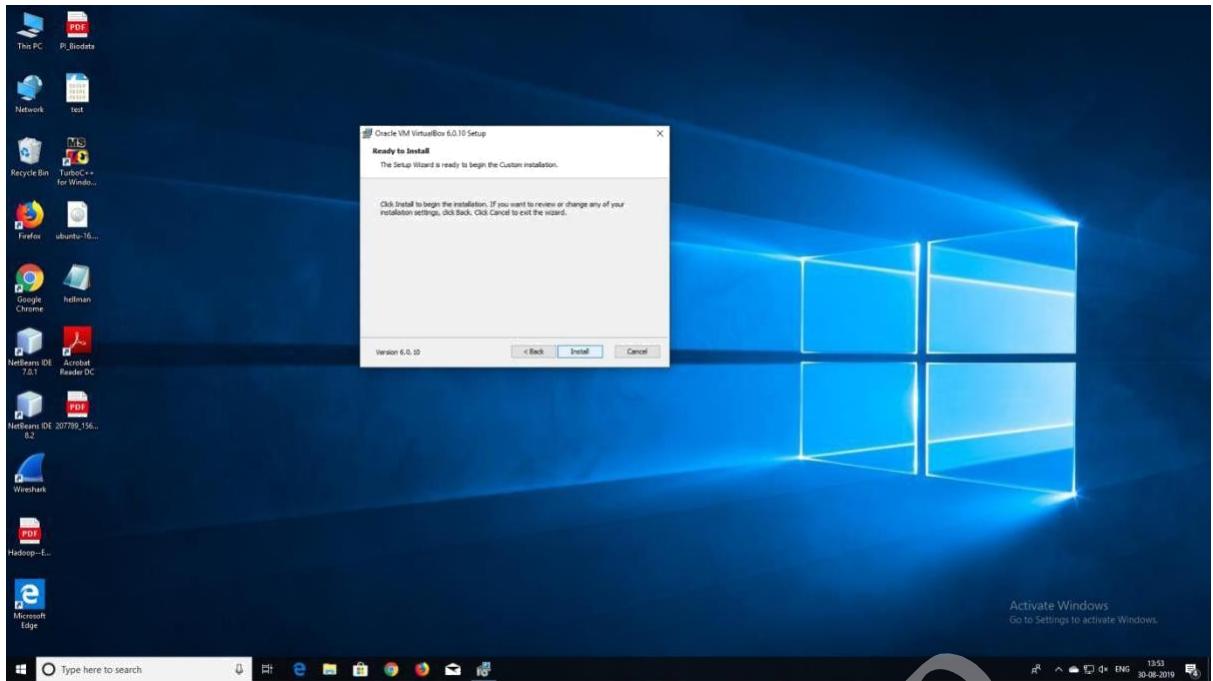
Step6: After installing VirtualBox, start it. You will see a window similar to this on your computer. Click on the „New“ icon in the toolbar or press **Ctrl+N** to create a new virtual machine. A dialogue box will appear like this.

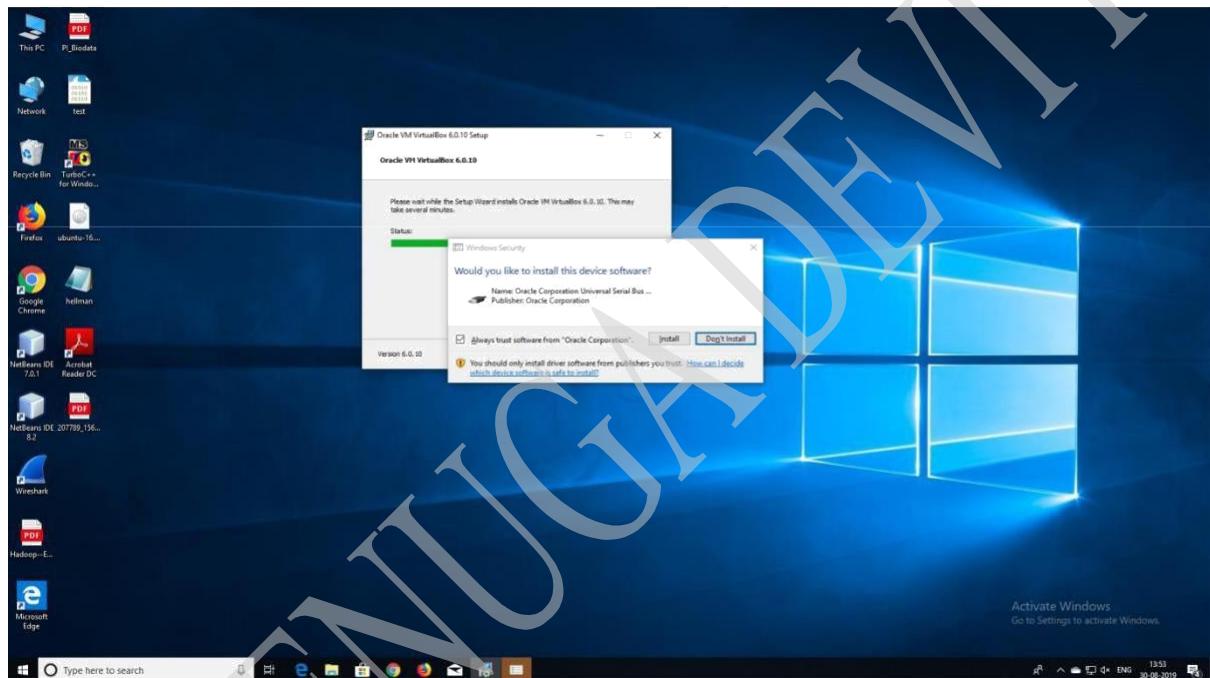
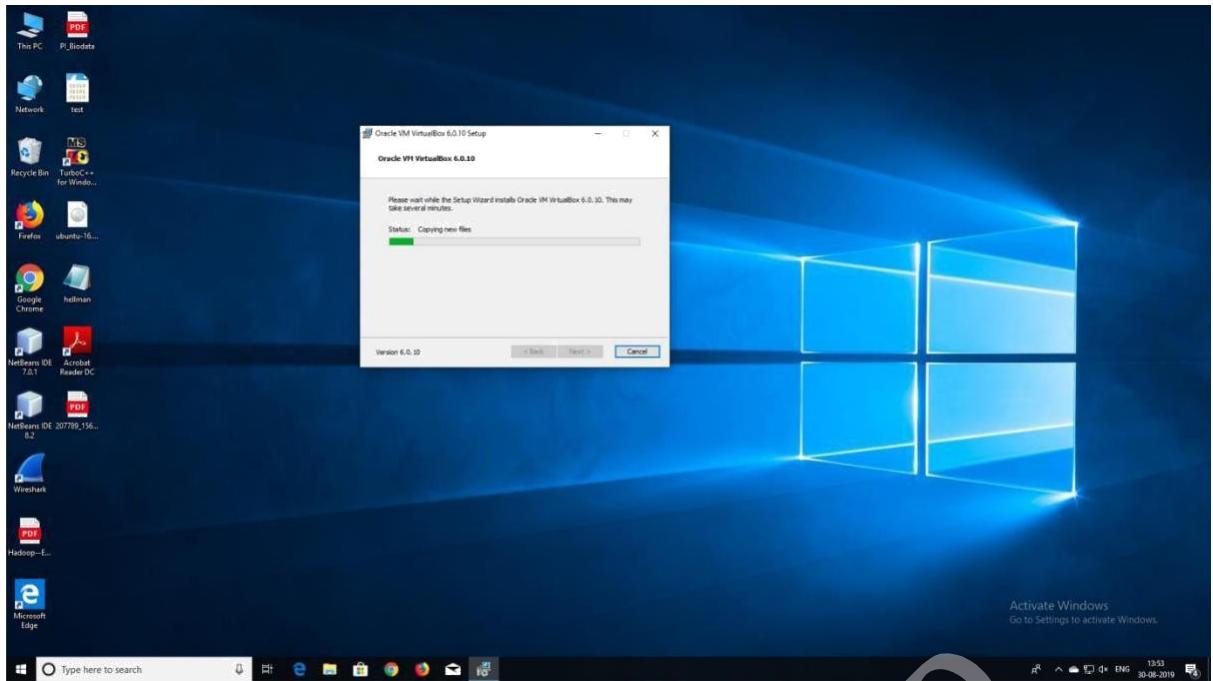
Name: Choose a name for your new Virtual Machine.
Type: Linux

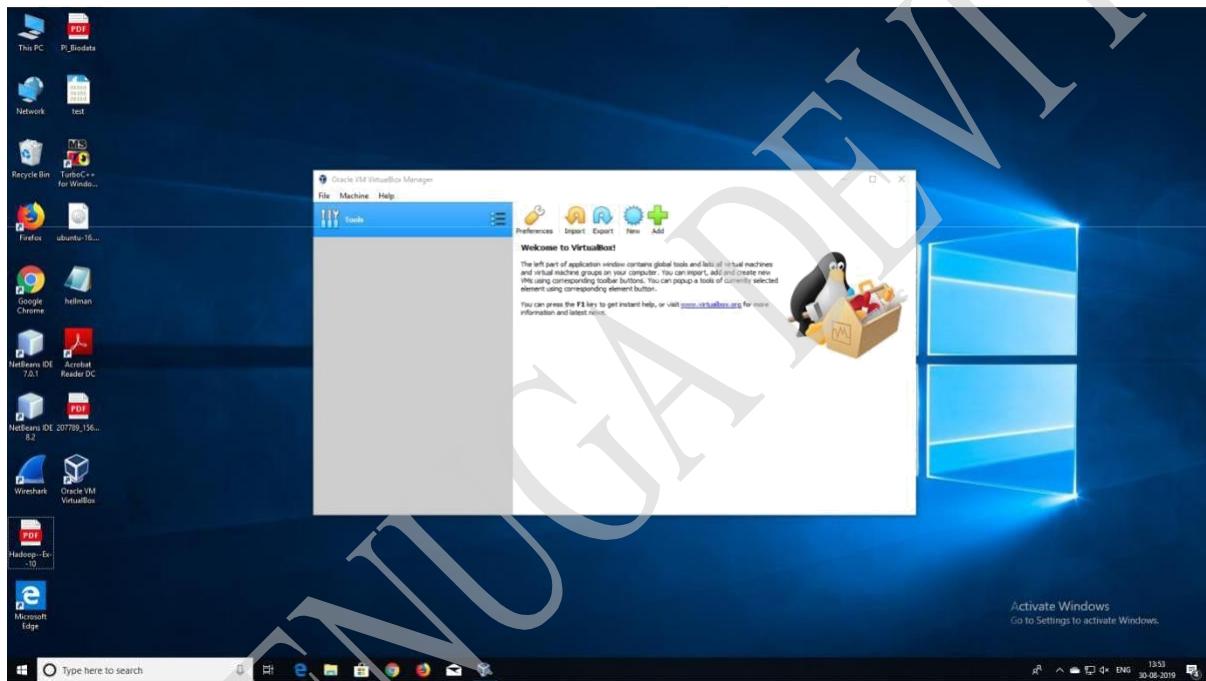
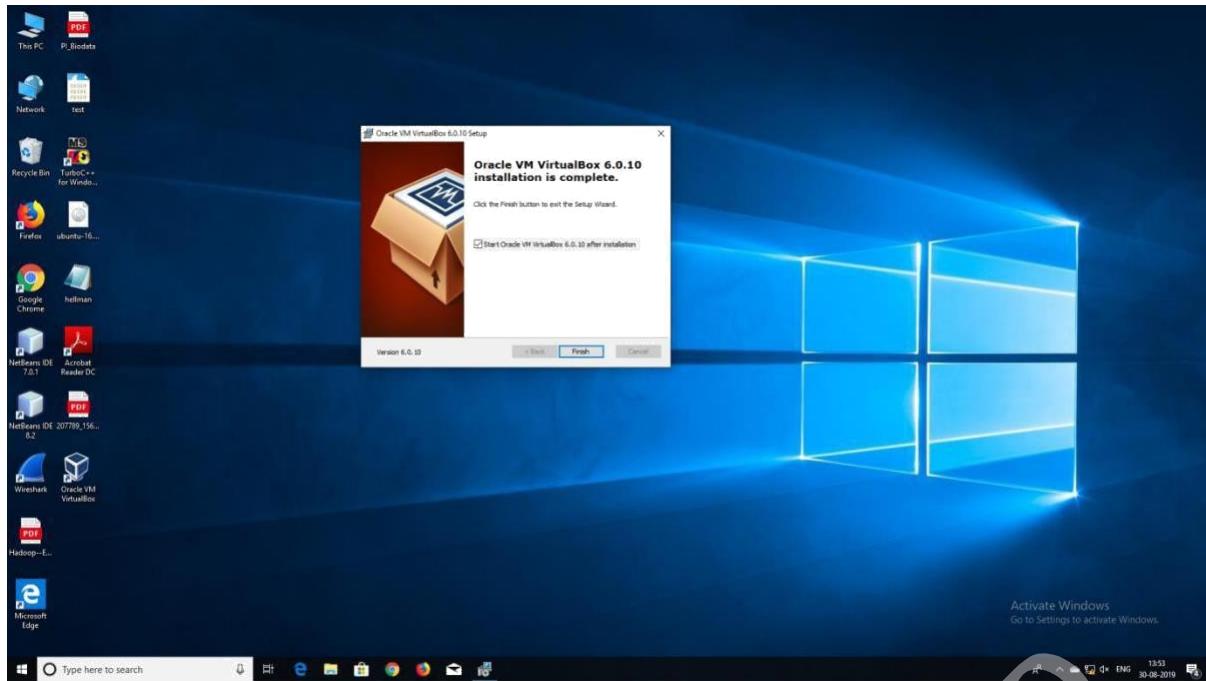
Version: Red Hat(32 bit/64 bit)

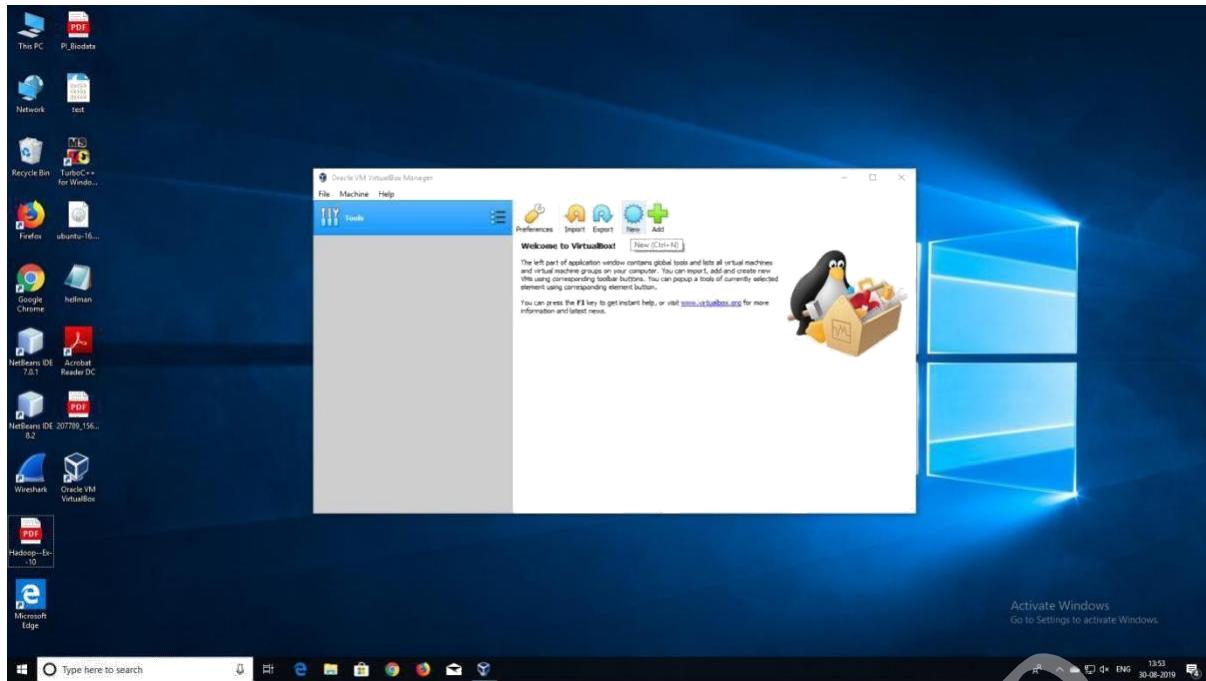




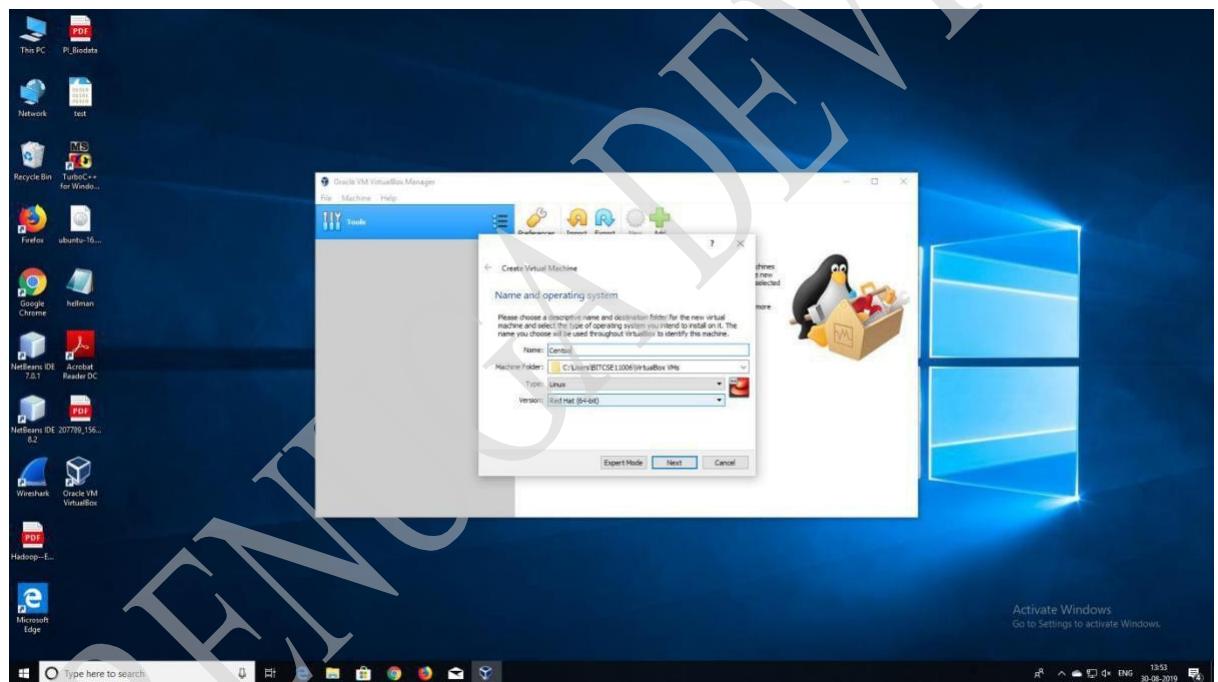




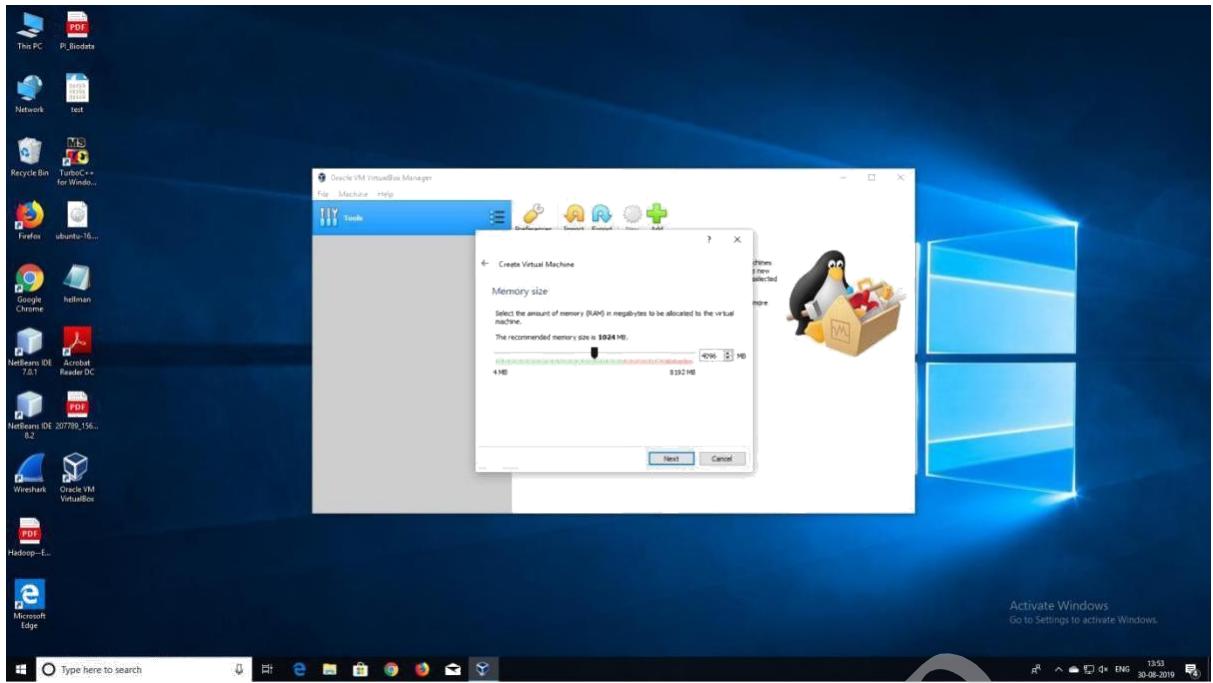




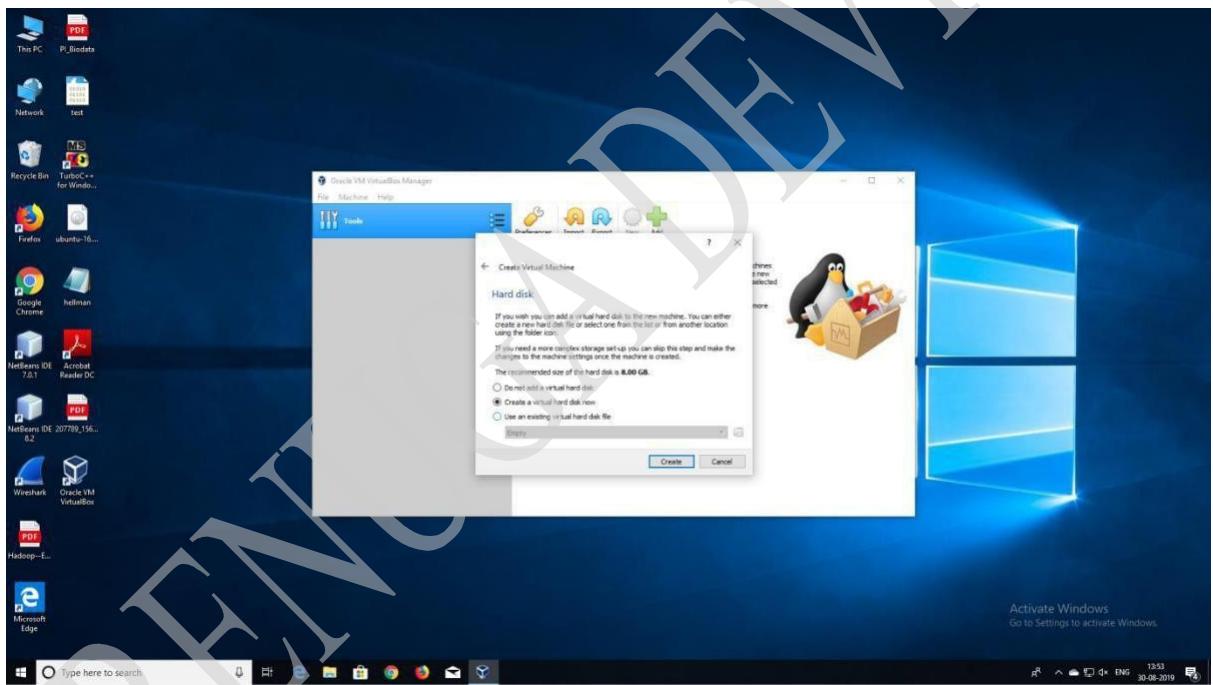
Step7: Choose a descriptive name and destination folder for the new VM and select the type of OS you intend to install on it.



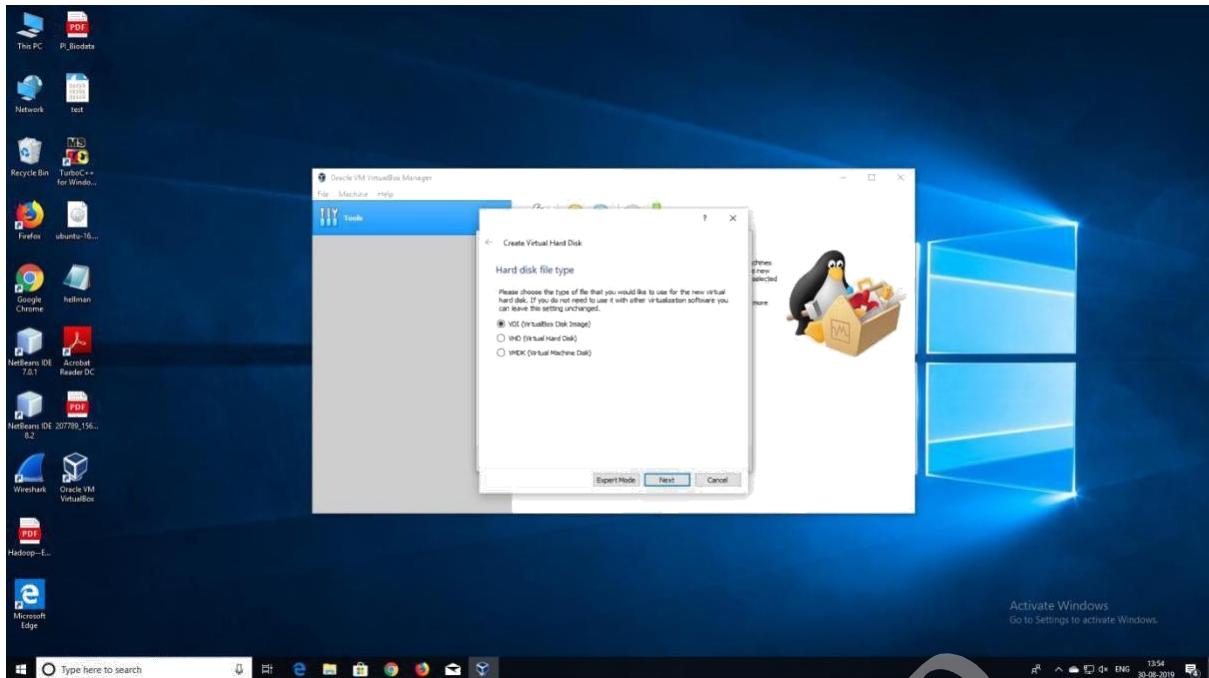
Step8: Set your VM Memory to at least 1024MB(1 GB) before you continue. I set this to 4096MB(4 GB) memory.



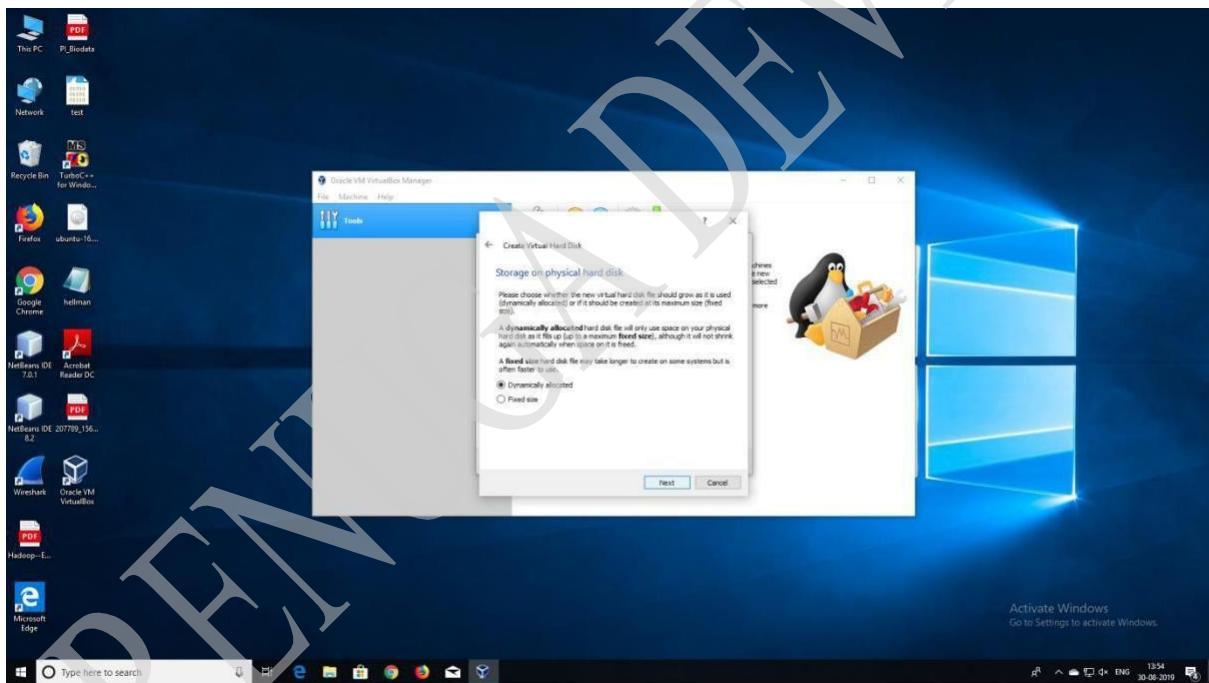
Step9: The recommended hard disk 8GB and click the radio button into “create the virtual hard disk now” and click to create.



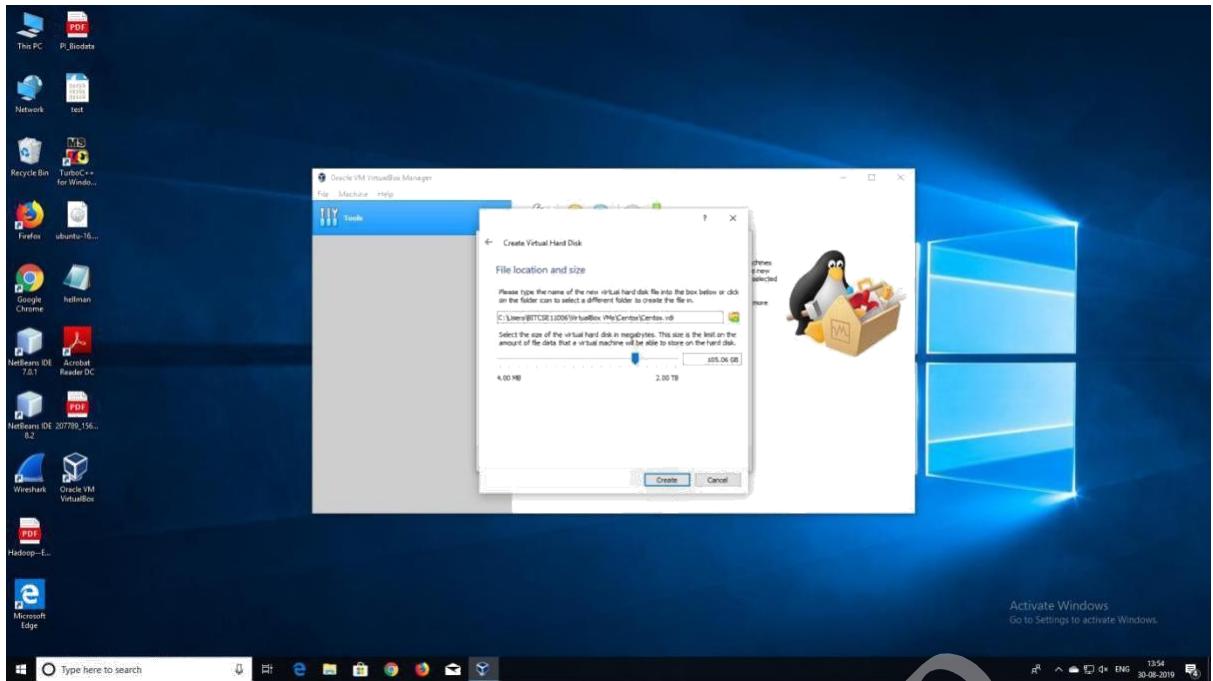
Step10: Choose the hard disk file type as “VDI (VirtualBox Disk Image).



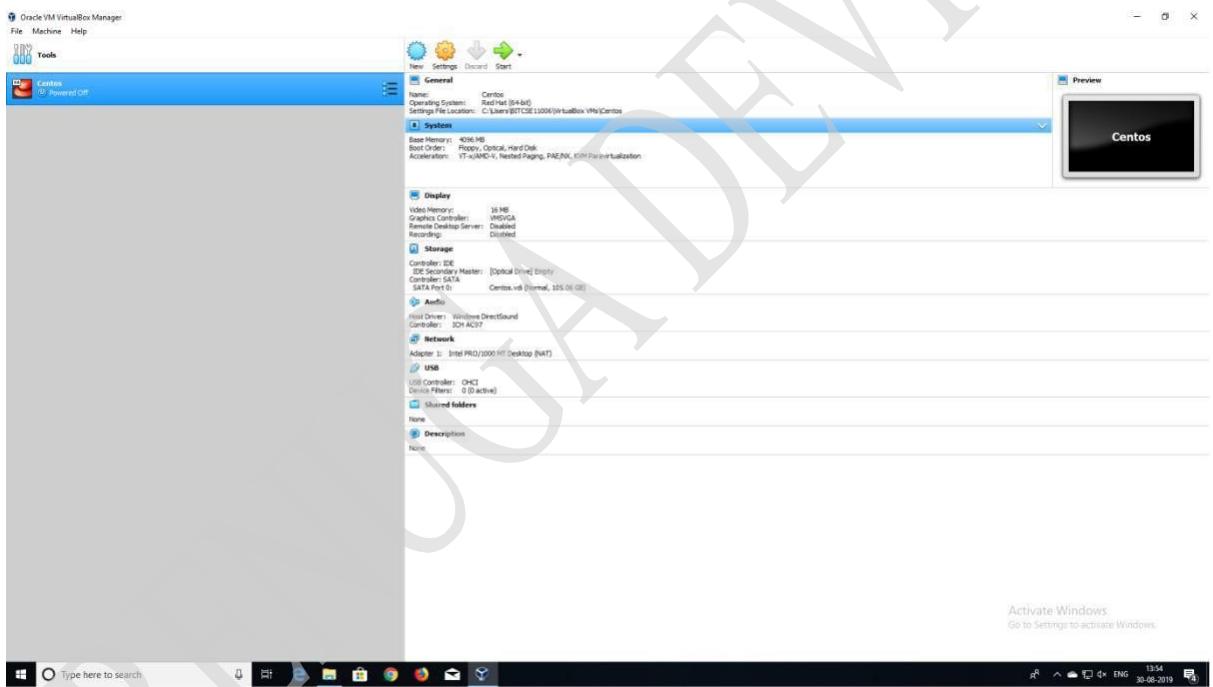
Step11: Choose dynamically allocated storage on physical hard disk.



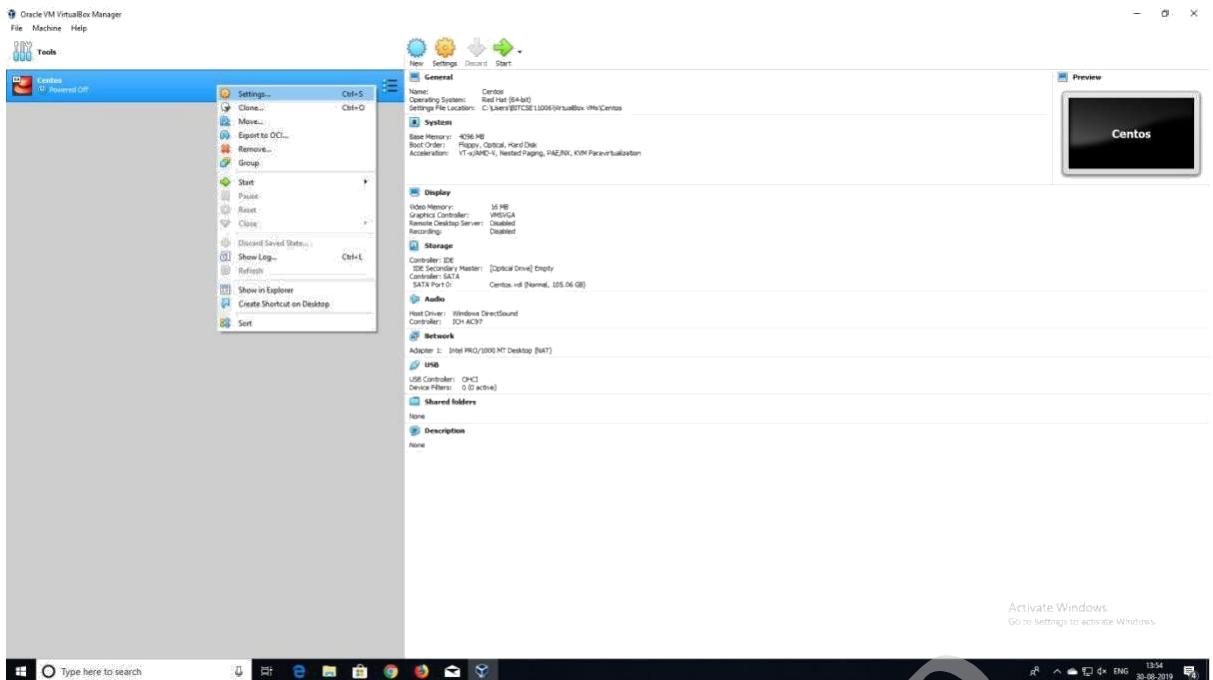
Step12: Choose the file location and size to create the file in the Oracle VirtualBox.



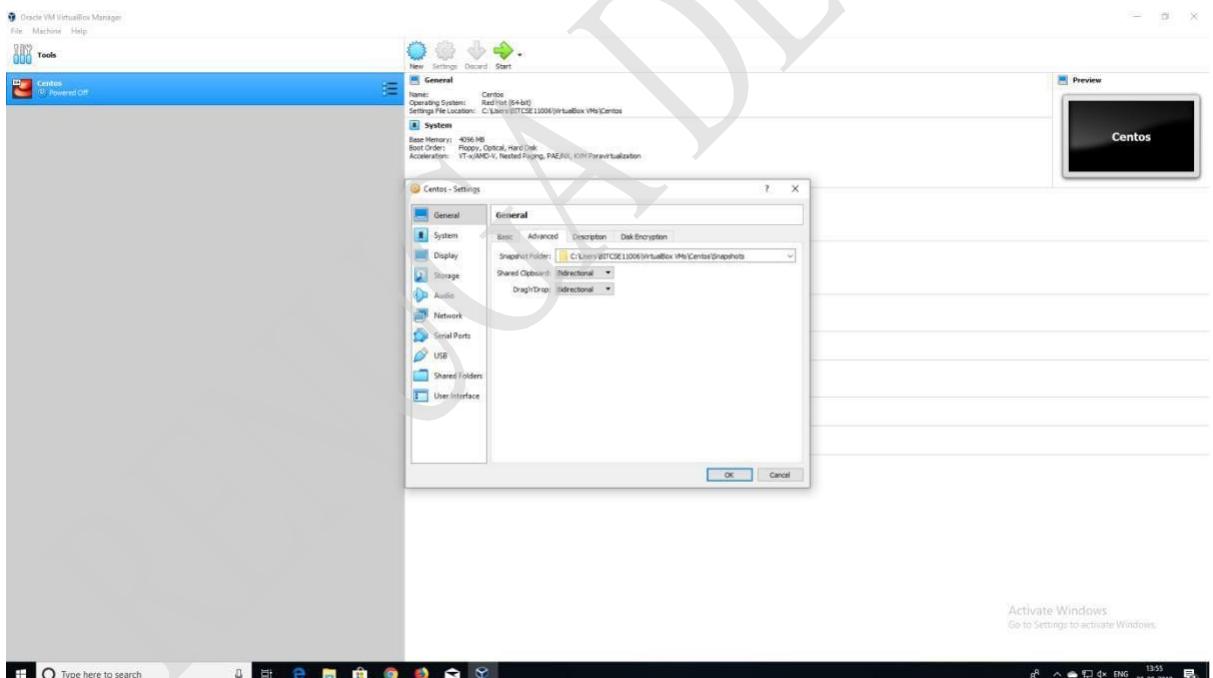
After choosing the file location and size, it will appear like the below screenshot after creating.



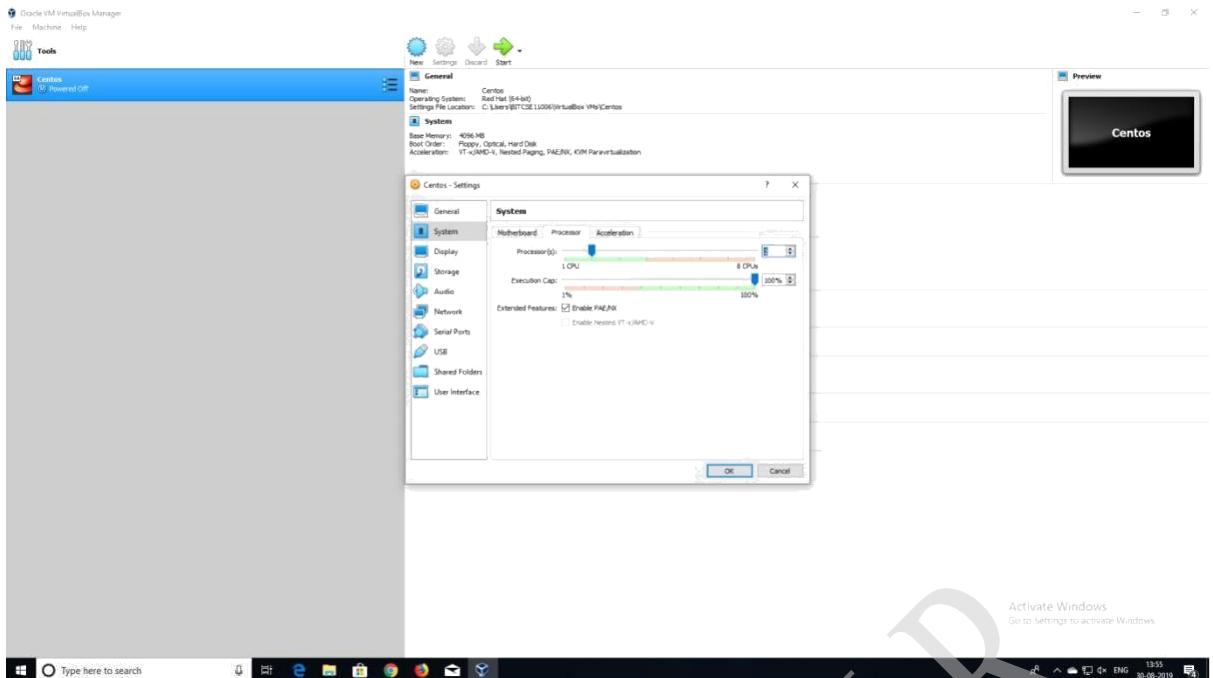
Step13: On the left had side you will be finding CentOS, right click on it and select settings.



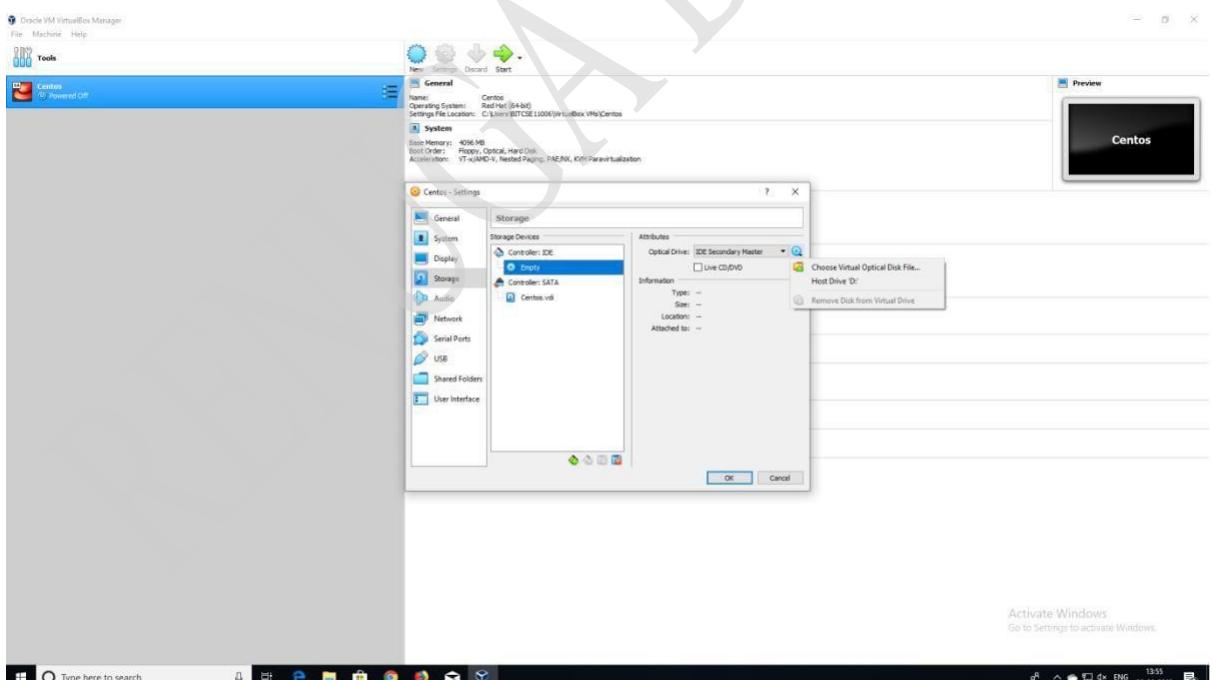
Step14: In the Setting tab, select General Advanced choose Shared clipboard as Bidirectional and Drag/Drop as Bidirectional and click ok.

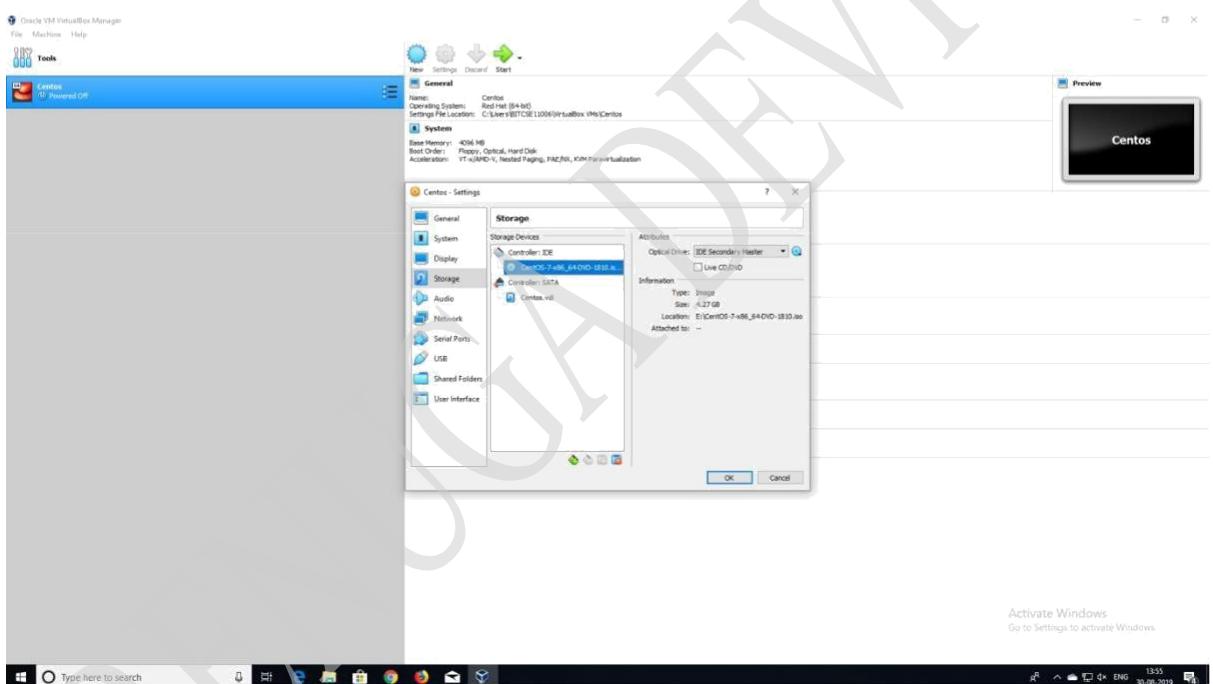
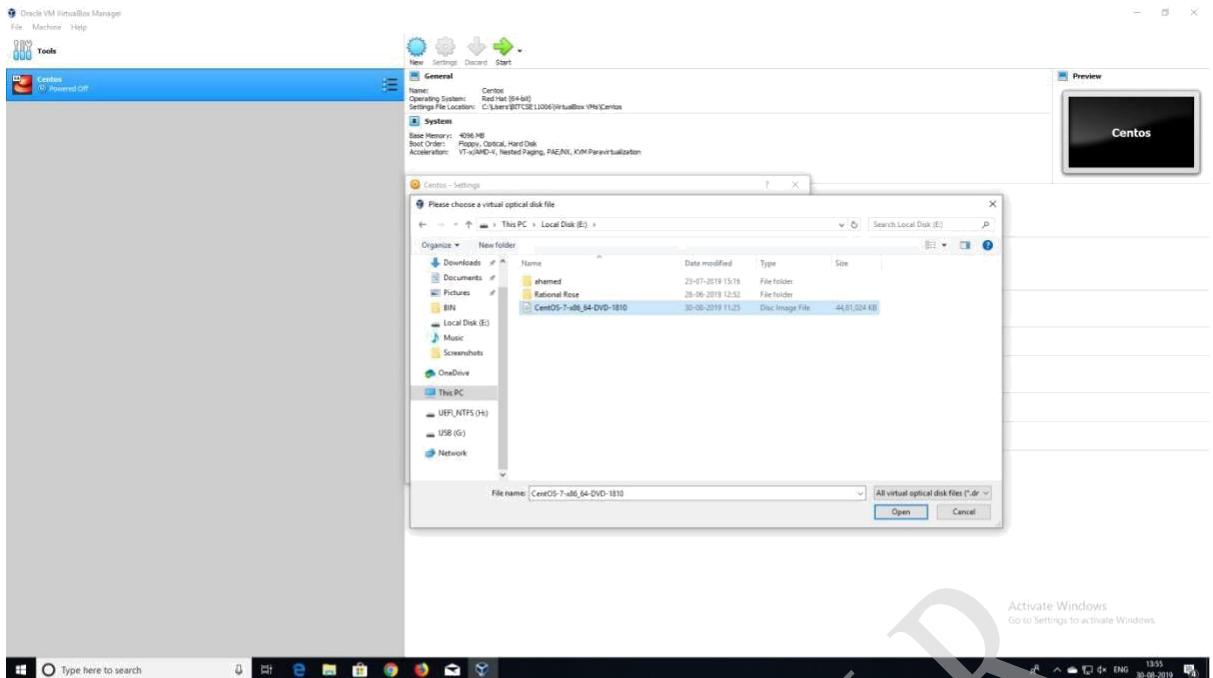


Step15: In the Setting tab, select System Processor (fix the value of the processor as 2) and then click ok.



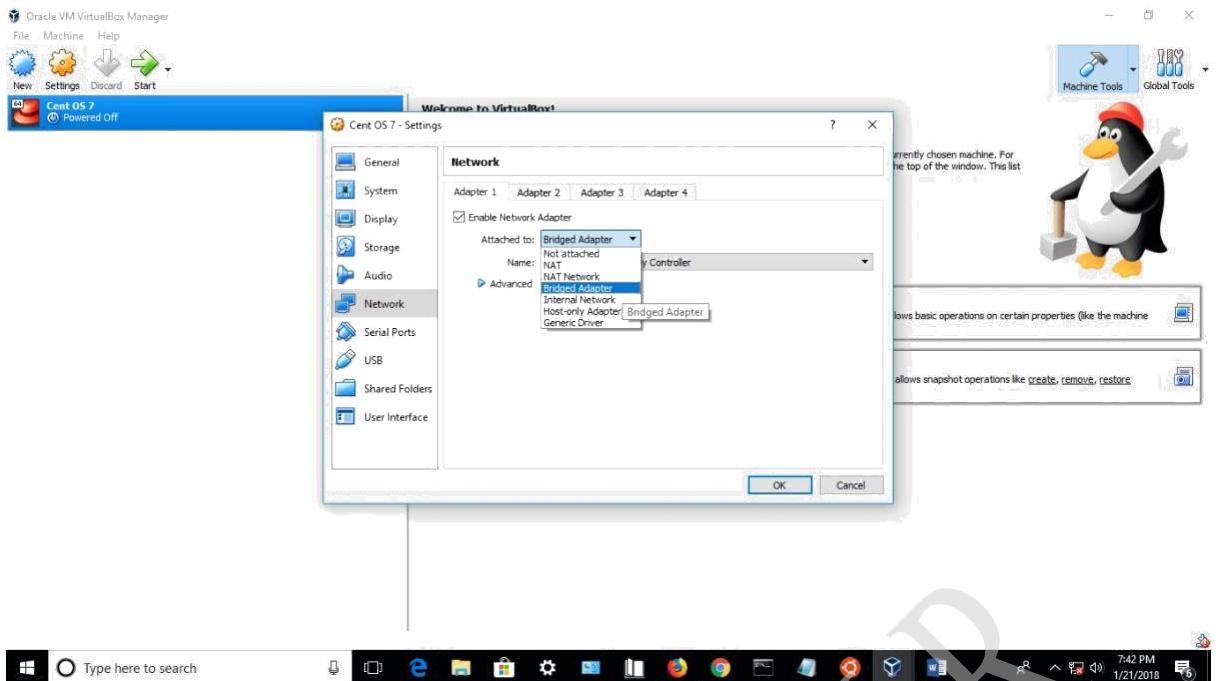
Step16: In the Setting tab, select Storage device Controller IDE
Attributes Optical drive choose virtual optical disk file location and then click ok.



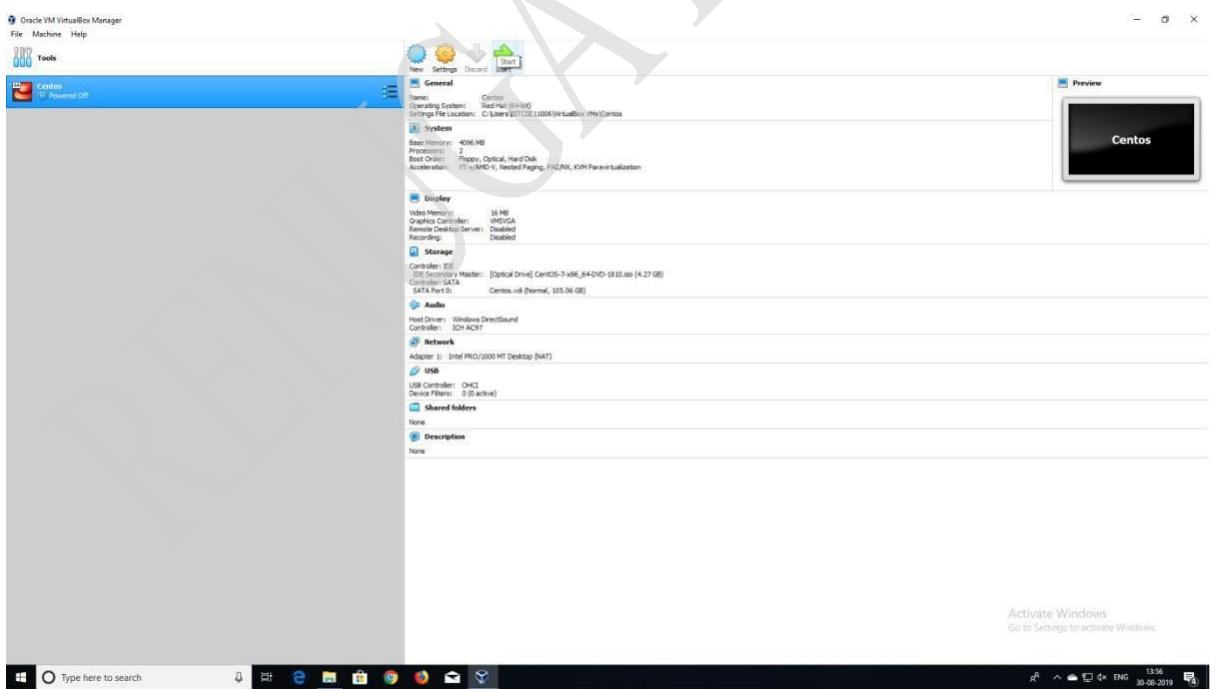


Step17: Make sure that „Enable Network Adapter“ is checked.

Attached to: Select „Bridge Adapter“.



Step18: In the Oracle VM VirtualBox Manager, you will be finding the start button in the top right corner and click into it.

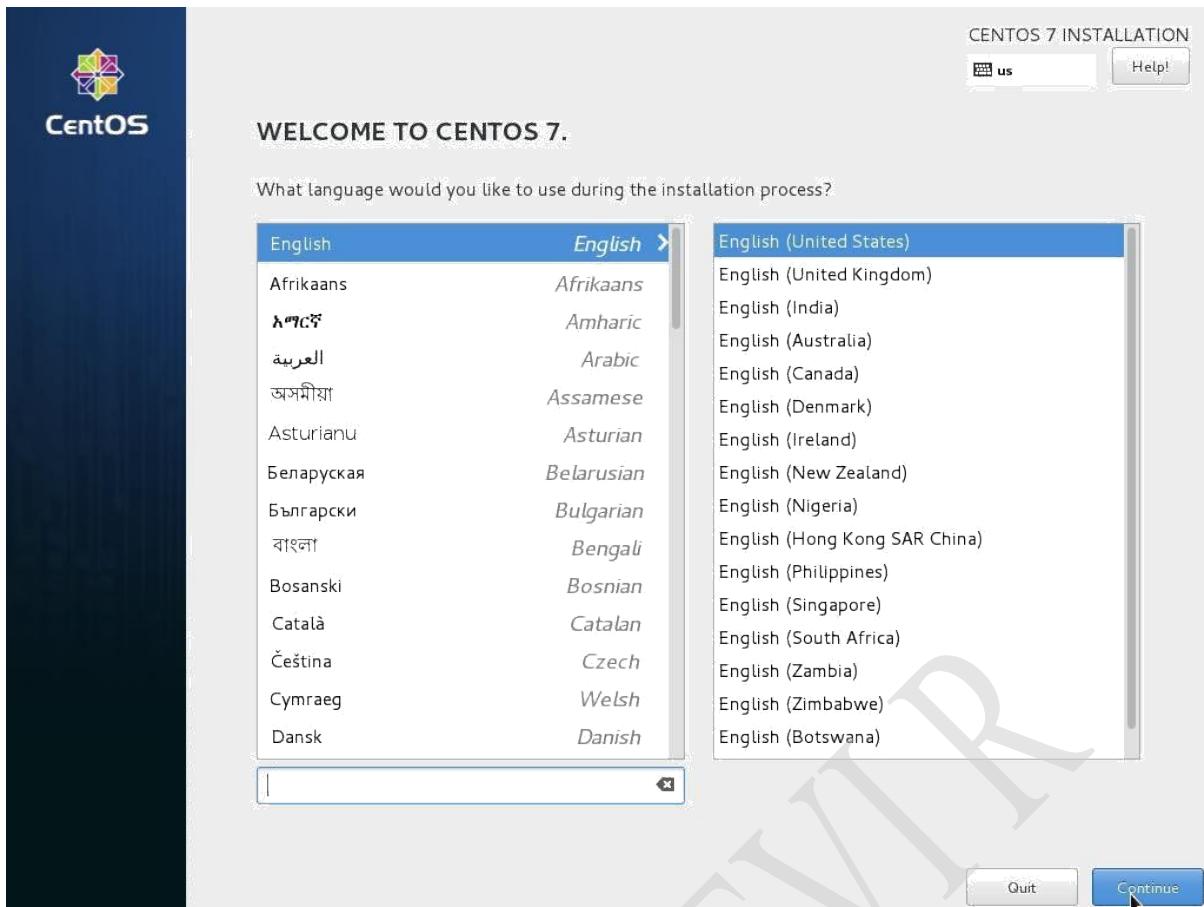


Step19:

- You will see the CentOS installation screen.
- Click in the window and use the arrow keys to stop automatic boot.
- Select the „Install CentOS 7“ option and the process will begin soon.

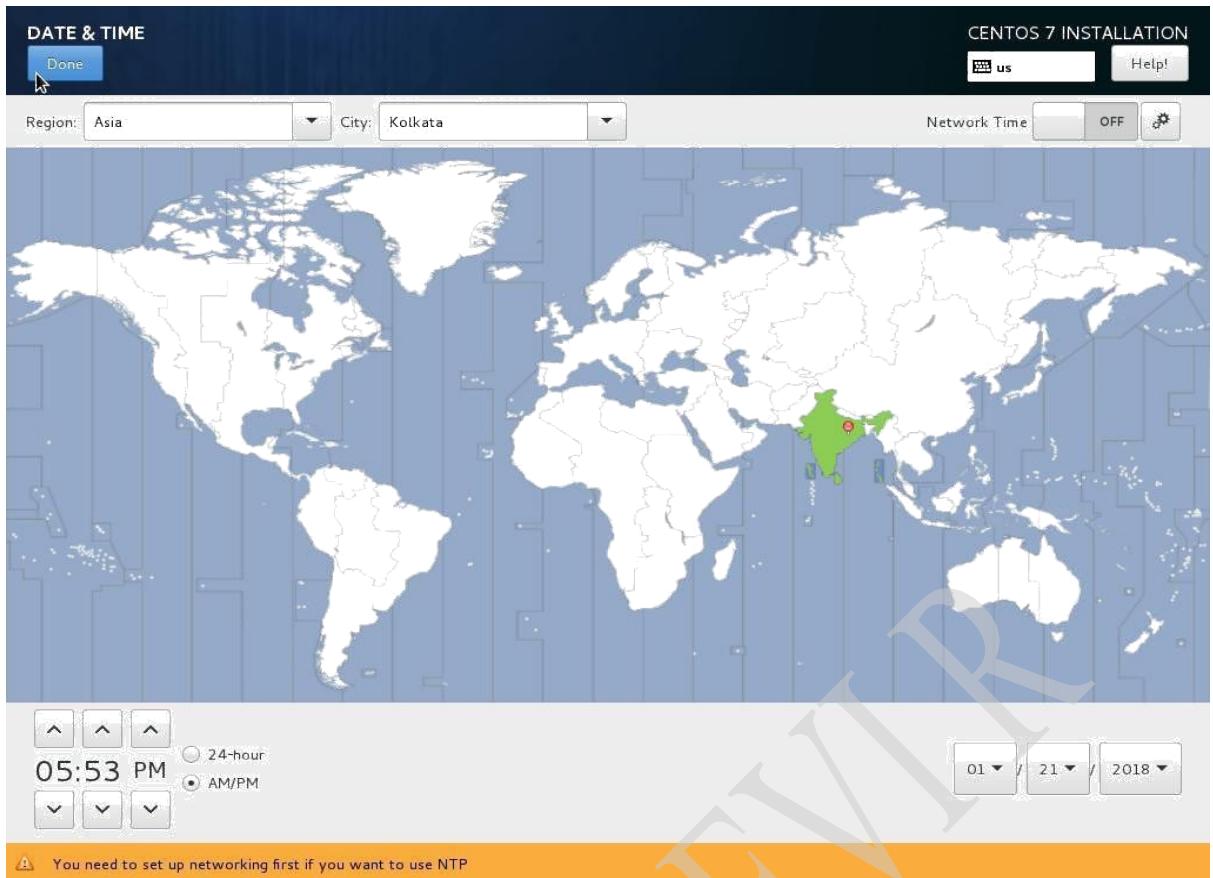


Step20: Select your language and press „Continue“.



Step21: Select „DATE & TIME“ and choose your time zone.

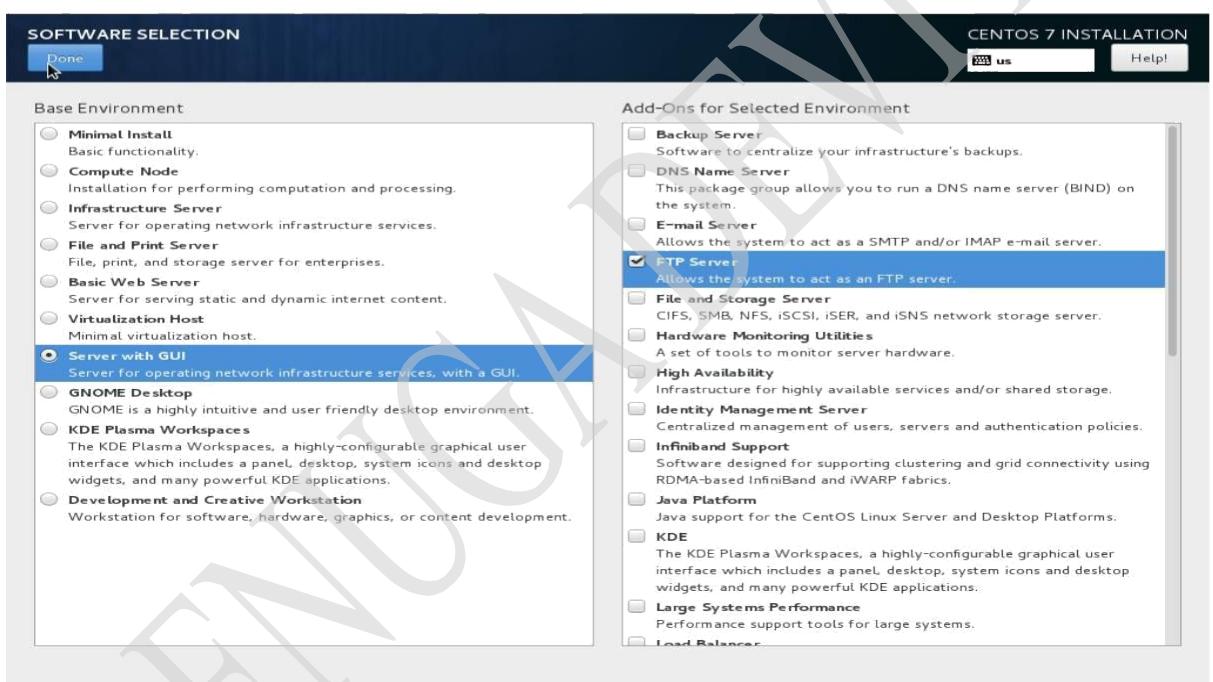
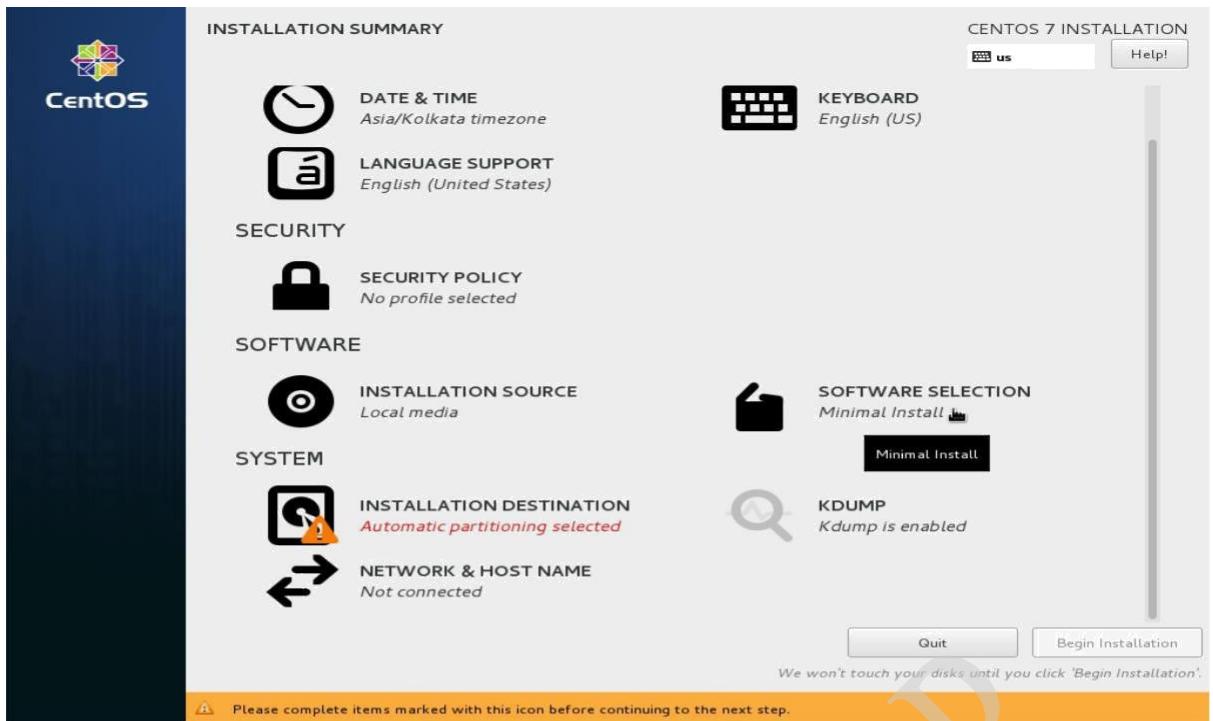




Step22: Select „**SOFTWARE SELECTION**“ under the “**SOFTWARE**” category . You will see a window in there select „**Server with GUI**“ and then check the „**FTP Server**“. Click on “**DONE**”.

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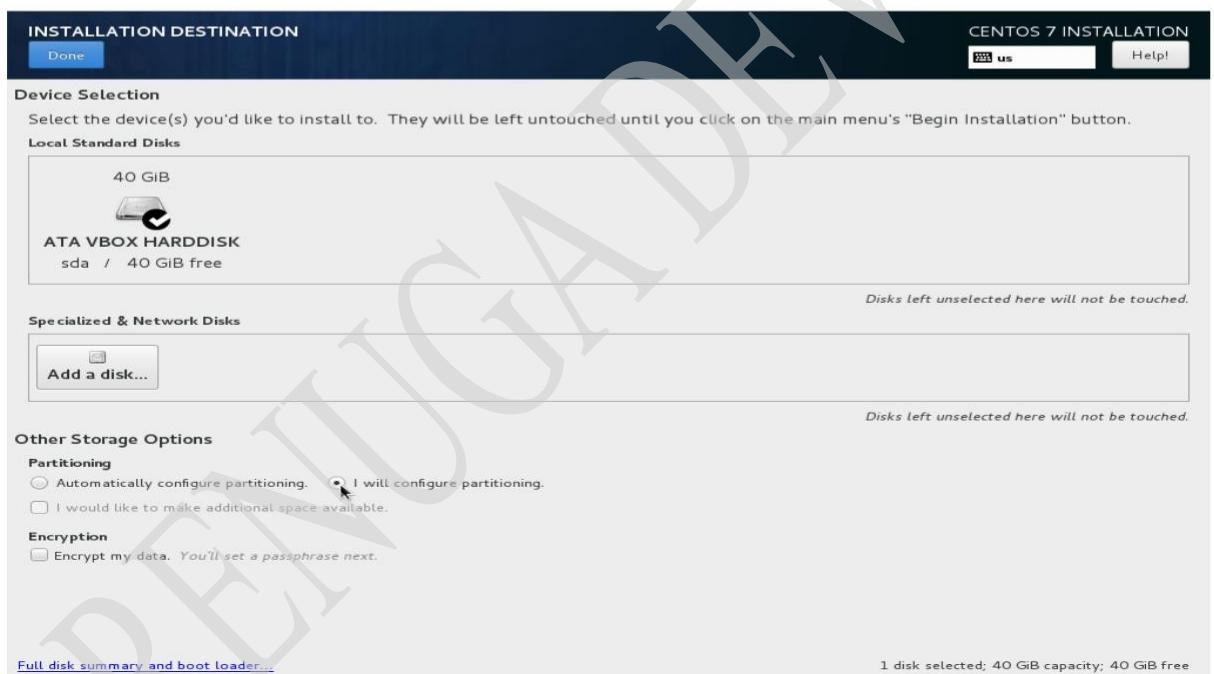
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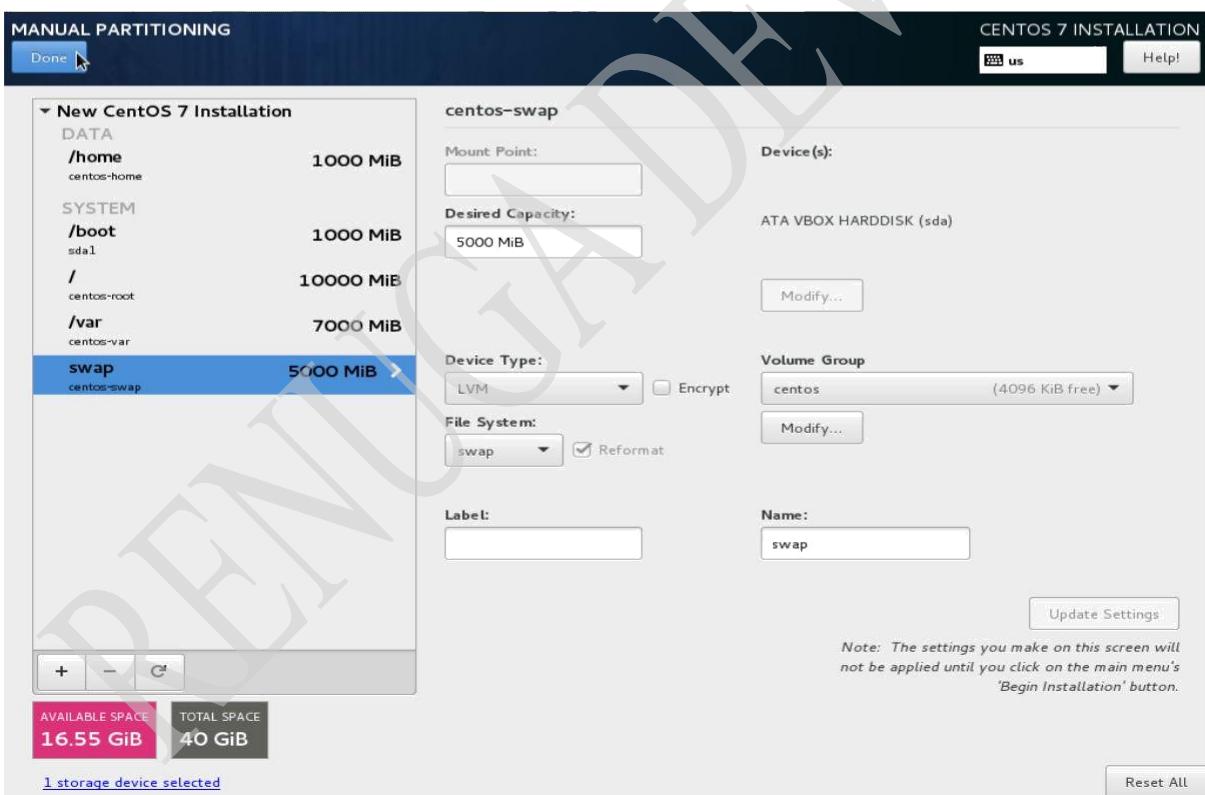
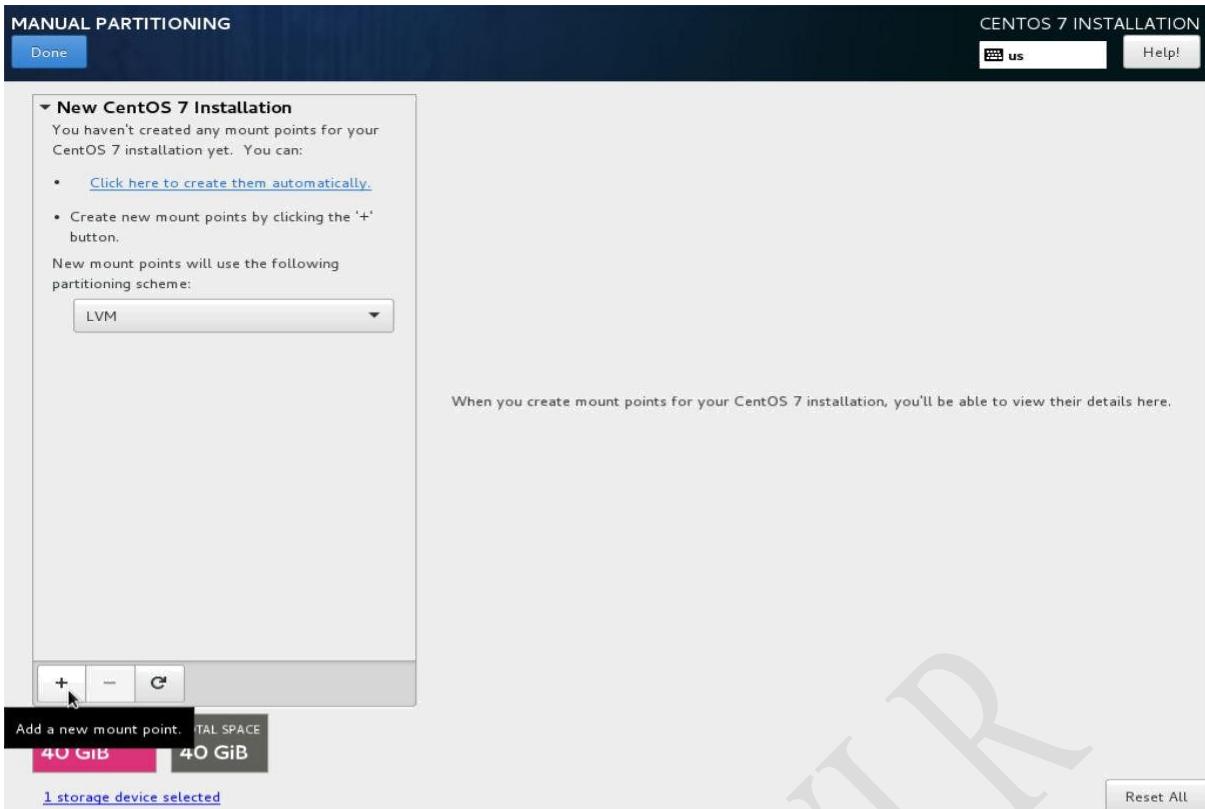


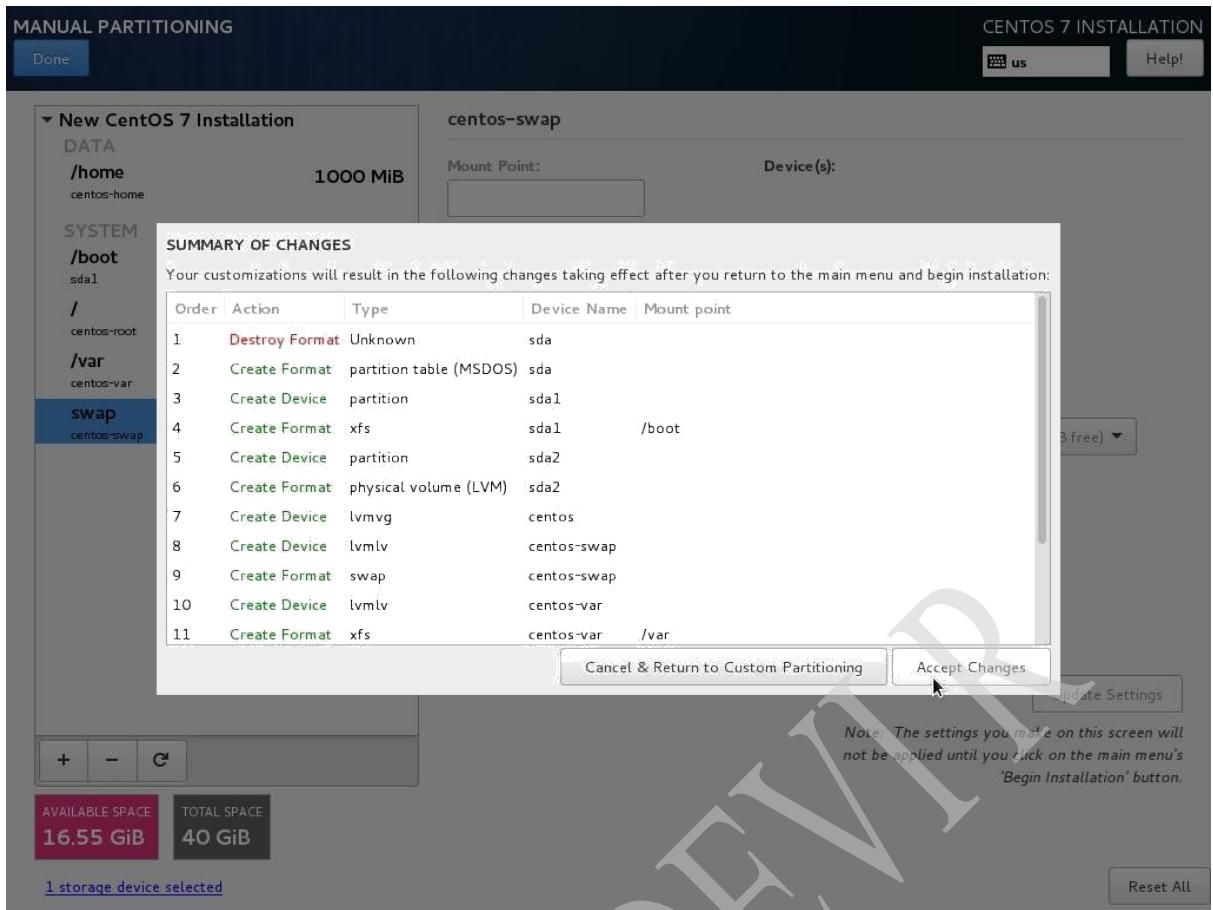
Step23: Next, select “INSTALLATION DESTINATION” under “SYSTEM” category and select “I will configure partition” and click “Done” to start with the Linux partition in the next step. In the next window, select LVM partition and click „+“ sign to add partitions. Click “Done” and then “Accept Changes”.

Note: When you set the swap memory, remember that it takes double the memory of your

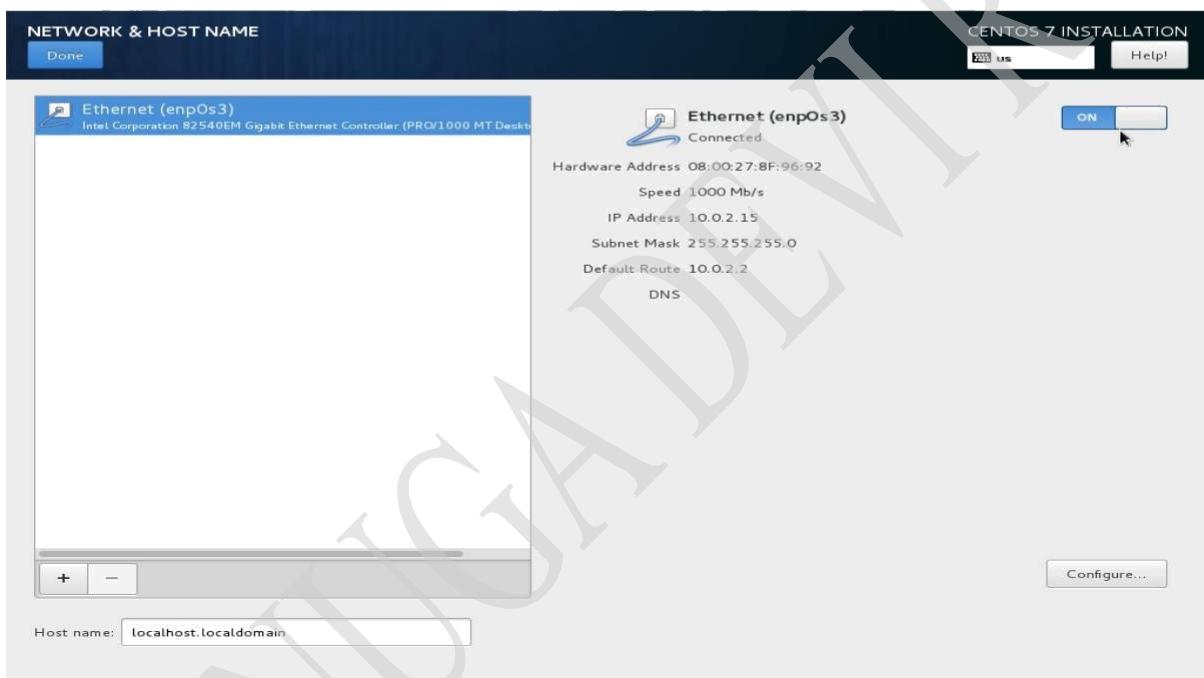
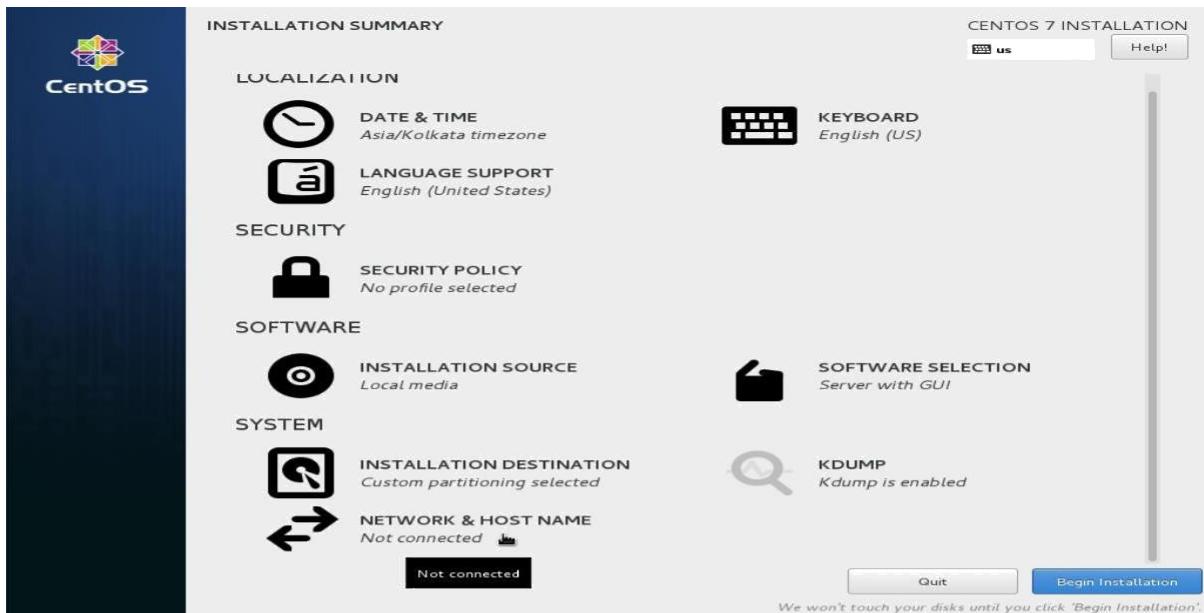
VM's allocated memory. I set my VM memory to 2500 MB so that's why I give it 5000 MB of swap memory.



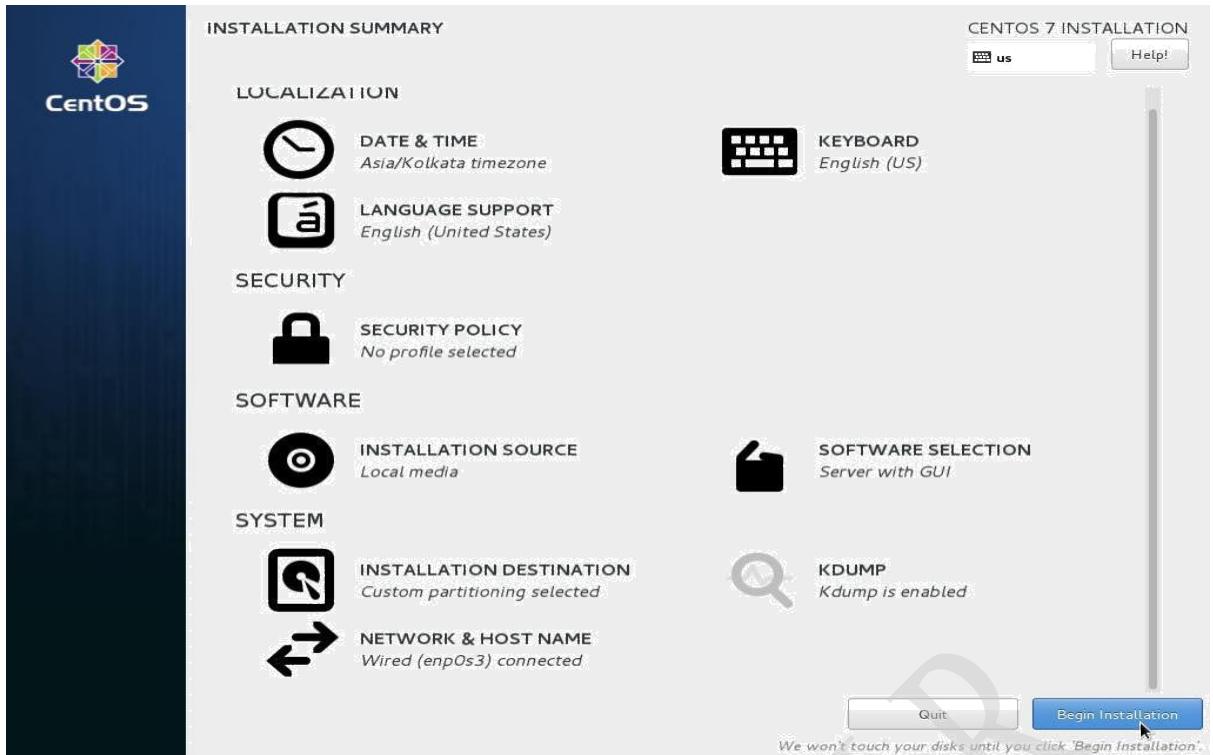




Step24: Set the “NETWORK & HOSTNAME” and turn on the “Ethernet switch” and give a hostname.

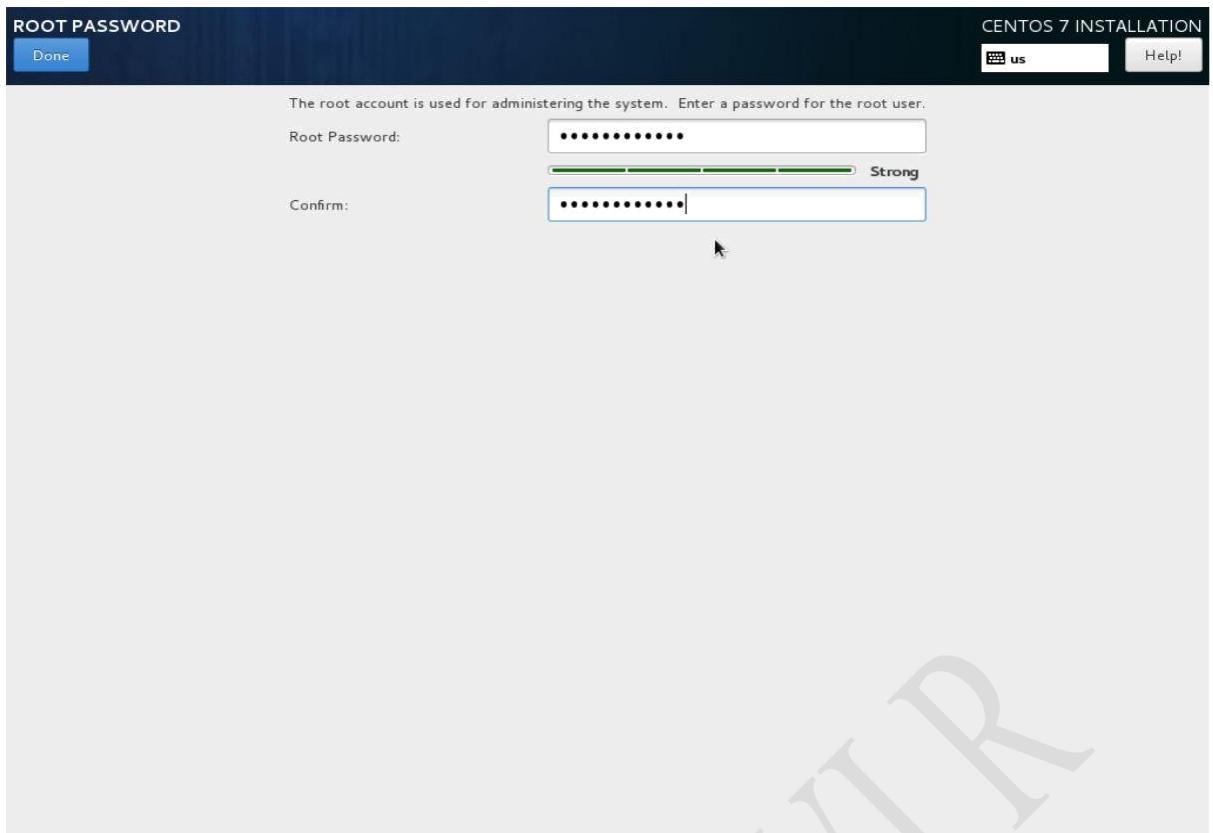


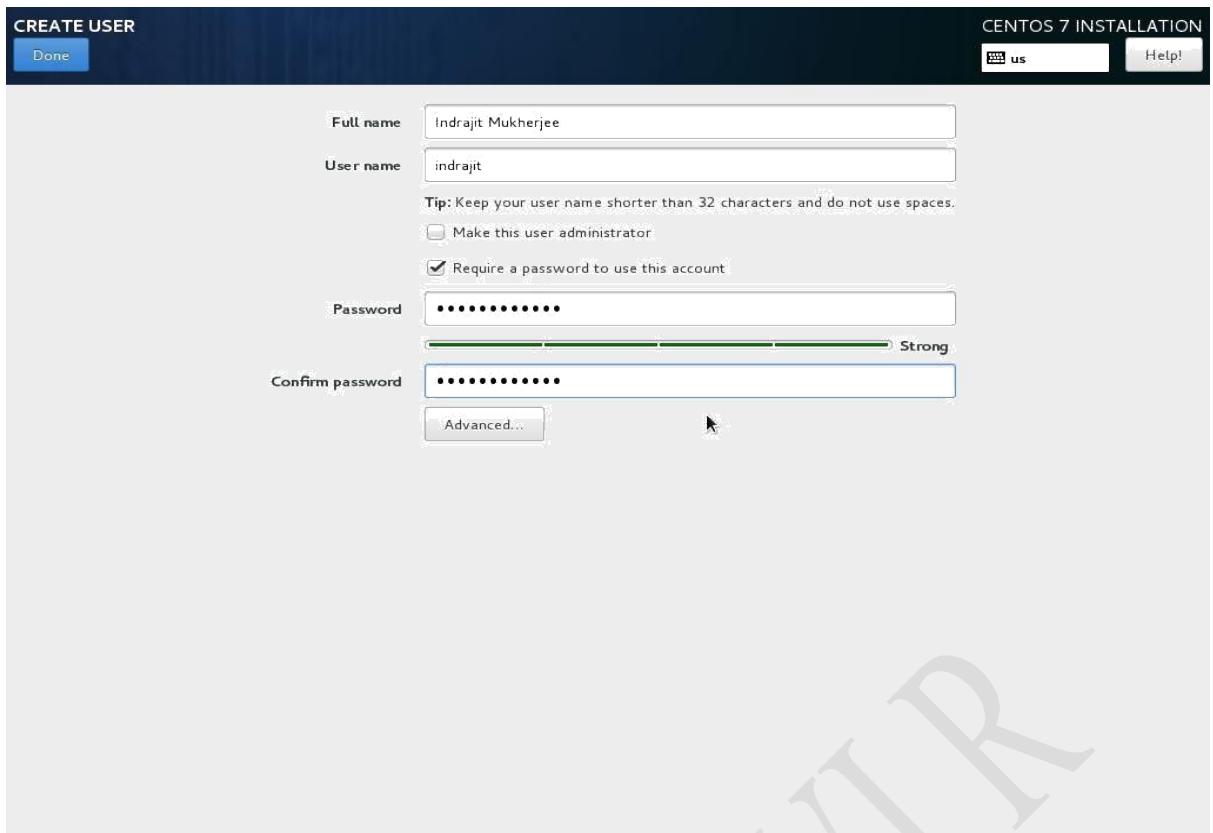
Step25: Click begin installation.



Step26: While VM is installing, set “ROOT PASSWORD” and create another user with the help of “USER CREATION” option.







Step27: Wait for the installation process, it can take some time. After installation of your CentOS 7 on your VM, press “Reboot”. After rebooting it will automatic boot up and take you to the Login screen. Select “Not Listed” option and login as a root user. Give your “Username” as root and root “Password” which you gave before. Press “Sign In”.

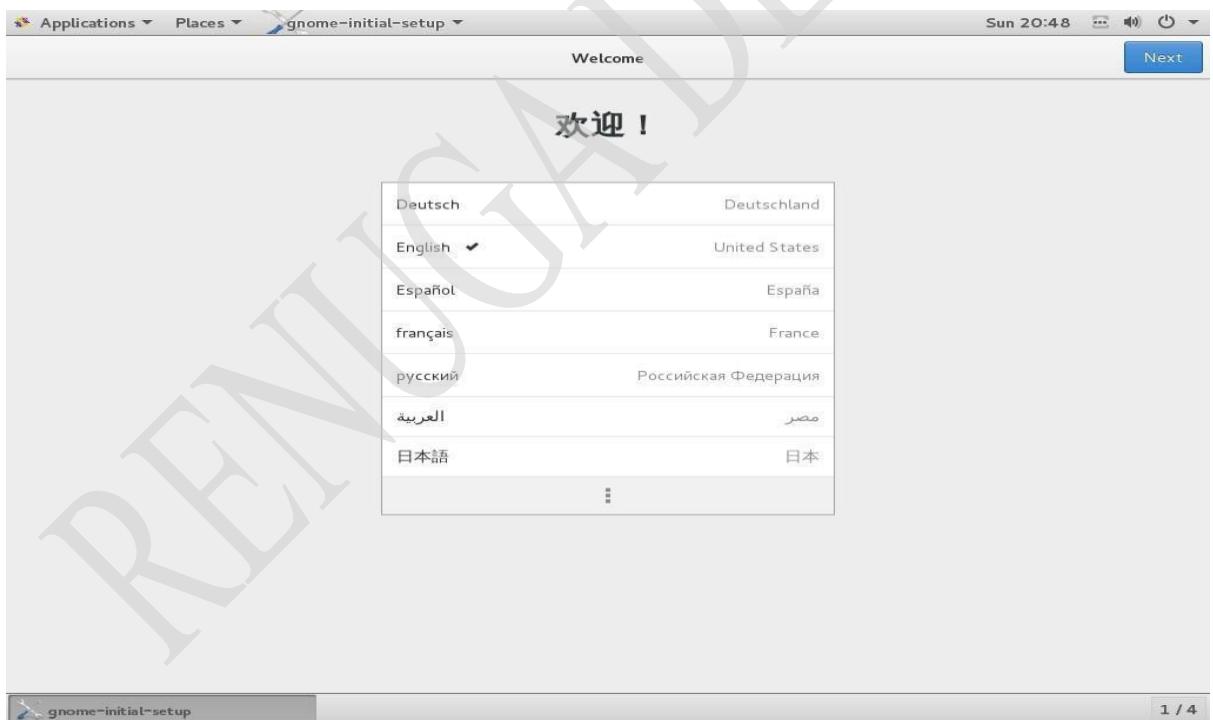
Note: In Linux, root user will get the maximum privileges and have any type of permissions. So be careful when you work in Linux/Unix as root user.

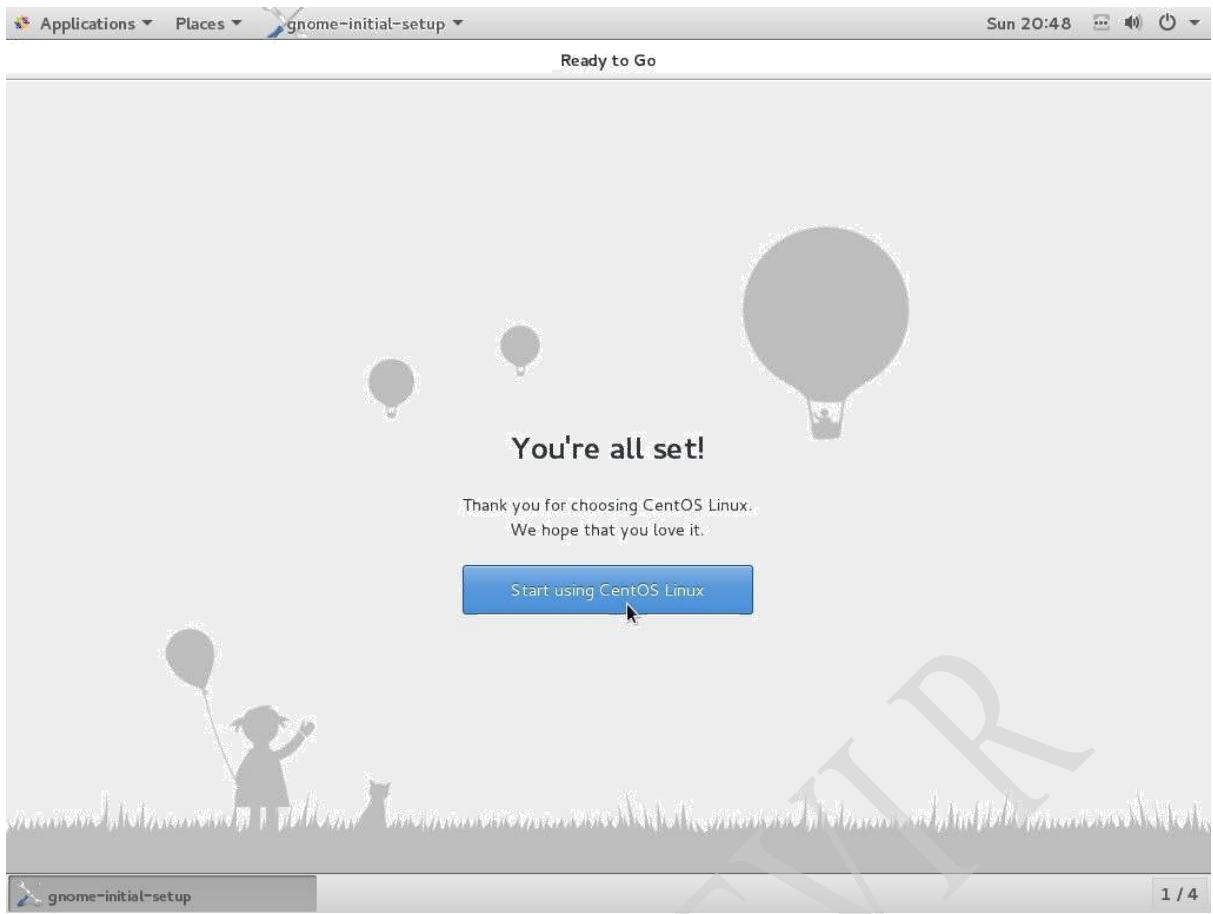






Step28: The Cent OS desktop screen will appear with a welcome window. Select your language and next press “Start using CentOS Linux”.





Result:

Thus, the CentOS Linux has been installed successfully in oracle VM VirtualBox.

Ex.no : 17 Mount the one node Hadoop cluster using FUSE

AIM

To mount the one node Hadoop cluster using FUSE and access files on HDFS in the same way as we do on Linux operating systems.

PROCEDURE

FUSE (Filesystem in Userspace) enables you to write a normal user application as a bridge for a traditional filesystem interface.

The hadoop-hdfs-fuse package enables you to use your HDFS cluster as if it were a traditional filesystem on Linux. It is assumed that you have a working HDFS cluster and know the hostname and port that your NameNode exposes.

To install fuse-dfs on Ubuntu systems:

```
hdpuser@jiju-PC:~$ wget http://archive.cloudera.com/cdh5/one-click-install/trusty/amd64/cdh5-repository_1.0_all.deb  
--2016-07-24 09:10:33-- http://archive.cloudera.com/cdh5/one-click-install/trusty/amd64/cdh5-repository_1.0_all.deb  
Resolving archive.cloudera.com (archive.cloudera.com)... 151.101.8.167 Connecting to archive.cloudera.com (archive.cloudera.com)|151.101.8.167|:80... connected. HTTP request sent, awaiting response... 200 OK Length: 3508 (3.4K)  
[application/x-debian-package]  
Saving to: cdh5-repository_1.0_all.deb  
  
100%[=====] 3,508 --.-K/s in  
0.09s 2016-07-24 09:10:34 (37.4 KB/s) - cdh5-repository_1.0_all.deb saved
```

```
[3508/3508] hdpuser@jiju-PC:~$ sudo dpkg -i cdh5-repository_1.0_all.deb
```

Selecting previously unselected package cdh5-repository.

(Reading database ... 170607 files and directories currently installed.)

Preparing to unpack cdh5-repository_1.0_all.deb ...

Unpacking cdh5-repository (1.0) ...

Setting up cdh5-repository (1.0) ...

gpg: keyring '/etc/apt/secreng.gpg' created

gpg: keyring '/etc/apt/trusted.gpg.d/cloudera-cdh5.gpg' created

gpg: key 02A818DD: public key "Cloudera Apt Repository" imported

gpg: Total number processed: 1

gpg: imported: 1

```
hdpuser@jiju-PC:~$ sudo apt-get update
```

```
hdpuser@jiju-PC:~$ sudo apt-get install hadoop-hdfs-fuse
```

Reading package lists... Done

Building dependency tree

Reading state information... Done

The following extra packages will be installed: avro-libs bigtop-jsvc bigtop-utils curl hadoop hadoop-0.20-mapreduce hadoop-client hadoop-hdfs hadoop-mapreduce hadoop-yarn libcurl3 libhdfs0 parquet parquet-format zookeeper

The following NEW packages will be installed: avro-libs bigtop-jsvc bigtop-utils curl hadoop hadoop-0.20-mapreduce hadoop-client hadoop-hdfs hadoop-hdfs-fuse hadoop-mapreduce hadoop-yarn libhdfs0 parquet parquet-format zookeeper
The following packages will be upgraded:

libcurl3

1 upgraded, 15 newly installed, 0 to remove and 702 not upgraded.

Need to get 222 MB of archives.

After this operation, 267 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-updates/main libcurl3 amd64 7.35.0-1ubuntu2.7 [173 kB]

Get:2 https://archive.cloudera.com/cdh5/ubuntu/trusty/amd64/cdh/ trusty-cdh5/contrib avro-libs all 1.7.6+cdh5.8.0+112-1.cdh5.8.0.p0.74~trusty-cdh5.8.0 [47.0 MB] Get:3

http://in.archive.ubuntu.com/ubuntu/ trusty-updates/main curl amd64 7.35.0-1ubuntu2.7 [123 kB]

Get:4 https://archive.cloudera.com/cdh5/ubuntu/trusty/amd64/cdh/ trusty-cdh5/contrib parquet-format all 2.1.0+cdh5.8.0+12-1.cdh5.8.0.p0.70~trusty-cdh5.8.0 [479 kB]

Get:5 https://archive.cloudera.com/cdh5/ubuntu/trusty/amd64/cdh/ trusty-cdh5/contrib parquet all 1.5.0+cdh5.8.0+174-1.cdh5.8.0.p0.71~trusty-cdh5.8.0 [27.1 MB] Get:6

https://archive.cloudera.com/cdh5/ubuntu/trusty/amd64/cdh/ trusty-cdh5/contrib hadoop all 2.6.0+cdh5.8.0+1601-1.cdh5.8.0.p0.93~trusty-cdh5.8.0 [28.2 MB]

Get:7 https://archive.cloudera.com/cdh5/ubuntu/trusty/amd64/cdh/ trusty-cdh5/contrib libhdfs0 amd64 2.6.0+cdh5.8.0+1601-1.cdh5.8.0.p0.93~trusty-cdh5.8.0 [320 kB]

Get:8 https://archive.cloudera.com/cdh5/ubuntu/trusty/amd64/cdh/ trusty-cdh5/contrib hadoop-hdfs-fuse amd64 2.6.0+cdh5.8.0+1601-1.cdh5.8.0.p0.93~trusty-cdh5.8.0 [317 kB] Fetched 222 MB in 3min 28s (1,064 kB/s)

(Reading database ... 170612 files and directories currently installed.)

Preparing to unpack .../libcurl3_7.35.0-1ubuntu2.7_amd64.deb ...

Unpacking libcurl3:amd64 (7.35.0-1ubuntu2.7) over (7.35.0-1ubuntu2) ...

Selecting previously unselected package curl.

Preparing to unpack .../curl_7.35.0-1ubuntu2.7_amd64.deb ...

Unpacking curl (7.35.0-1ubuntu2.7) ...

Selecting previously unselected package avro-libs.

Preparing to unpack .../avro-libs_1.7.6+cdh5.8.0+112-1.cdh5.8.0.p0.74~trusty-cdh5.8.0_all.deb ...

Unpacking avro-libs (1.7.6+cdh5.8.0+112-1.cdh5.8.0.p0.74~trusty-cdh5.8.0) ...

Selecting previously unselected package bigtop-utils.

Preparing to unpack .../bigtop-utils_0.7.0+cdh5.8.0+0-1.cdh5.8.0.p0.72~trusty-cdh5.8.0_all.deb ...

Unpacking bigtop-utils (0.7.0+cdh5.8.0+0-1.cdh5.8.0.p0.72~trusty-cdh5.8.0) ...

Selecting previously unselected package bigtop-jsvc.

Preparing to unpack .../bigtop-jsvc_0.6.0+cdh5.8.0+847-1.cdh5.8.0.p0.74~trusty-cdh5.8.0_amd64.deb ...

Unpacking bigtop-jsvc (0.6.0+cdh5.8.0+847-1.cdh5.8.0.p0.74~trusty-cdh5.8.0) ...

Selecting previously unselected package zookeeper.

```
Preparing to unpack .../zookeeper_3.4.5+cdh5.8.0+94-1.cdh5.8.0.p0.76~trusty-cdh5.8.0_all.deb ...
Unpacking zookeeper (3.4.5+cdh5.8.0+94-1.cdh5.8.0.p0.76~trusty-cdh5.8.0) ...
Selecting previously unselected package parquet-format.
Preparing to unpack .../parquet-format_2.1.0+cdh5.8.0+12-1.cdh5.8.0.p0.70~trusty-cdh5.8.0_all.deb ...
Unpacking parquet-format (2.1.0+cdh5.8.0+12-1.cdh5.8.0.p0.70~trusty-cdh5.8.0) ...
Selecting previously unselected package hadoop-yarn.
Preparing to unpack .../hadoop-yarn_2.6.0+cdh5.8.0+1601-1.cdh5.8.0.p0.93~trusty-cdh5.8.0_all.deb ...
Unpacking hadoop-yarn (2.6.0+cdh5.8.0+1601-1.cdh5.8.0.p0.93~trusty-cdh5.8.0) ...
Selecting previously unselected package hadoop-mapreduce.
Preparing to unpack .../hadoop-mapreduce_2.6.0+cdh5.8.0+1601-1.cdh5.8.0.p0.93~trusty-cdh5.8.0_all.deb ...
Unpacking hadoop-mapreduce (2.6.0+cdh5.8.0+1601-1.cdh5.8.0.p0.93~trusty-cdh5.8.0) ...
Selecting previously unselected package hadoop-hdfs.
Preparing to unpack .../hadoop-hdfs_2.6.0+cdh5.8.0+1601-1.cdh5.8.0.p0.93~trusty-cdh5.8.0_all.deb ...
Unpacking hadoop-hdfs (2.6.0+cdh5.8.0+1601-1.cdh5.8.0.p0.93~trusty-cdh5.8.0) ...
Selecting previously unselected package hadoop-0.20-mapreduce.
Preparing to unpack .../hadoop-0.20-mapreduce_2.6.0+cdh5.8.0+1601-1.cdh5.8.0.p0.93~trusty-cdh5.8.0_amd64.deb ...
Unpacking hadoop-0.20-mapreduce (2.6.0+cdh5.8.0+1601-1.cdh5.8.0.p0.93~trusty-cdh5.8.0)
...
Selecting previously unselected package hadoop-client.
Preparing to unpack .../hadoop-client_2.6.0+cdh5.8.0+1601-1.cdh5.8.0.p0.93~trusty-cdh5.8.0_all.deb ...
Unpacking hadoop-client (2.6.0+cdh5.8.0+1601-1.cdh5.8.0.p0.93~trusty-cdh5.8.0) ...
Selecting previously unselected package parquet.
Preparing to unpack .../parquet_1.5.0+cdh5.8.0+174-1.cdh5.8.0.p0.71~trusty-cdh5.8.0_all.deb ...
Unpacking parquet (1.5.0+cdh5.8.0+174-1.cdh5.8.0.p0.71~trusty-cdh5.8.0) ...
Selecting previously unselected package hadoop.
Preparing to unpack .../hadoop_2.6.0+cdh5.8.0+1601-1.cdh5.8.0.p0.93~trusty-cdh5.8.0_all.deb ...
Unpacking hadoop (2.6.0+cdh5.8.0+1601-1.cdh5.8.0.p0.93~trusty-cdh5.8.0) ...
Selecting previously unselected package libhdfs0.
Preparing to unpack .../libhdfs0_2.6.0+cdh5.8.0+1601-1.cdh5.8.0.p0.93~trusty-cdh5.8.0_amd64.deb ...
Unpacking libhdfs0 (2.6.0+cdh5.8.0+1601-1.cdh5.8.0.p0.93~trusty-cdh5.8.0) ...
Selecting previously unselected package hadoop-hdfs-fuse.
Preparing to unpack .../hadoop-hdfs-fuse_2.6.0+cdh5.8.0+1601-1.cdh5.8.0.p0.93~trusty-cdh5.8.0_amd64.deb ...
Unpacking hadoop-hdfs-fuse (2.6.0+cdh5.8.0+1601-1.cdh5.8.0.p0.93~trusty-cdh5.8.0) ...
Processing triggers for man-db (2.6.7.1-1) ...
Setting up libcurl3:amd64 (7.35.0-1ubuntu2.7) ...
Setting up curl (7.35.0-1ubuntu2.7) ...
Setting up avro-libs (1.7.6+cdh5.8.0+112-1.cdh5.8.0.p0.74~trusty-cdh5.8.0) ...
Setting up bigtop-utils (0.7.0+cdh5.8.0+0-1.cdh5.8.0.p0.72~trusty-cdh5.8.0) ...
Setting up bigtop-jsvc (0.6.0+cdh5.8.0+847-1.cdh5.8.0.p0.74~trusty-cdh5.8.0) ...
Setting up zookeeper (3.4.5+cdh5.8.0+94-1.cdh5.8.0.p0.76~trusty-cdh5.8.0) ...
```

update-alternatives: using /etc/zookeeper/conf.dist to provide /etc/zookeeper/conf (zookeeper-conf) in auto mode
Setting up parquet-format (2.1.0+cdh5.8.0+12-1.cdh5.8.0.p0.70~trusty-cdh5.8.0) ...
Setting up parquet (1.5.0+cdh5.8.0+174-1.cdh5.8.0.p0.71~trusty-cdh5.8.0) ...
Setting up hadoop (2.6.0+cdh5.8.0+1601-1.cdh5.8.0.p0.93~trusty-cdh5.8.0) ...
update-alternatives: using /etc/hadoop/conf.empty to provide /etc/hadoop/conf (hadoop-conf) in auto mode
Setting up hadoop-yarn (2.6.0+cdh5.8.0+1601-1.cdh5.8.0.p0.93~trusty-cdh5.8.0) ...
Setting up libhdfs0 (2.6.0+cdh5.8.0+1601-1.cdh5.8.0.p0.93~trusty-cdh5.8.0) ...
Setting up hadoop-mapreduce (2.6.0+cdh5.8.0+1601-1.cdh5.8.0.p0.93~trusty-cdh5.8.0) ...
Setting up hadoop-hdfs (2.6.0+cdh5.8.0+1601-1.cdh5.8.0.p0.93~trusty-cdh5.8.0) ...
Setting up hadoop-0.20-mapreduce (2.6.0+cdh5.8.0+1601-1.cdh5.8.0.p0.93~trusty-cdh5.8.0)
...
Setting up hadoop-client (2.6.0+cdh5.8.0+1601-1.cdh5.8.0.p0.93~trusty-cdh5.8.0) ...
Setting up hadoop-hdfs-fuse (2.6.0+cdh5.8.0+1601-1.cdh5.8.0.p0.93~trusty-cdh5.8.0) ...
Processing triggers for libc-bin (2.19-0ubuntu6) ...

hdpuser@jiju-PC:~\$ **sudo mkdir -p /home/hdpuser/hdfs**
[sudo] password for hdpuser:

hdpuser@jiju-PC:~\$ **sudo hadoop-fuse-dfs dfs://localhost:54310 /home/hdpuser/hdfs/**

INFO /data/jenkins/workspace/generic-package-ubuntu64-14-04/CDH5.8.0-Packaging-Hadoop-2016-07-12_15-43-10/hadoop-2.6.0+cdh5.8.0+1601-1.cdh5.8.0.p0.93~trusty/hadoop-hdfs-project/hadoop-hdfs/src/main/native/fuse-dfs/fuse_options.c:164 Adding FUSE arg /home/hdpuser/hdfs/

hdpuser@jiju-PC:~\$ **ls /home/hdpuser/hdfs/**

hdpuser@jiju-PC:~\$ **mkdir /home/hdpuser/hdfs/new**

Permission	Owner	Group	Size	Replication	Block Size	Name
drwxr-xr-x	hdpuser	supergroup	0 B	0	0 B	new

hdpuser@jiju-PC:~\$ **ls /home/hdpuser/hdfs/**
new

hdpuser@jiju-PC:~\$ **mkdir /home/hdpuser/hdfs/example**

```
hdpuser@jiju-PC:~$ ls -l  
/home/hdpuser/hdfs/ total 8  
drwxr-xr-x 2 hdpuser 99 4096 Jul 24 15:28 example  
drwxr-xr-x 2 hdpuser 99 4096 Jul 24 15:19 new
```

To Unmount the file system

Using umount command the filesystem can be unmounted.

```
hdpuser@jiju-PC:~$ sudo umount /home/hdpuser/hdfs
```

NOTE: You can now add a permanent HDFS mount which persists through reboots.

To add a system mount:

Open /etc/fstab and add lines to the bottom similar to these: (sudo vi /etc/fstab)

```
hadoop-fuse-dfs#dfs://<name_node_hostname>:<namenode_port><mount_point>  
fuse allow_other,usetrash,rw 2 0
```

For example:

```
sudo hadoop-fuse-dfs#dfs://localhost:54310 /home/hdpuser/hdfs fuse  
allow_other,usetrash,rw 2 0
```

Test to make sure everything is working properly:

```
$ mount <mount_point>
```

```
hdpuser@jiju-PC:~$ sudo mount /home/hdpuser/hdfs
```

Result:

Thus the fuse has been installed successfully.

Ex.no : 18

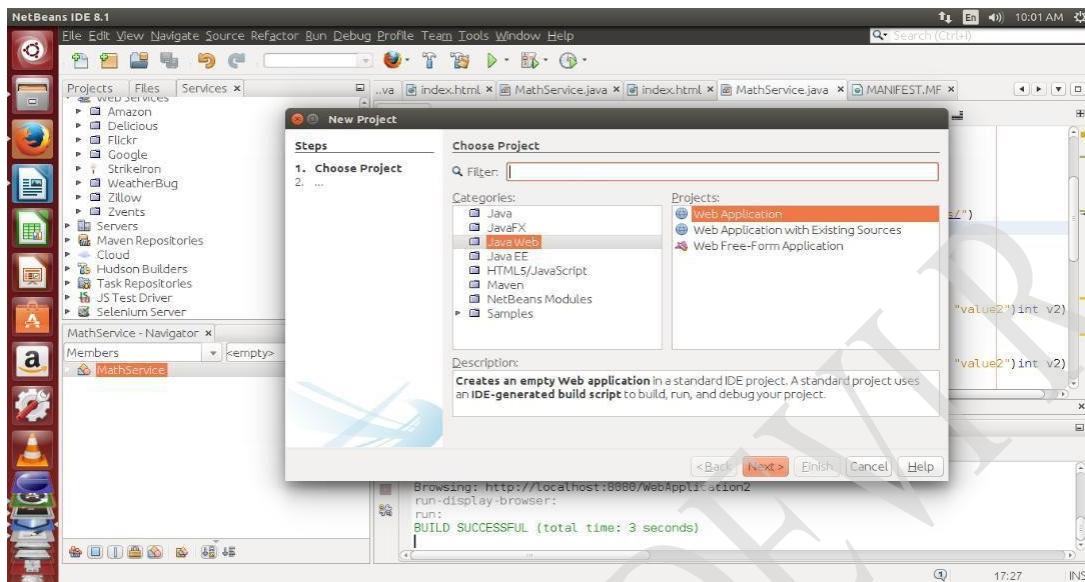
Develop a new Web Service for Calculator

Aim:

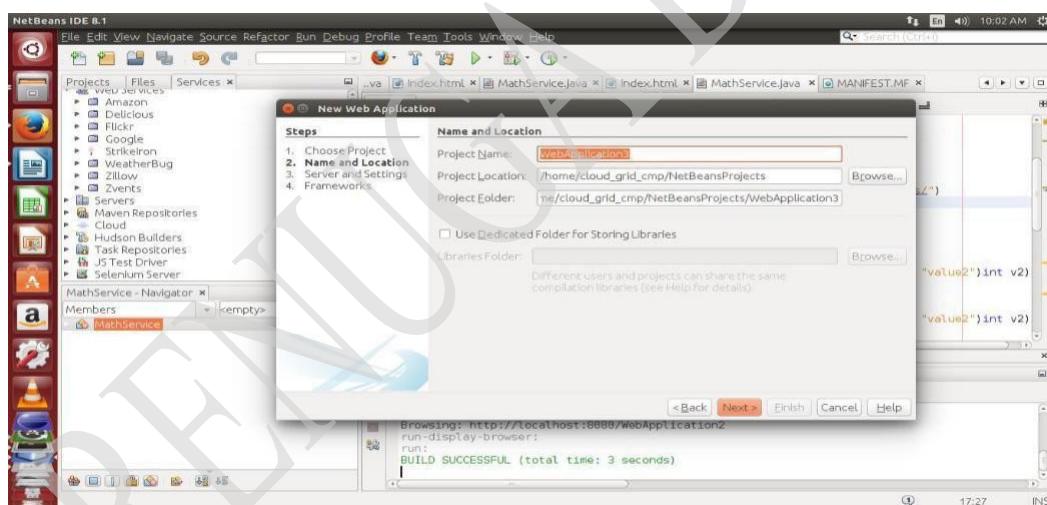
To develop a web service program for a calculator.

Procedures:

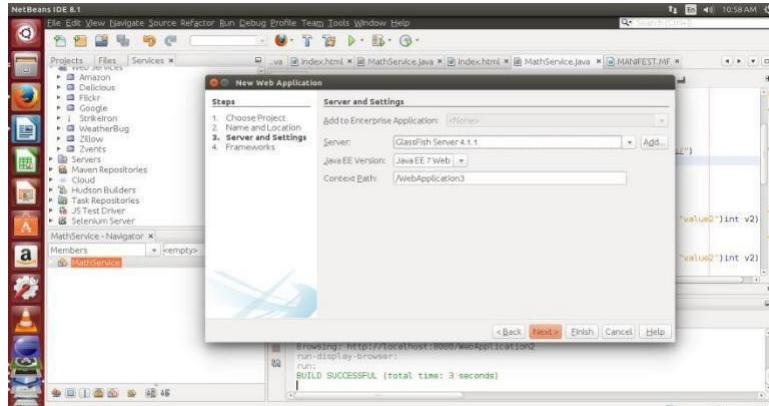
Step1. Open netbeans and go to New



Step 2. Choose Java Web and select Web Application and give next.

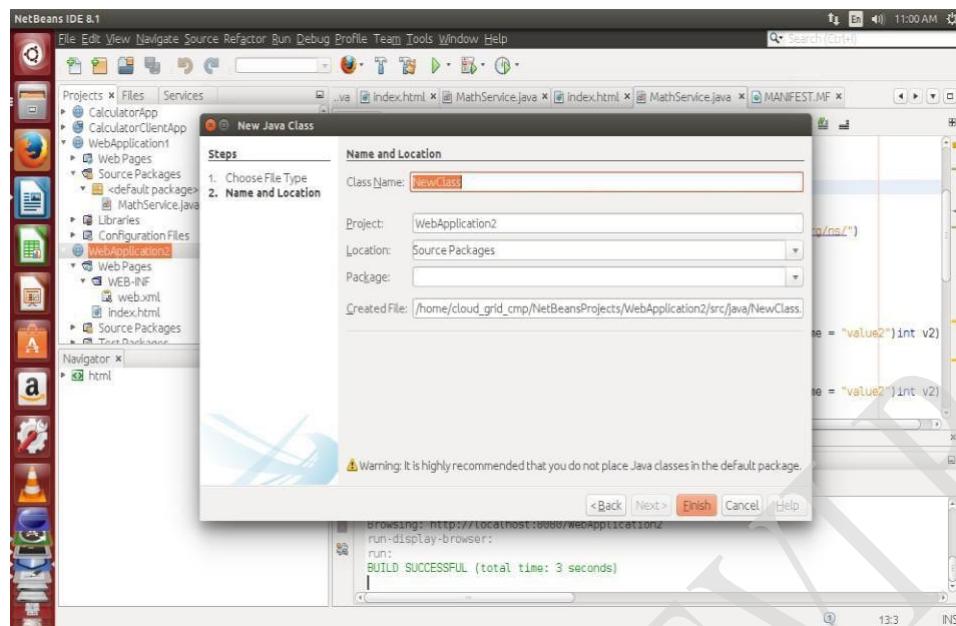


Step 3. Enter the project name and give next and Select the Server either tomcat or glassfish



Step 4. Give next and select finish

Step 5. Right click the WebApplication (Projec Name) and Select New, and choose Java Class



Step 6. Type the following code

```
import javax.jws.WebMethod;
import javax.jws.WebParam;
import javax.jws.WebService;

/*
 * To change this license header, choose License Headers in Project Properties.
 * To change this template file, choose Tools | Templates
 * and open the template in the editor.
 */

/**
 *
 * @author
cloud_grid_cmp */
@WebService(serviceName="MathService", targetNamespace =
"http://my.org/ns/")
public class MathService {
    @WebMethod(operationName = "hello")
    public String hello(@WebParam(name="name")String txt){ return "Hello"+txt+"!"; }
    @WebMethod(operationName = "addSer")
    public String addSer(@WebParam(name="value1")int v1, @WebParam(name =
"value2")int v2){
        return "Answer:" +(v1+v2)+"!";
    }
    @WebMethod(operationName = "subSer")
    public String subSer(@WebParam(name="value1")int v1, @WebParam(name =
"value2")int v2){
```

```

        return "Answer:" +(v1-v2)+"!";
    }
    @WebMethod(operationName = "mulSer")
    public String mulSer(@WebParam(name="value1")int v1, @WebParam(name =
    "value2")int v2){
        return "Answer:" +(v1*v2)+"!";
    }
    @WebMethod(operationName = "divSer")
    public String divSer(@WebParam(name="value1")int v1, @WebParam(name =
    "value2")int v2){
        float res = 0;
        try
        {
            res = ((float)v1)/((float) v2);
            return "Answer:" +res+"!";
        }
        catch(ArithmaticException e){
            System.out.println("Can't be divided by Zero"+e);
            return "Answer:"
            +e.getMessage().toString()+"!!!"; }
    }
}

```

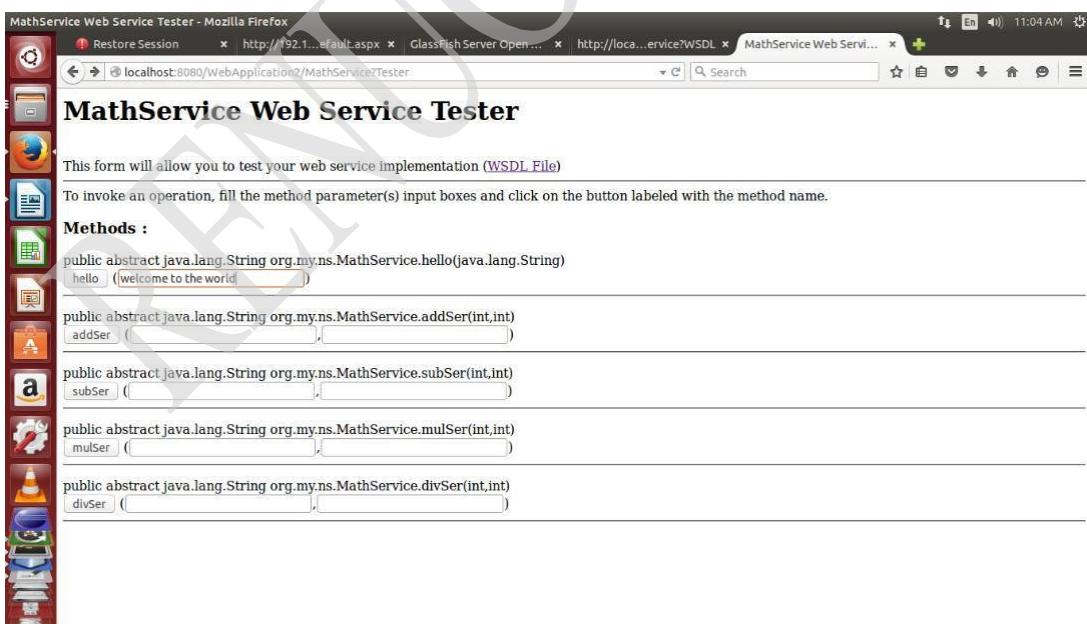
Step 7. Run Project by pressing F6 key or Run button.

Step 8. Check Web browser

for the following name is available else give it

<http://localhost:8080/WebApplication2/MathService?Tester>

MathService?Tester ---> represents the java class name



Output Screen:

Give some value in the fields and check the output by pressing enter key.

Method parameter(s)

Type	Value
int	45
int	90

Method returned

java.lang.String : "Answer:135!"

SOAP Request

```
<?xml version="1.0" encoding="UTF-8"?><S:Envelope xmlns:S="http://schemas.xmlsoap.org/soap/envelope/" xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/">
  <S:Header>
  <S:Body>
    <ns2:addSer xmlns:ns2="http://my.org/ns/">
      <value1>45</value1>
      <value2>90</value2>
    </ns2:addSer>
  </S:Body>
</S:Envelope>
```

SOAP Response

```
<?xml version="1.0" encoding="UTF-8"?><S:Envelope xmlns:S="http://schemas.xmlsoap.org/soap/envelope/" xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/">
```

```
-->
--> Generated by JAX-WS RI (http://jax-ws.java.net). RI's version is Metro/2.3.2-b608 (trunk-7979; 2015-01-21T12:50:19+0000) JAXWS-RI/2.2.11-b150120.1832 JAXWS-API/2.2.12 JAXB-RI/2.2.
-->
-<definitions targetNamespace="http://my.org/ns/" name="MathService">
-<types>
-  <xsd:schema>
-    <xsd:import namespace="http://my.org/ns/" schemaLocation="http://localhost:8080/WebApplication2/MathService?xsd=1"/>
-  </xsd:schema>
-</types>
-<message name="hello">
-  <part name="parameters" element="tns:hello"/>
-</message>
-<message name="helloResponse">
-  <part name="parameters" element="tns:helloResponse"/>
-</message>
-<message name="addSer">
-  <part name="parameters" element="tns:addSer"/>
-</message>
-<message name="addSerResponse">
-  <part name="parameters" element="tns:addSerResponse"/>
-</message>
-<message name="subSer">
-  <part name="parameters" element="tns:subSer"/>
-</message>
-<message name="subSerResponse">
-  <part name="parameters" element="tns:subSerResponse"/>
-</message>
-<message name="mulSer">
-  <part name="parameters" element="tns:mulSer"/>
-</message>
-<message name="mulSerResponse">
-  <part name="parameters" element="tns:mulSerResponse"/>
-</message>
```

Finally select the WSDL link

Result:

Thus the program on calculator for web services is executed successfully.

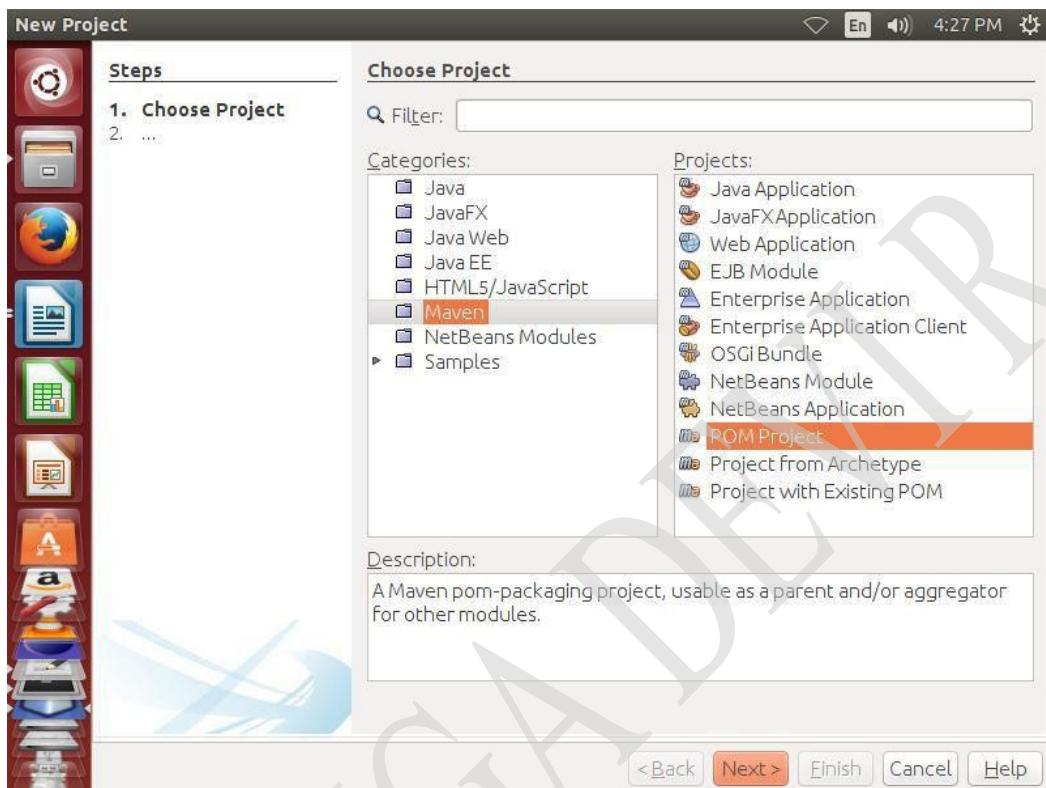
Ex.no : 19 To develop a new OGSA complaint Webservice.

Aim:

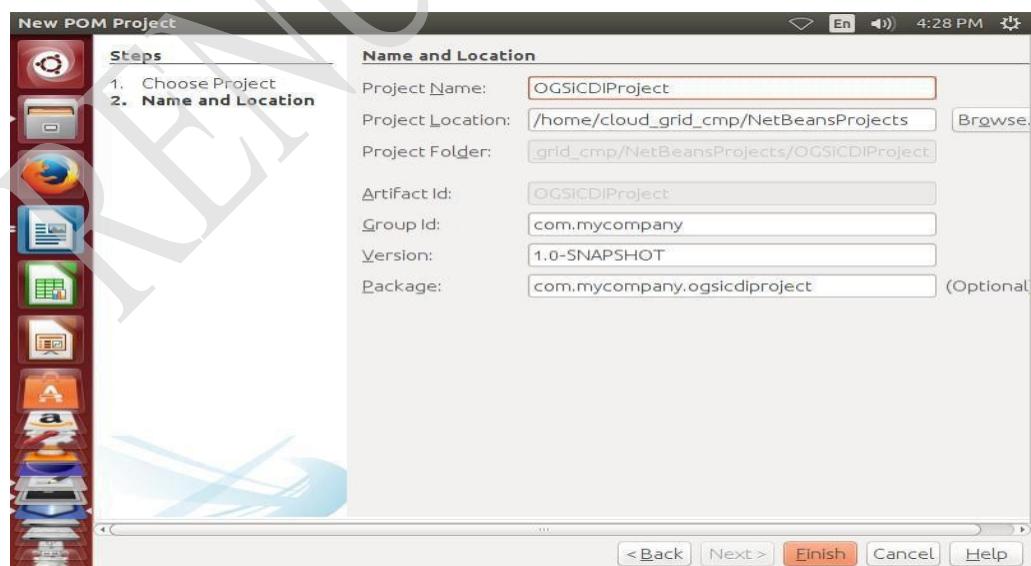
To develop a new OGSA complaint Webservice

Procedure:

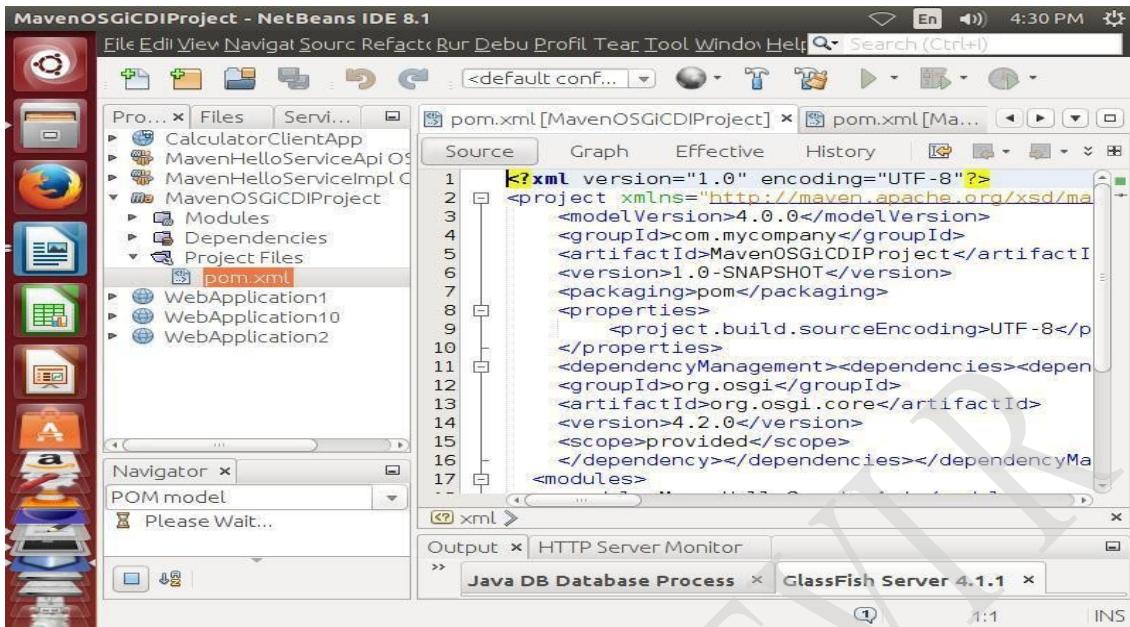
Step 1: Choose New Project from the main menu



Step 2: Select POM project from the maven category



Step 3: Type MavenOSGiCDIProject as the project name and click finish. When you click finish, the IDE creates the POM project and opens the project in the project window.



Step 4: Expand the project files node in the project window and double – click pom.xml to open the file in editor and do the modification in the file and save.

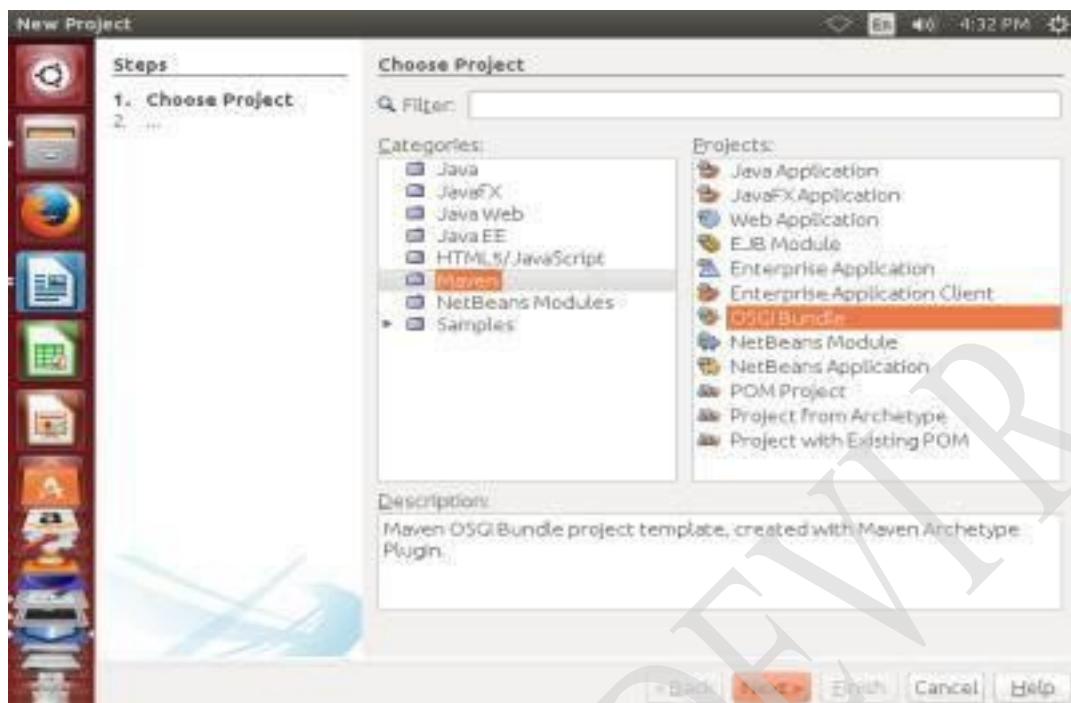
In pom.xml file

```
<?xml version="1.0" encoding="UTF-8"?>
<project xmlns="http://maven.apache.org/xsd/maven-4.0.0.xsd"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://maven.apache.org/POM/4.0.0
  http://maven.apache.org/xsd/maven-4.0.0.xsd">
  <modelVersion>4.0.0</modelVersion>
  <groupId>com.mycompany</groupId>
  <artifactId>MavenOSGiCDIProject</artifactId>
  <version>1.0-SNAPSHOT</version>
  <packaging>pom</packaging>
  <properties>
    <project.build.sourceEncoding>UTF-8</project.build.sourceEncoding>
  </properties>
  <dependencyManagement><dependencies><dependency>
    <groupId>org.osgi</groupId>
    <artifactId>org.osgi.core</artifactId>
    <version>4.2.0</version>
    <scope>provided</scope>
  </dependency></dependencies></dependencyManagement>
</project>
```

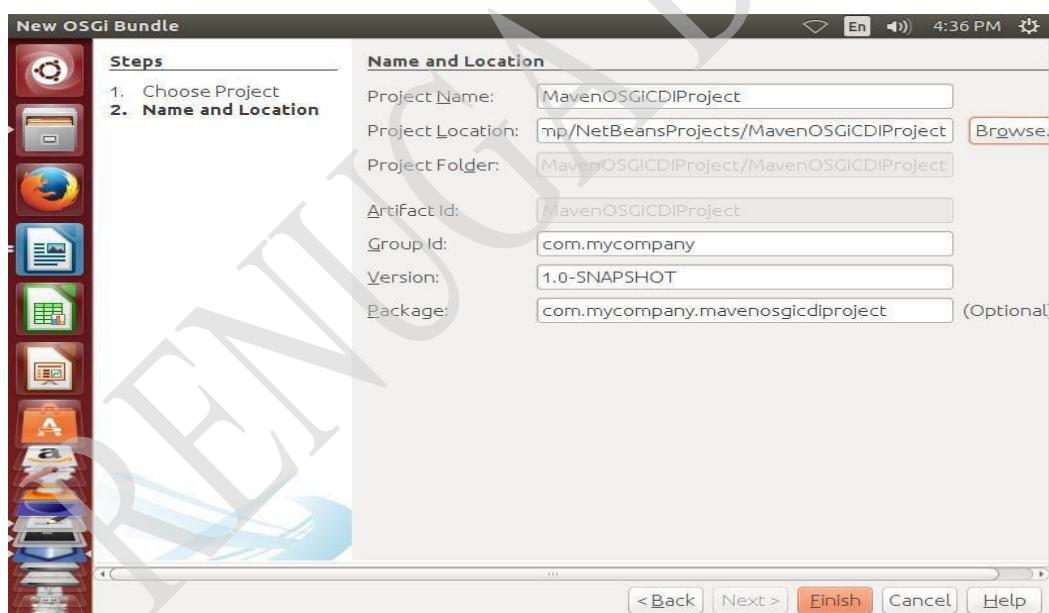
Step 5:Creating OGSI Bundle Projects

Choose File -> New Project to open the New Project Wizzard

Step 5 : Choose OGSI Bundle from Maven category. Click Next

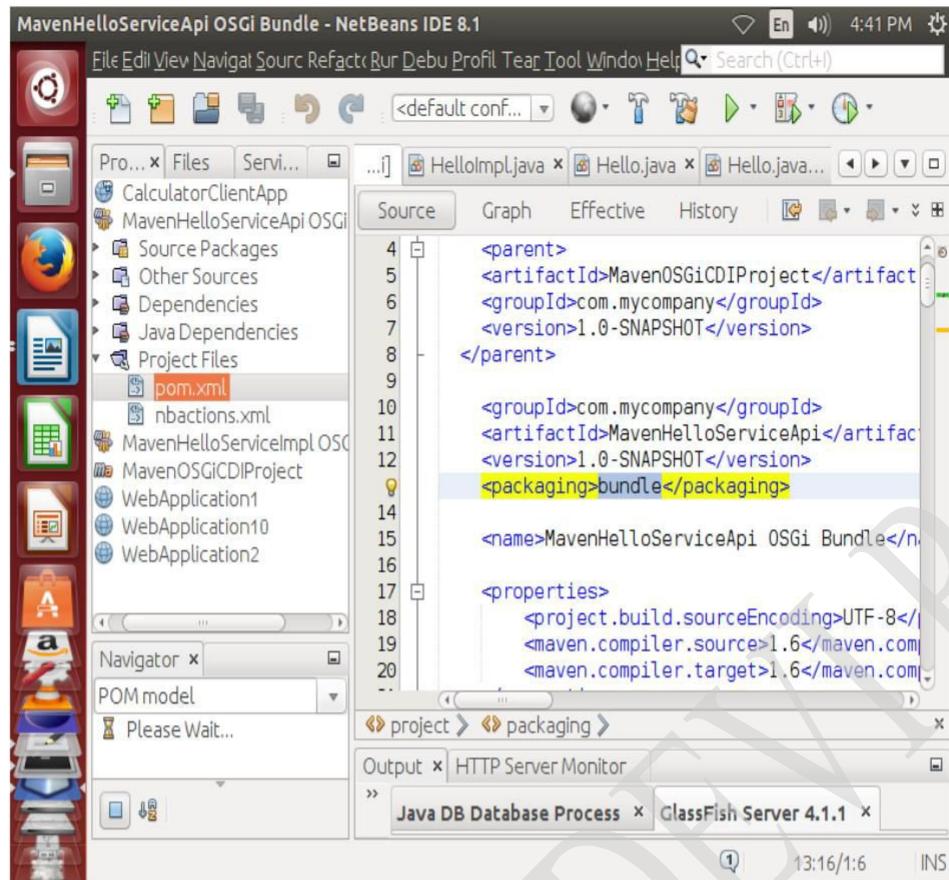


Step 6: Creating MavenHelloServiceApi as the Project Name for OGSI Bundle



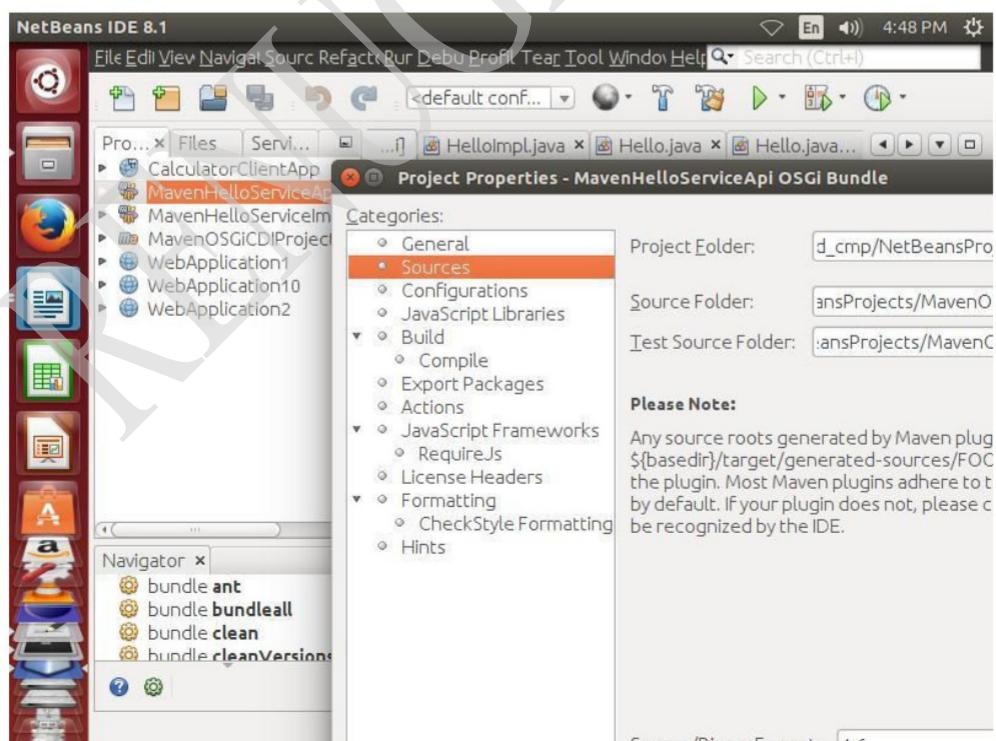
The IDE creates the bundle project and opens the project in the Project Window. And check the building pugins at pom.xml under project files.

As well as it will create org.osgi.core artifact as default and it can be view at under Dependencies.

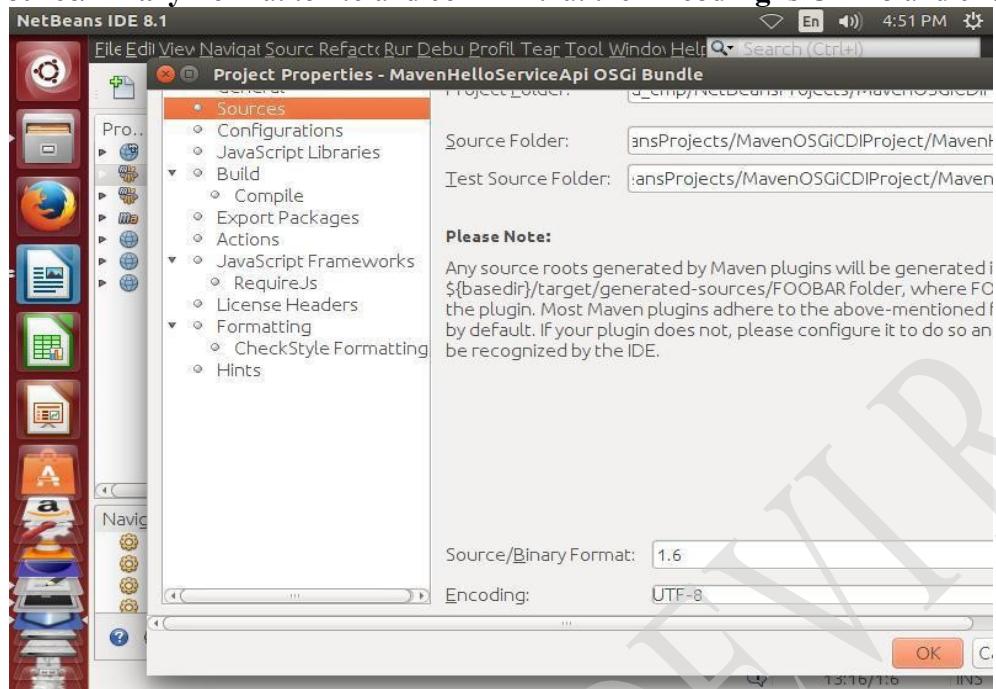


Step 7: Build the MavenHelloServiceApi Project by

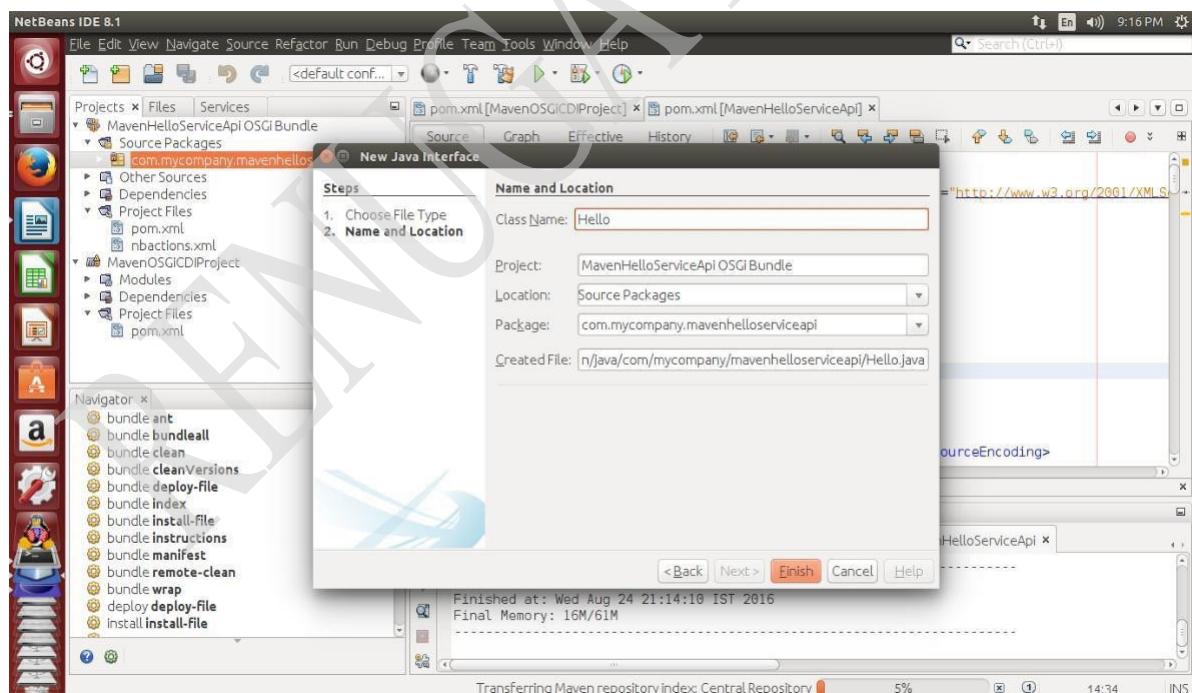
1. Right Click the MavenHelloServiceApi project node in the project window and choose properties.



2. Select the source category in the project project dialog box
3. Set the **Source/Binary Format** to 1.6 and confirm that the **Encoding** is UTF-8 and click ok



4. Right click the source package node in the project window and choose New -> JavaInterface
5. Type **Hello** for the Class Name.

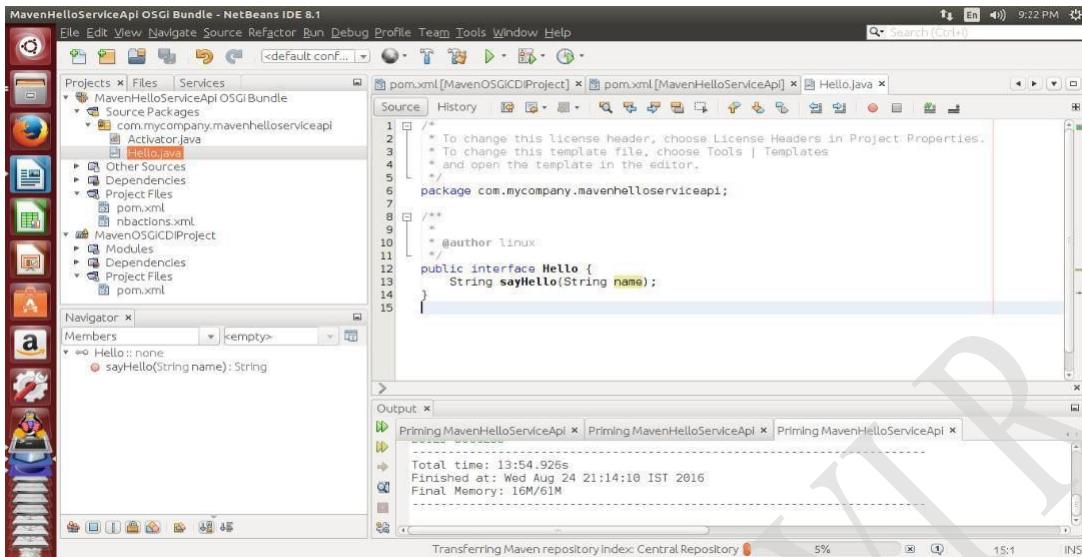


6. Select **com.mycompany.mavenhelloserviceapi** as the Package. Click finish.
7. Add the following sayHello method to the interface and save the changes.

```

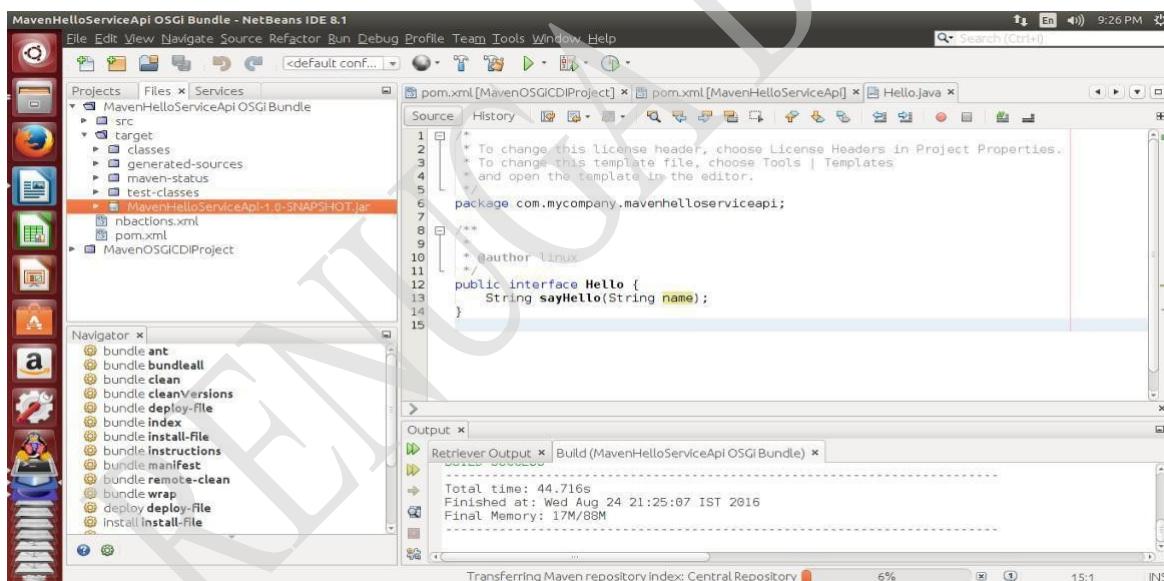
package com.mycompany.mavenhelloserviceapi;
public interface Hello {
    String sayHello(String name);
}

```



8. Right click the project node in the project window and choose build.

9. After building the project, open files window and expand the project node such that you can see MavenHelloServiceApi-1.0-SNAPSHOT.jar is created in the target folder.



Step 8: Creating the MavenHelloServiceImpl Implementation Bundle

Here you will create the MavenHelloServiceImpl in the POM Project.

1. Choose File -> New Project to open the New Project Wizard
2. Choose OSGi Bundle from the Maven category. Click Next.
3. Type **MavenHelloServiceImpl** for the Project Name
4. Click Browse and select the MavenOSGiCDIProject POM project as the Location. Click Finish.(As earlier step).
5. Right click the project node in the Projects window and choose Properties.

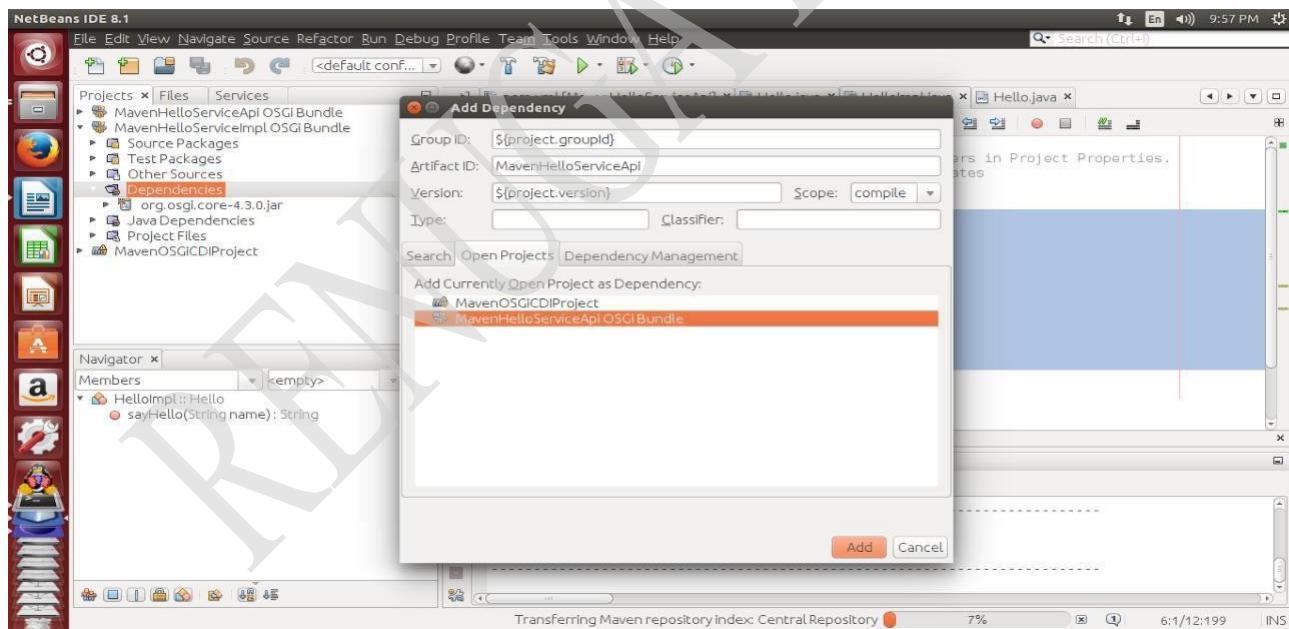
6. Select the Sources category in the Project Properties dialog box.
7. Set the **Source/Binary Format** to 1.6 and confirm that the **Encoding** is UTF-8. Click OK.
8. Right click Source Packages node in the Projects window and choose New -> Java Class.
9. Type **HelloImpl** for the Class Name.
10. Select **com.mycompany.mavenhelloserviceimpl** as the Package. Click Finish.
11. Type the following and save your changes.

```
package com.mycompany.mavenhelloserviceimpl;

/**
 *
 * @author linux */
public class HelloImpl implements Hello
{ public String sayHello(String name)
{
    return "Hello" +name;
}
}
```

When you implement Hello, the IDE will display an error that you need to resolve by adding the MavenHelloServiceApi project as a dependency.

12. Right click the Dependencies folder of **MavenHelloServiceImpl** in the Projects window and choose Add Dependency.
13. Click the Open Projects tab in the Add Library dialog.
14. Select **MavenHelloServiceApi OSGi Bundle**. Click Add



14. Expand the **com.mycompany.mavenhelloserviceimpl** package and double click **Activator.java** and open the file in editor.

The IDE automatically creates the Activator.java bundle and its manage the lifecycle of bundle. By default it includes start() and stop().

15. Modify the start() and Stop() methods in the bundle activator class by adding the

following lines.

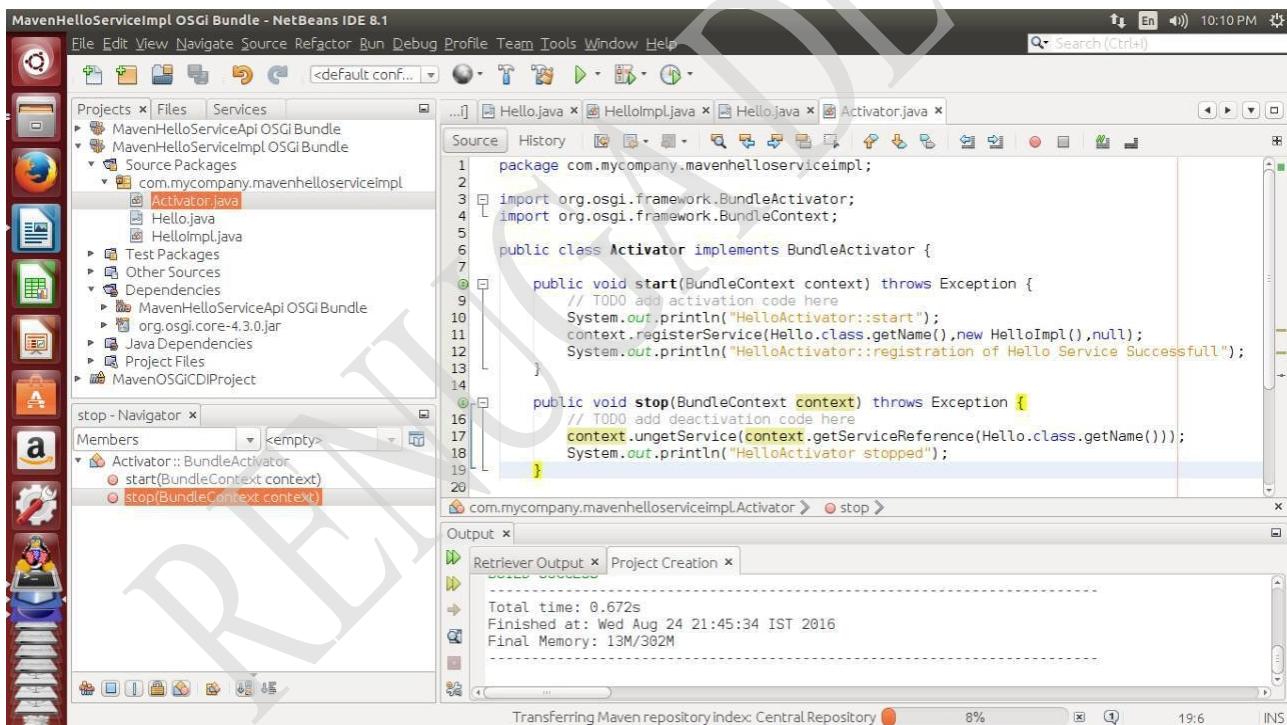
```
ackage com.mycompany.mavenhelloserviceimpl;

import org.osgi.framework.BundleActivator;
import org.osgi.framework.BundleContext;

public class Activator implements BundleActivator {

    public void start(BundleContext context) throws Exception {
        // TODO add activation code here
        System.out.println("HelloActivator::start");
        context.registerService(Hello.class.getName(),new HelloImpl(),null);
        System.out.println("HelloActivator::registration of Hello Service Successfull");
    }

    public void stop(BundleContext context) throws Exception
    {
        // TODO add deactivation code here
        context.ungetService(context.getServiceReference(Hello.class.getName()));
        System.out.println("HelloActivator stopped");
    }
}
```

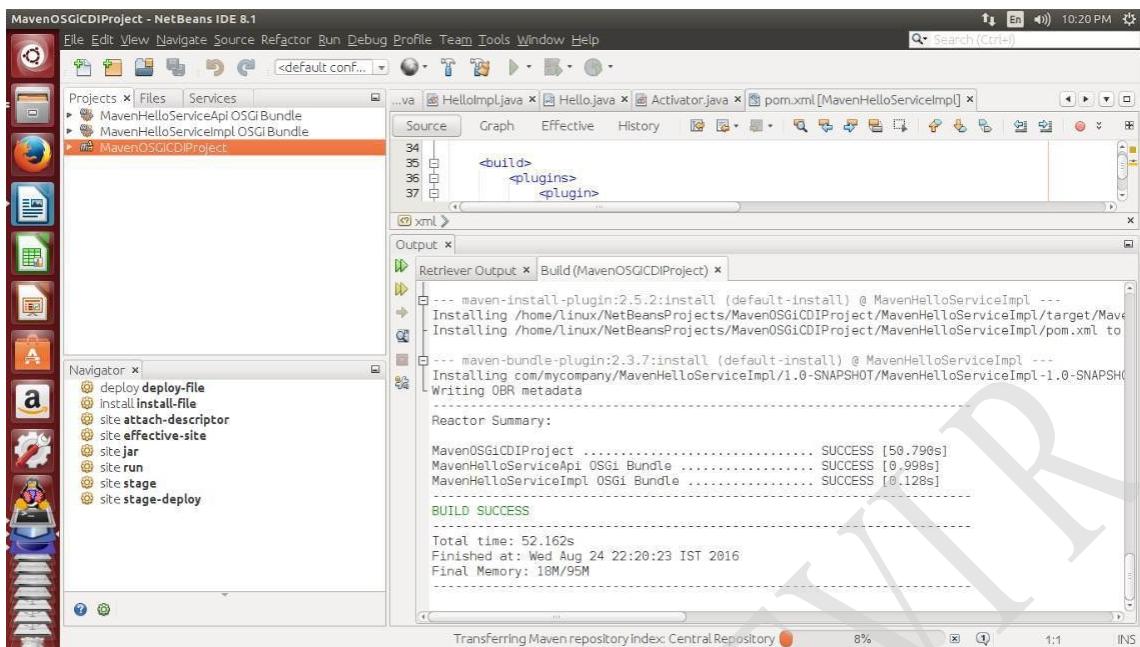


Step 9: Building and Deploying the OSGi Bundles

Here you will build the OSGi bundles and deploy the bundles to GlassFish

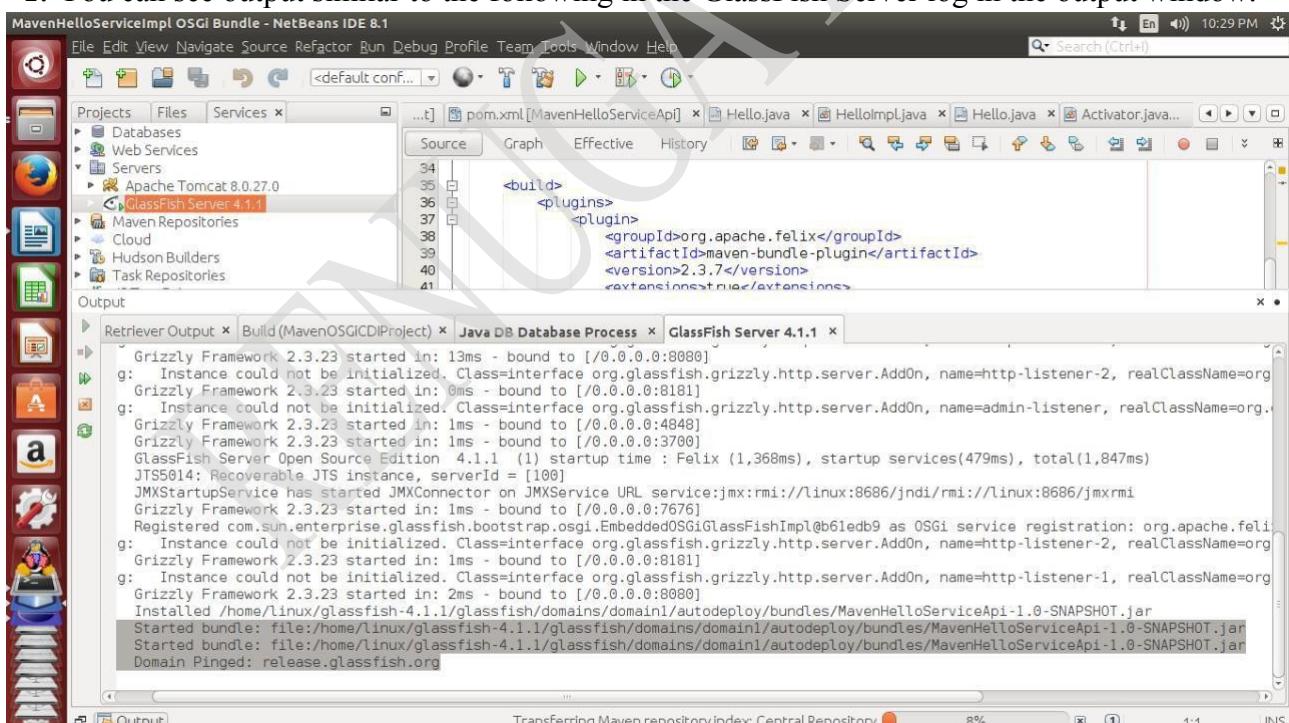
1. Right click the MavenOSGiCDIProject folder in the Projects window and choose Clean and Build.
When you build the project the IDE will create the JAR files in the target folder and also install the snapshot JAR in the local repository.

In file window, by expanding the target folder of each of the two bundle projects it will show two JAR archieves(MavenHelloServiceApi-1.0-SNAPSHOT.jar and MavenHelloServiceImpl-1.0-SNAPSHOT.jar.)



2. Start the GlassFish server (if not already started)
3. Copy the MavenHelloServiceApi-1.0-SNAPSHOT.jar to the **/home/linux/glassfish-4.1.1/glassfish/domains/domain1/autodeploy/bundles** (GlassFish installed Directory)

4. You can see output similar to the following in the GlassFish Server log in the output window.



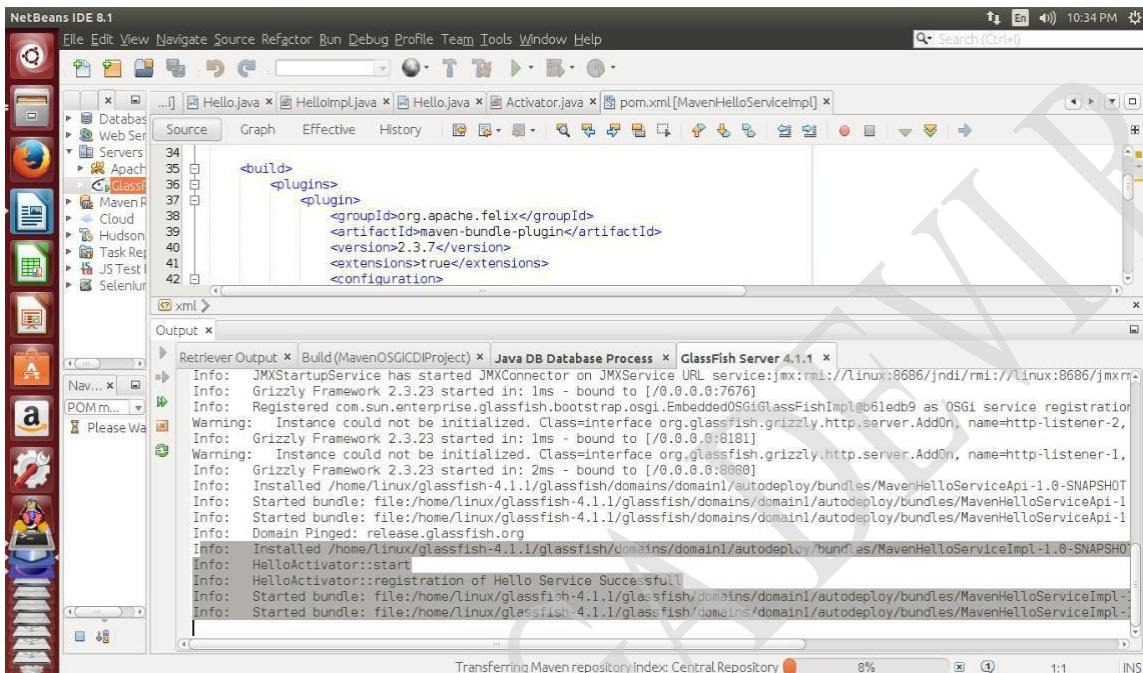
Info: Installed /home/linux/glassfish-4.1.1/glassfish/domains/domain1/autodeploy/bundles/MavenHelloServiceApi-1.0-SNAPSHOT.jar
Info: Started bundle: file:/home/linux/glassfish-

4.1.1/glassfish/domains/domain1/autodeploy/bundles/MavenHelloServiceApi-1.0-SNAPSHOT.jar

Info: Started bundle: file:/home/linux/glassfish-4.1.1/glassfish/domains/domain1/autodeploy/bundles/MavenHelloServiceApi-1.0-SNAPSHOT.jar

5. Repeat the step of copying the MavenHelloServiceImpl-1.0-SNAPSHOT.jar to the /home/linux/glassfish-4.1.1/glassfish/domains/domain1/autodeploy/bundles (GlassFish installed Directory)

6. You can see the output at the glassfish server log



```
<build>
    <plugins>
        <plugin>
            <groupId>org.apache.felix</groupId>
            <artifactId>maven-bundle-plugin</artifactId>
            <version>2.3.7</version>
            <extensions>true</extensions>
            <configuration>
```

Output

```
Retriever Output x Build (MavenOSGiCDIProject) x Java DB Database Process x GlassFish Server 4.1.1 x
Info: JMXStartupService has started JMXConnector on JMXService URL service:jmx:rmi://linux:8686/jndi/rmi://linux:8686/jmxrn
Info: Grizzly Framework 2.3.23 started in: 1ms - bound to [/0.0.0.0:7676]
Info: Registered com.sun.enterprise.glassfish.bootstrap.osgi.EmbeddedOSGiGlassFishImpl@61edb9 as OSGi service registration
Warning: Instance could not be initialized. Class=interface org.glassfish.grizzly.http.server.AddOn, name=http-listener-2,
Info: Grizzly Framework 2.3.23 started in: 1ms - bound to [/0.0.0.0:8181]
Warning: Instance could not be initialized. Class=interface org.glassfish.grizzly.http.server.AddOn, name=http-listener-1,
Info: Grizzly Framework 2.3.23 started in: 2ms - bound to [/0.0.0.0:8080]
Info: Installed /home/linux/glassfish-4.1.1/glassfish/domains/domain1/autodeploy/bundles/MavenHelloServiceApi-1.0-SNAPSHOT
Info: Started bundle: file:/home/linux/glassfish-4.1.1/glassfish/domains/domain1/autodeploy/bundles/MavenHelloServiceApi-1.0-SNAPSHOT
Info: Started bundle: file:/home/linux/glassfish-4.1.1/glassfish/domains/domain1/autodeploy/bundles/MavenHelloServiceApi-1.0-SNAPSHOT
Info: Domain Pinged: release.glassfish.org
Info: Installed /home/linux/glassfish-4.1.1/glassfish/domains/domain1/autodeploy/bundles/MavenHelloServiceImpl-1.0-SNAPSHOT
Info: HelloActivator::start
Info: HelloActivator::registration of Hello Service Successfull
Info: Started bundle: file:/home/linux/glassfish-4.1.1/glassfish/domains/domain1/autodeploy/bundles/MavenHelloServiceImpl-1.0-SNAPSHOT
Info: Started bundle: file:/home/linux/glassfish-4.1.1/glassfish/domains/domain1/autodeploy/bundles/MavenHelloServiceImpl-1.0-SNAPSHOT
Info: Started bundle: file:/home/linux/glassfish-4.1.1/glassfish/domains/domain1/autodeploy/bundles/MavenHelloServiceImpl-1.0-SNAPSHOT
```

Info: Installed /home/linux/glassfish

4.1.1/glassfish/domains/domain1/autodeploy/bundles/MavenHelloServiceImpl-1.0-SNAPSHOT.jar

Info: HelloActivator::start

Info: HelloActivator::registration of Hello Service Successfull

Info: Started bundle: file:/home/linux/glassfish-

4.1.1/glassfish/domains/domain1/autodeploy/bundles/MavenHelloServiceImpl-1.0-SNAPSHOT.jar

Info: Started bundle: file:/home/linux/glassfish-

4.1.1/glassfish/domains/domain1/autodeploy/bundles/MavenHelloServiceImpl-1.0-SNAPSHOT.jar

Result:

Thus a new OGSA- compliant web service has been executed successfully.

Ex.no:20 Using Apache Axis Develop a Grid Service

Aim:

To develop a Grid Service using Apache Axis

Procedure:

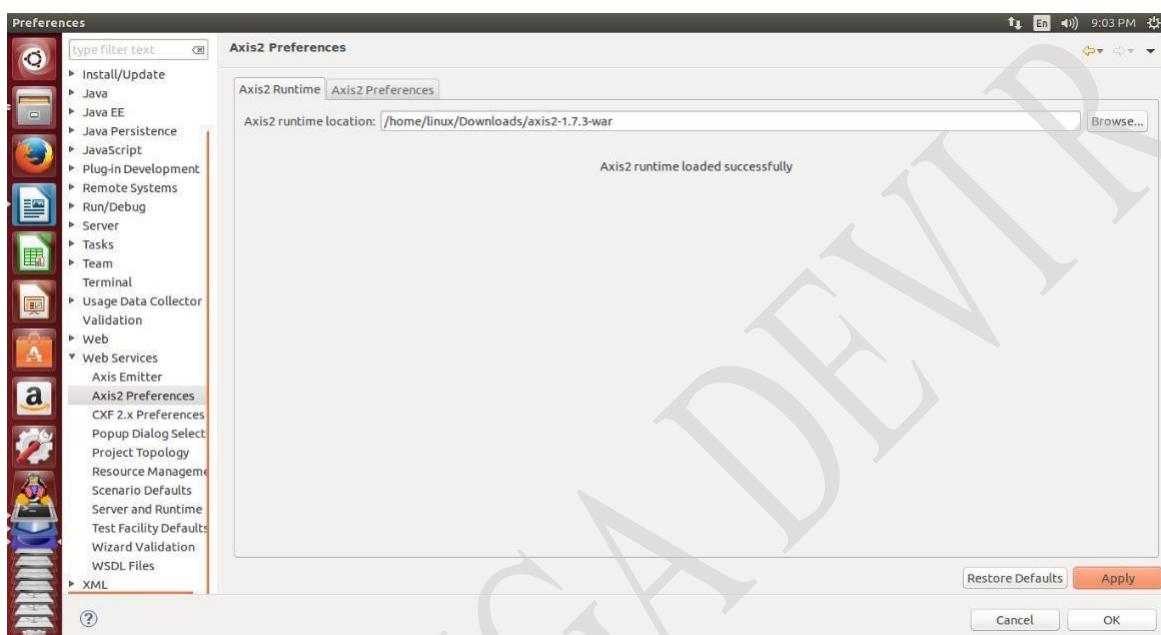
Step1. Prerequisites;

- Installing Apache Axis, Download it from :

<http://mirror.fibergrid.in/apache/axis/axis2/java/core/1.7.3/>

7.3/ b. Extract the axis file

c. Open Eclipse, Click window and choose preference and select the Axis2 preference from Web Services. Finally map the extracted path of Axis2 and click apply and ok.



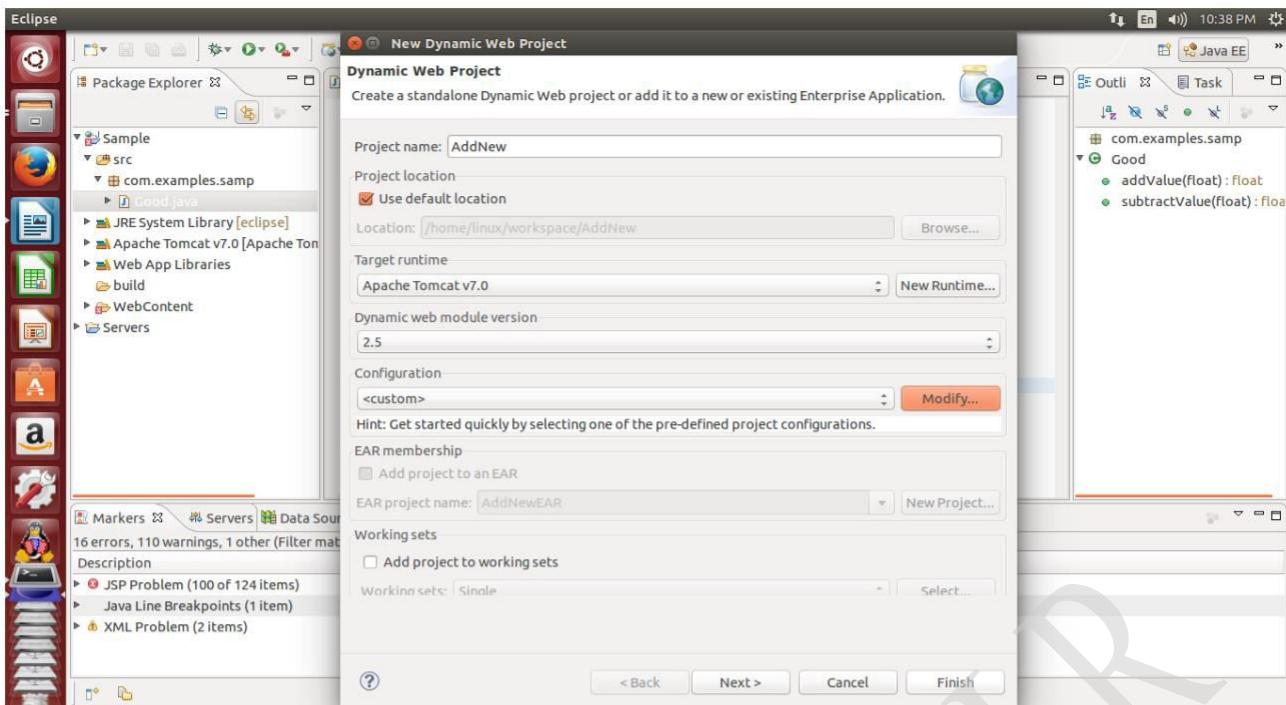
d. Download apache-tomcat and install the services by unzipping the rar file of apache tomcat. Check in terminal by moving to tomcat folder

\$ bin/startup.sh

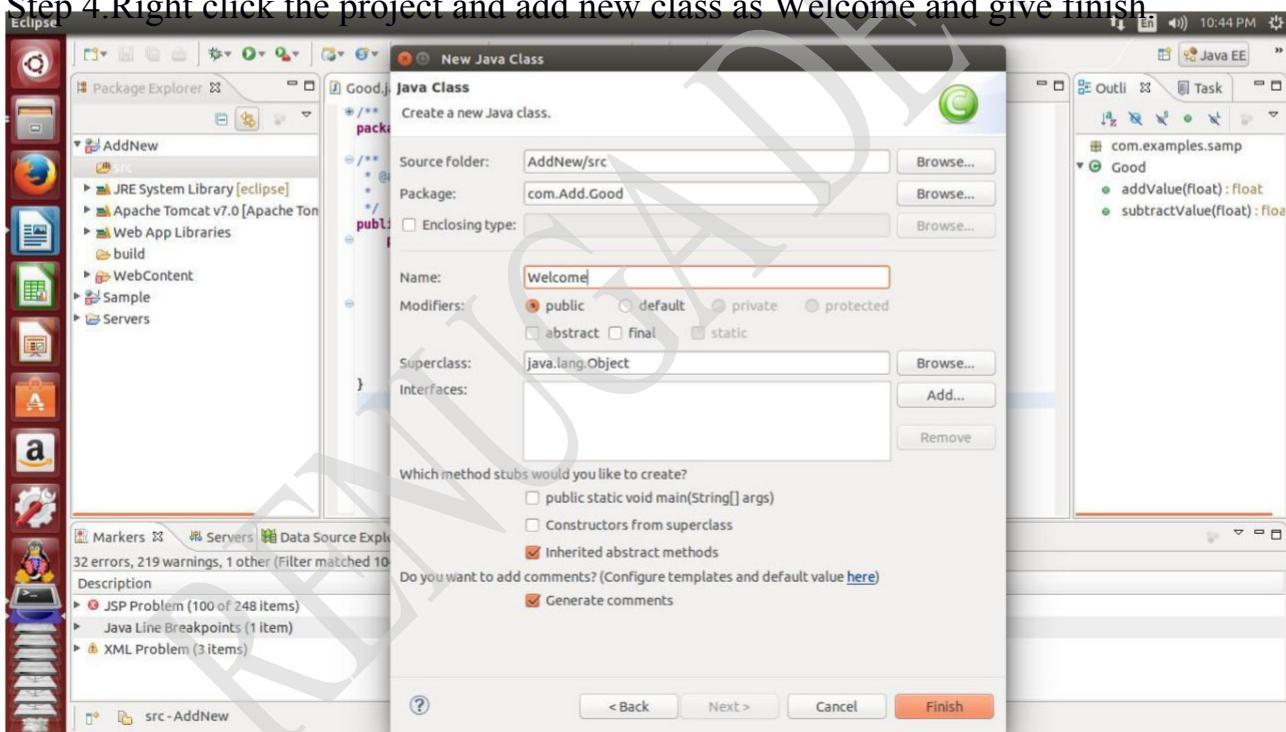
Check the tomcat service in webbrowser by visiting--> **localhost:8080**

Step 2. Open Eclipse and select new dynamic web project by selecting new.

Step 3. Enter the name as **AddNew** and select tomcat server environment as **7.0** and Dynamic web module version as **2.5**. In configuration select Modify and tick the **Axis2 Web services**. Give Finish.



Step 4. Right click the project and add new class as Welcome and give finish.



Step 5. Type the following sample code in the class.

```
package com.Add.Good;
public class Welcome {

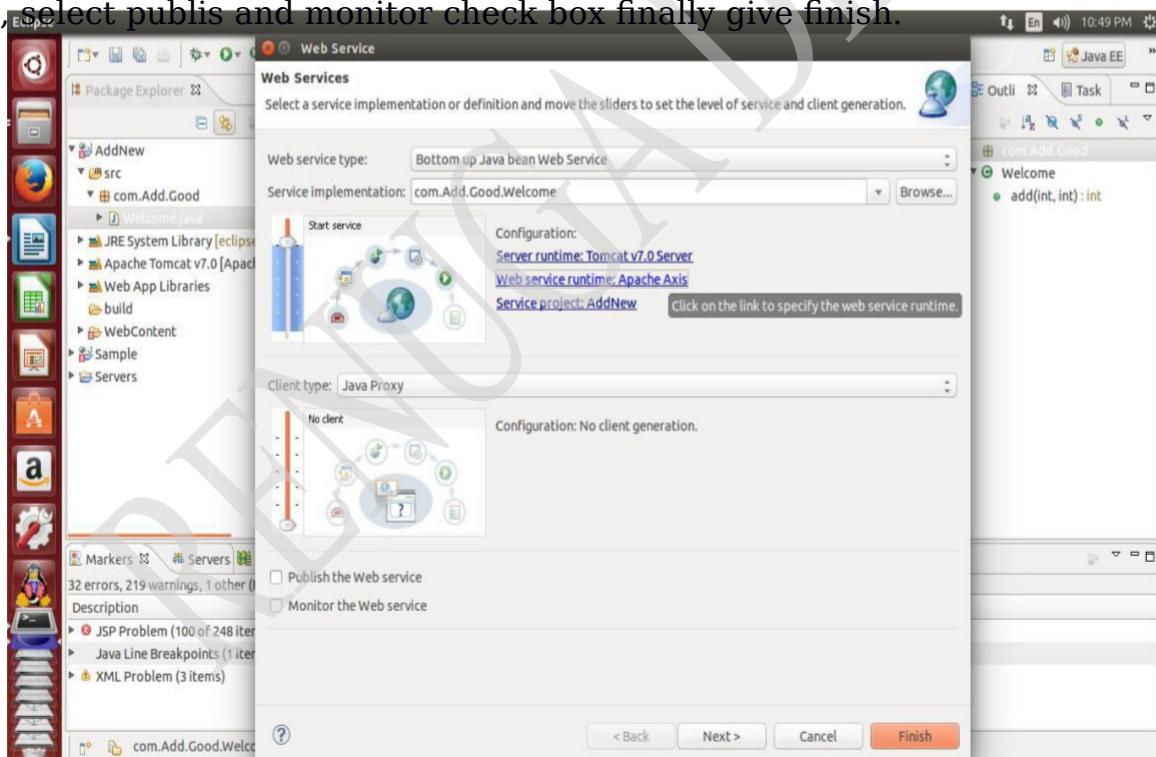
    public int add(int x, int y){
        return x + y;
    }
}
```

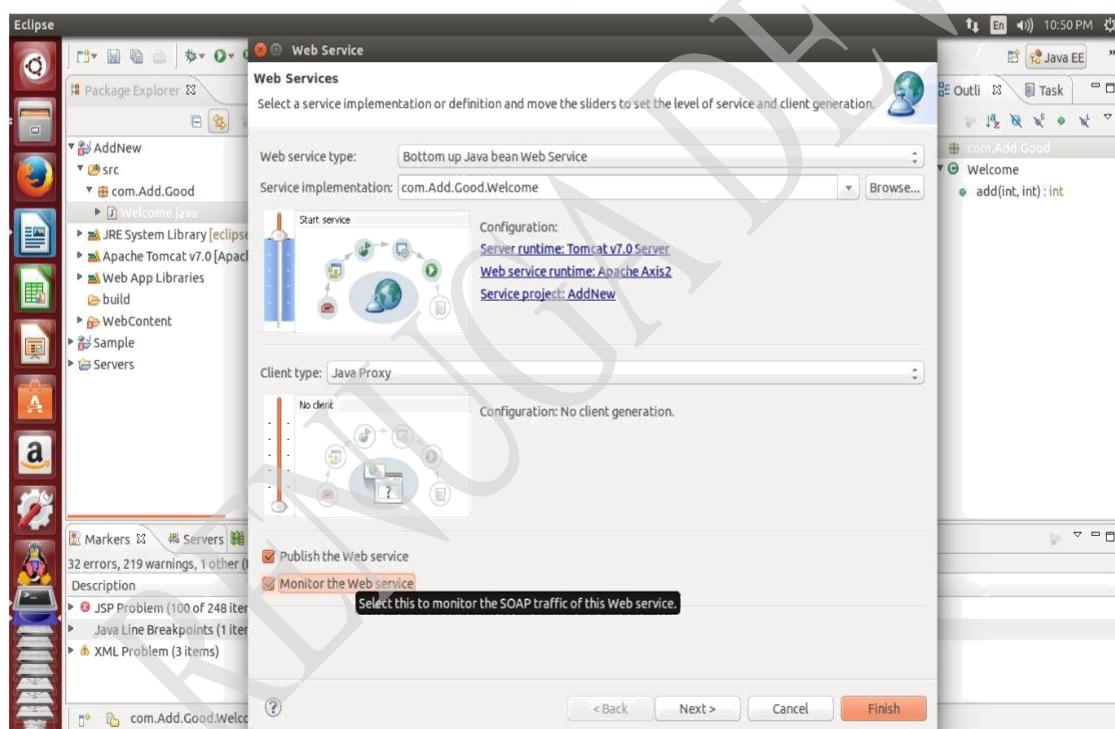
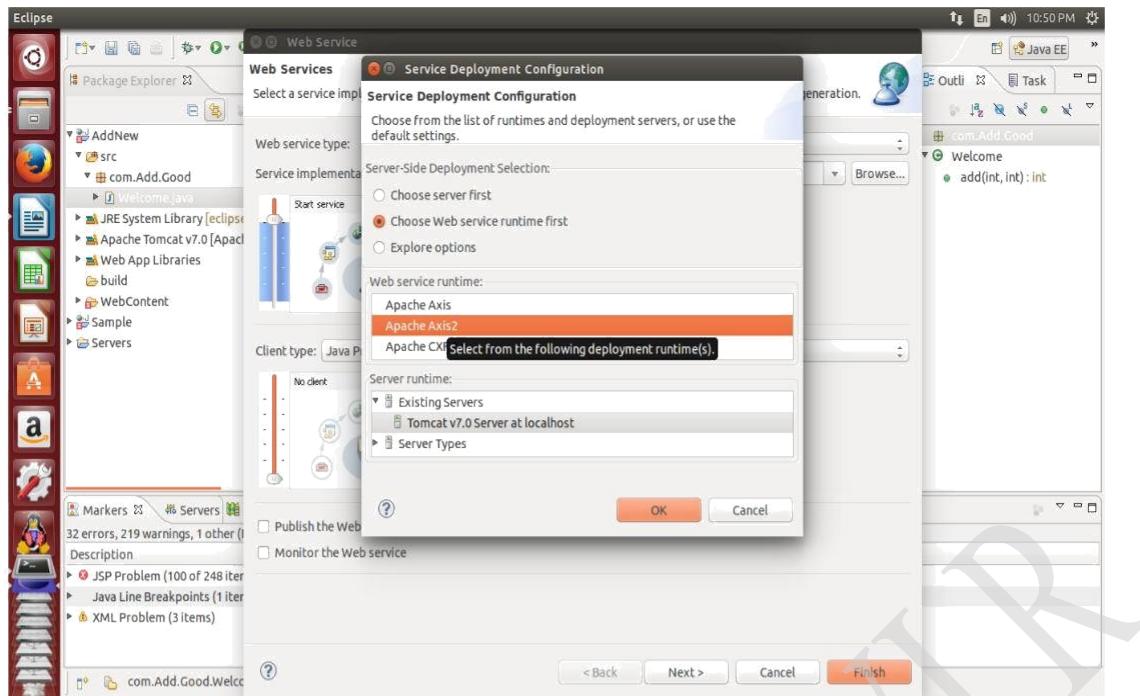
RENUGADEVIR

```
package com.Add.Good;

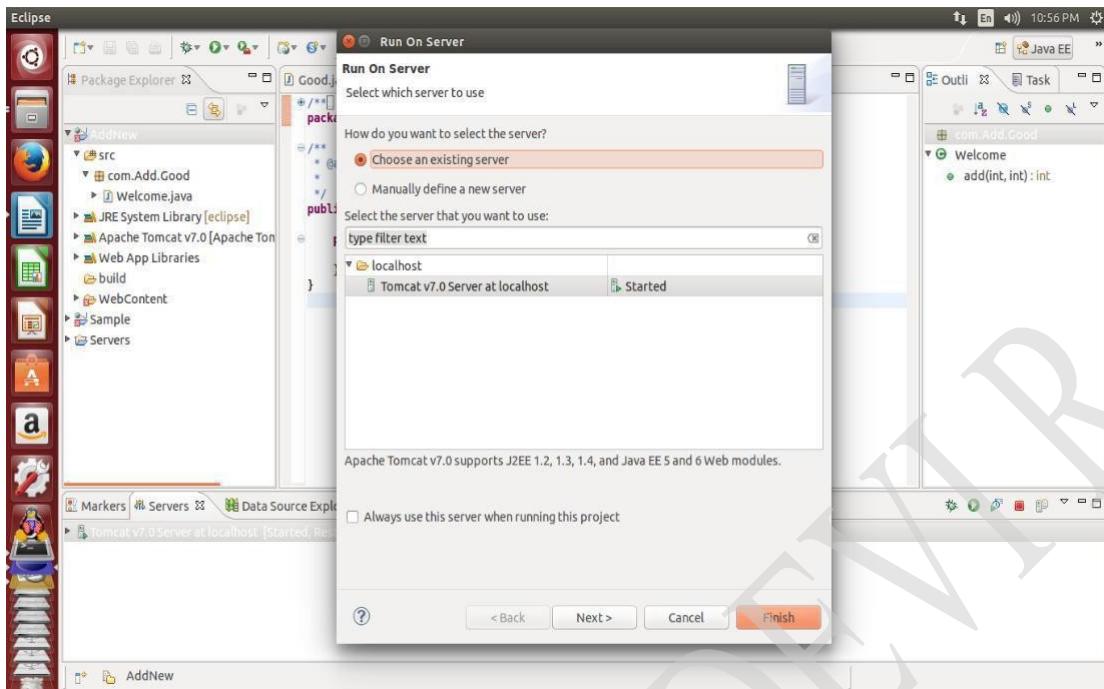
/**
 * @author linux
 */
public class Welcome {
    public int add(int x, int y){
        return x + y;
    }
}
```

Step 6. Right click the Welcome.java and select new --> Web Service
Click Web Service runtime Apache axis and select Apache Axis 2 and Tomcat 7.0, select publis and monitor check box finally give finish.



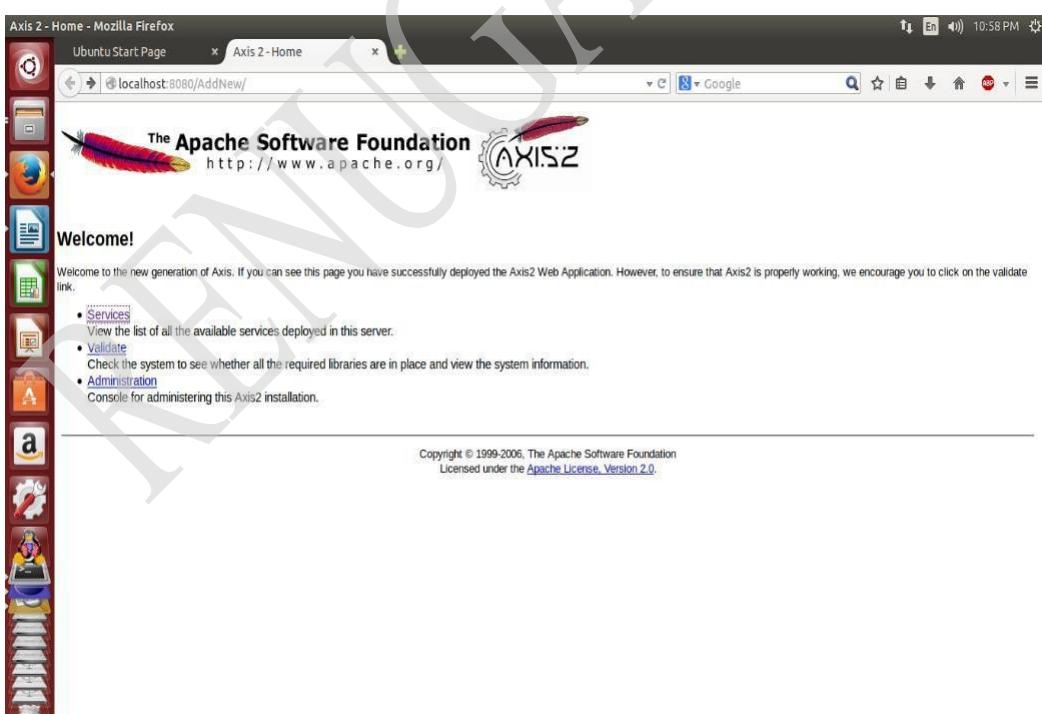


Step 7. Right Click the project and select Run as by Run on server



Step 8. Give finish by checking the above selected field in the figure.
As output in web browser automatically a page will open.

localhost:8080/AddNew/



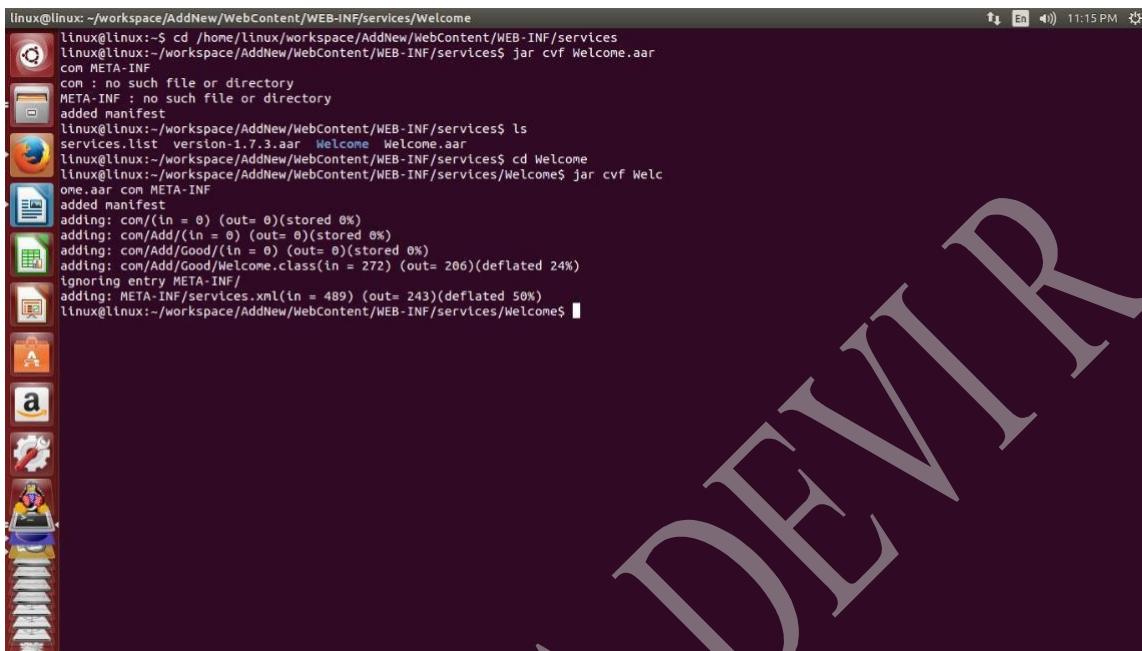
Once you click the service, all the methods will show as output.

Step 9. Creating the .aar(Axis Archive) file and Deploying Service

a. In our eclipse workspace, go to Welcome folder at

/home/linux/workspace/AddNew/WebContent/WEB-INF/services/Welcome. Go to that directory through terminal and give the command as

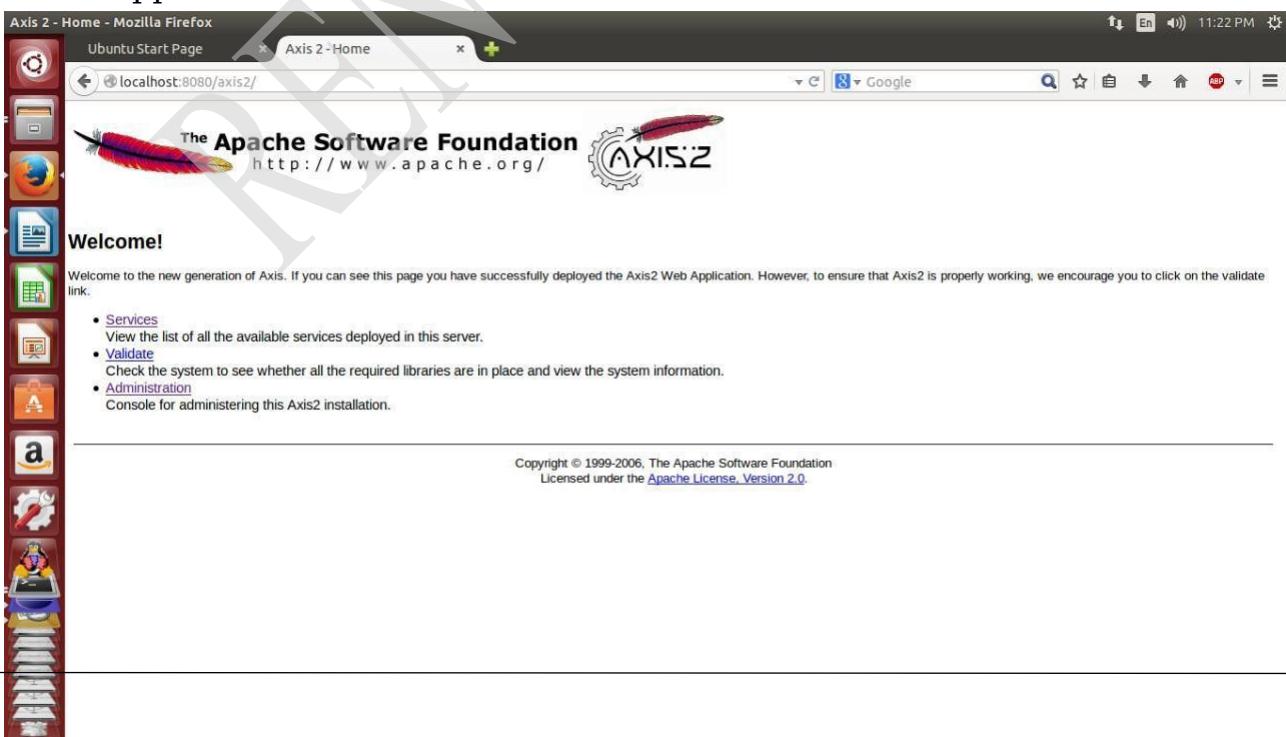
\$ jar cvf Welcome.aar com META-INF



```
linux@linux: ~/workspace/AddNew/WebContent/WEB-INF/services>Welcome
linux@linux:~$ cd /home/linux/workspace/AddNew/WebContent/WEB-INF/services
linux@linux:~/workspace/AddNew/WebContent/WEB-INF/services$ jar cvf Welcome.aar
com META-INF
com : no such file or directory
META-INF : no such file or directory
added manifest
linux@linux:~/workspace/AddNew/WebContent/WEB-INF/services$ ls
services.list version-1.7.3.jar Welcome Welcome.aar
linux@linux:~/workspace/AddNew/WebContent/WEB-INF/services$ cd Welcome
linux@linux:~/workspace/AddNew/WebContent/WEB-INF/services/Welcome$ jar cvf Welcome.aar com META-INF
added manifest
adding: com/(in = 0) (out= 0)(stored 0%)
adding: com/Add/(in = 0) (out= 0)(stored 0%)
adding: com/Add/Good/(in = 0) (out= 0)(stored 0%)
adding: com/Add/Good/Welcome.class(in = 272) (out= 206)(deflated 24%)
ignoring entry META-INF/
adding: META-INF/services.xml(in = 489) (out= 243)(deflated 50%)
linux@linux:~/workspace/AddNew/WebContent/WEB-INF/services/Welcome$
```

b. Then copy the axis2.war file which is inside Apache axis 2 war distribution. (Which is downloaded earlier) to the webapps directory of Apache Tomcat.

c. Now start the Tomcat service through terminal (bin/startup.sh). Now there will be a new directory called axis2 inside the webapps folder. Now go to <http://localhost:8080/axis2/> and you can find the homepage of Axis2 Web Application.



d. Now, click the Administration Link and login by using username: admin and password : axis2.

There you can find the upload service link on top left and you can upload the created

Welcome.aar file. This is equal to manually copying the Welcome.aar to webapps/axis2/WEB-INF/services folder.

e. Now you can list the services by visiting localhost:8080/axis2/services/listServices, you can able to see our newly added service.



Result:

Thus the grid service has been implemented successfully using Apache Axis.

Ex.no: 21 Develop secured applications using basic security mechanism available in Globus Toolkit.

Aim:

To develop a secured applications using basic security mechanisms available in Globus toolkit.

Procedures:

Step 1. Installing and setup of Certificate Authority. Open Terminal and move to root user and give command as

```
root@linux:~# apt-get install
```

```
root@linux:~# sudo grid-ca-create -noint
```

Certificate Authority Setup

This script will setup a Certificate Authority for signing Globus users certificates. It will also generate a simple CA package that can be distributed to the users of the CA.

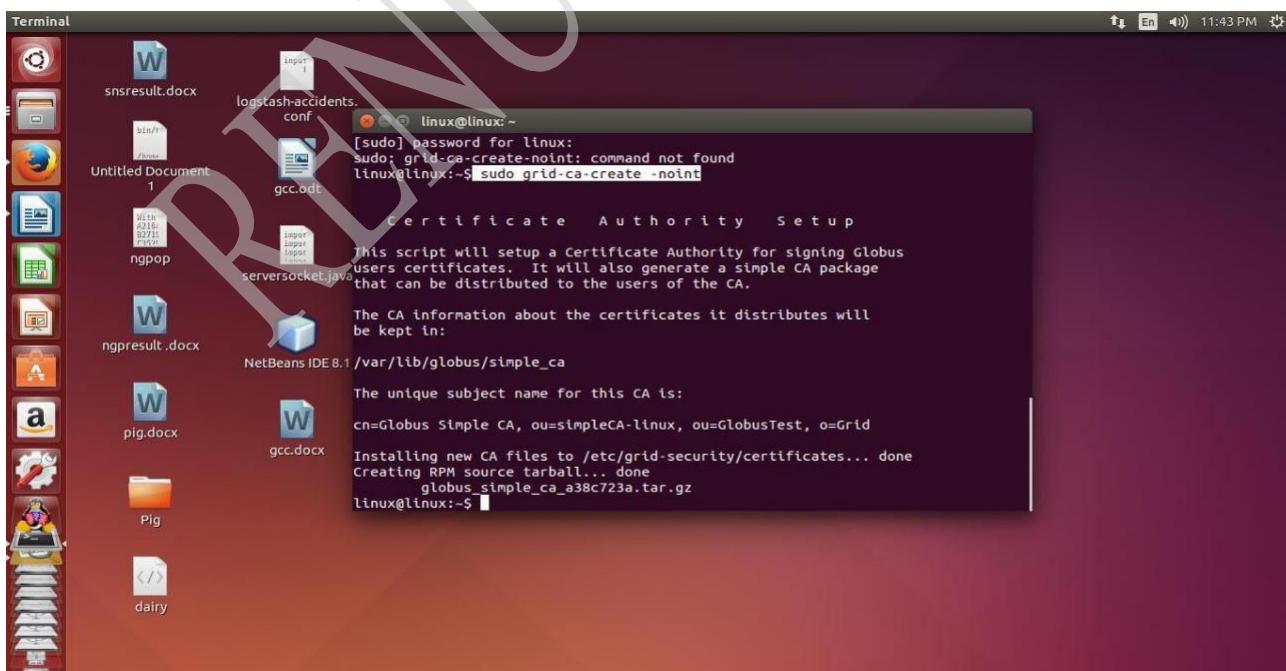
The CA information about the certificates it distributes will be kept in:

/var/lib/globus/simple_ca

The unique subject name for this CA is:

cn=Globus Simple CA, ou=simpleCA-ubuntu, ou=GlobusTest, o=Grid
Insufficient permissions to install CA into the trusted certificate directory (tried

`\${sysconfdir}/grid-security/certificates and \${datadir}/certificates) Creating RPM source tarball... done

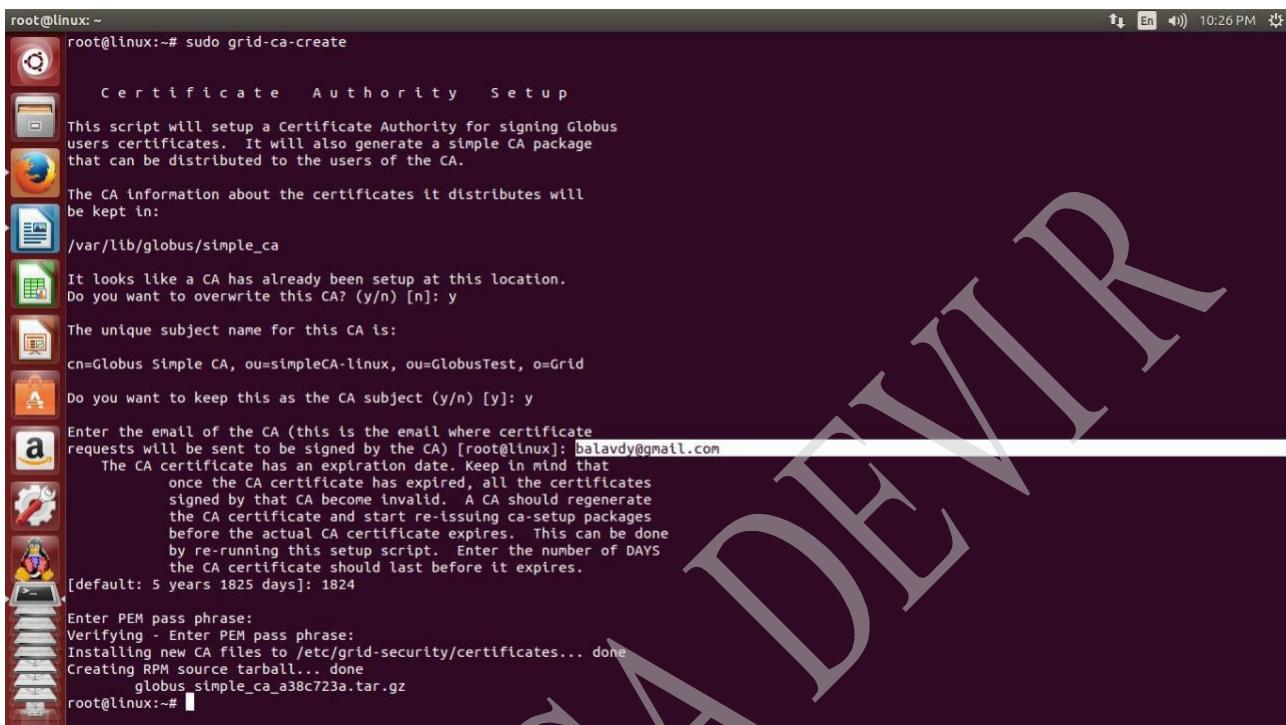


globus_simple_ca_388f6778.tar.gz

Configure the subject name

The grid-ca-create program next prompts you for information about the name of CA you wish to create:

```
root@linux:~# sudo grid-ca-create
```



```
root@linux:~#
root@linux:~# sudo grid-ca-create

C e r t i f i c a t e   A u t h o r i t y   S e t u p

This script will setup a Certificate Authority for signing Globus
users certificates. It will also generate a simple CA package
that can be distributed to the users of the CA.

The CA information about the certificates it distributes will
be kept in:
/var/lib/globus/simple_ca

It looks like a CA has already been setup at this location.
Do you want to overwrite this CA? (y/n) [n]: y

The unique subject name for this CA is:
cn=Globus Simple CA, ou=simpleCA-linux, ou=GridTest, o=Grid

Do you want to keep this as the CA subject (y/n) [y]: y

Enter the email of the CA (this is the email where certificate
requests will be sent to be signed by the CA) [root@linux]: balavdy@gmail.com
The CA certificate has an expiration date. Keep in mind that
once the CA certificate has expired, all the certificates
signed by that CA become invalid. A CA should regenerate
the CA certificate and start re-issuing ca-setup packages
before the actual CA certificate expires. This can be done
by re-running this setup script. Enter the number of DAYS
the CA certificate should last before it expires.

[default: 5 years 1825 days]: 1824

Enter PEM pass phrase:
Verifying - Enter PEM pass phrase:
Installing new CA files to /etc/grid-security/certificates... done
Creating RPM source tarball... done
globus_simple_ca_a38c723a.tar.gz
root@linux:~#
```

It will ask few things in command prompt and give the things

- i. Permission
- ii. Unique subject name
- iii. Mailid
- iv. expiration date
- v. password.

Generating Debian Packages

Get into the default simple_ca path `/var/lib/globus/simple_ca`

Examining a Certificate Request

To examine a certificate request, use the command `openssl req -text -in`
Get into the path /etc/grid-security/

```
root@linux:/etc/grid-security# openssl req -noout -text -in hostcert_request.pem
```

```

root@linux:/etc/grid-security#
root@linux:/etc/grid-security# openssl req -noout -text -in hostcert_request.pem
Certificate Request:
Data:
    Version: 0 (0x0)
    Subject: O=Grid, OU=GlobusTest, OU=simpleCA-linux, CN=linux
    Subject Public Key Info:
        Public Key Algorithm: rsaEncryption
            Public-Key: (2048 bit)
                Modulus:
                    00:f4:0b:1e:65:3f:35:54:36:cc:25:1f:b6:d1:01:
                    22:24:70:76:31:38:2e:30:1d:8c:25:12:ec:7b:17:
                    96:5b:dd:2b:0f:e5:be:be:f7:2f:1f:0a:ab:cf:bc:
                    91:50:25:1d:ea:c1:03:f9:47:5b:1f:05:70:04:43:
                    bc:4e:12:df:56:98:dd:b9:f8:a5:7f:79:38:e7:25:
                    7a:27:ba:6a:5c:fc:36:fe:d7:4b:72:15:29:d4:e0:
                    74:99:a2:8f:93:c8:fc:e3:b5:0f:41:be:c9:2b:cd:
                    4a:bd:b3:8c:e9:42:d3:1f:7d:99:58:ed:b0:19:0f:
                    b7:12:07:ca:85:32:e5:44:44:39:d9:19:53:88:84:
                    a8:84:c1:b4:7c:f8:af:e4:28:93:f2:7c:0c:f0:85:
                    99:2d:98:33:62:c4:08:ef:d8:03:a3:38:19:16:ef:
                    45:77:9b:ef:f3:d0:e5:b5:58:d4:5b:b2:0c:bf:c0:f8:
                    8d:11:70:15:74:7a:f4:ea:fa:a3:31:9a:36:d8:
                    63:00:0d:e7:d8:5a:4d:6c:54:c0:b8:55:be:97:bf:
                    af:58:fe:c3:96:94:67:36:51:2d:8b:d1:b0:06:1a:
                    9f:62:70:4f:b2:96:7c:30:e0:cf:f5:88:77:di:74:
                    33:4e:36:c8:10:ff:19:29:85:a8:b3:7c:ac:00:ef:
                    d1:33
                Exponent: 65537 (0x10001)
    Attributes:
    Requested Extensions:
        Netscape Cert Type:
            SSL CA, S/MIME CA, Object Signing CA
Signature Algorithm: sha256WithRSAEncryption
    44:c0:b6:0f:6c:18:fc:a2:fa:e4:ce:59:b6:8e:b9:3e:ae:9e:
    93:d6:a9:bc:37:68:ea:bd:67:21:6d:59:15:be:8c:bf:52:91:
    99:7b:95:ae:44:8f:8c:cf:27:f0:8e:9f:4d:f4:26:f2:17:
    c5:f3:c4:f6:21:92:aa:50:6e:b6:be:4a:b3:4e:c7:5b:be:49:
    38:e9:ce:4c:3e:21:aa:f7:a6:2f:ea:d1:cc:90:8d:6e:21:fe:
    9c:22:f8:28:bd:ac:a8:94:04:dc:e0:3d:35:a9:54:9e:fd:bb:
    24:c7:99:3e:1f:22:0f:63:2e:e4:89:6d:45:3a:31:c1:b4:c6:
```

Signing a Certificate Request:

```
root@linux:/var/lib/globus/simple_ca# grid-ca-sign -in certreq.pem -out cert.pem
```

```

root@linux:/var/lib/globus/simple_ca#
root@linux:/var/lib/globus/simple_ca# grid-ca-sign -in cacert.pem -out cert.pem
To sign the request
Please enter the password for the CA key:
ERROR running command:
openssl ca -passin stdin \
-batch -config /var/lib/globus/simple_ca/grid-ca-ssl.conf \
-in cacert.pem -out cert.pem
=====
Using configuration from /var/lib/globus/simple_ca/grid-ca-ssl.conf
Error reading certificate request in cacert.pem
140708224325280:error:0906D06C:PEM routines:PEM_read_bio:no start line:pem_lib.c
:701:Expecting: CERTIFICATE REQUEST
=====
root@linux:/var/lib/globus/simple_ca# grid-ca-sign -in cacert.pem -out cert1.pem
To sign the request
Please enter the password for the CA key:
ERROR running command:
openssl ca -passin stdin \
-batch -config /var/lib/globus/simple_ca/grid-ca-ssl.conf \
-in cacert.pem -out cert1.pem
=====
Using configuration from /var/lib/globus/simple_ca/grid-ca-ssl.conf
Error reading certificate request in cacert.pem
140541101045408:error:0906D06C:PEM routines:PEM_read_bio:no start line:pem_lib.c
:701:Expecting: CERTIFICATE REQUEST
=====
root@linux:/var/lib/globus/simple_ca# grid-ca-create
Certificate Authority Setup
```

Revoking a Certificate

SimpleCA does not yet provide a convenient interface to revoke a signed certificate, but it can be done with the openssl command.

```
root@linux:/var/lib/globus/simple_ca# openssl ca -config grid-ca-ssl.conf -revoke
newcerts/01.pem
```

Using configuration from /home/simpleca/.globus/simpleCA/grid-ca-ssl.conf Enter pass phrase for /home/simpleca/.globus/simpleCA/private/cakey.pem: Revoking Certificate 01.

Data Base Updated

Renewing a CA

```
root@linux:/var/lib/globus/simple_ca# openssl req -key private/cakey.pem -new -x509 -days 1825 -out newca.pem -config grid-ca-ssl.conf
```

output:

You are about to be asked to enter information that will be incorporated into your certificate request.

What you are about to enter is what is called a Distinguished Name or a DN. There are quite a few fields but you can leave some blank For some fields there will be a default value,

If you enter '', the field will be left blank.

Level 0 Organization [Grid]:

Level 0 Organizational Unit [GlobusTest]:

Level 1 Organizational Unit [simpleCA-elephant.globus.org]:

Name (E.g., John M. Smith) []:bala

```
root@linux:/var/lib/globus/simple_ca# grid-ca-package -d -cadir ~/.globus/simple_ca/  
Creating RPM source tarball... done
```

 globus_simple_ca_388f6778.tar.gz

Creating debian binary...dpkg-buildpackage: source package globus-simple-ca-388f6778

dpkg-buildpackage: source version 0.0

dpkg-buildpackage: source distribution UNRELEASED

dpkg-buildpackage: source changed by gcclab <gcclab@>

dpkg-buildpackage: host architecture amd64

dpkg-source --before-build globus-simple-ca-388f6778

debian/rules clean

test -x debian/rules

dh_clean

dh_clean debian/*.install

dpkg-source -b globus-simple-ca-388f6778 dpkg-source: warning: no source format specified in debian/source/format, see dpkg-source(1)

dpkg-source: info: using source format `1.0'

dpkg-source: warning: source directory 'globus-simple-ca-388f6778' is not <sourcepackage>-

<upstreamversion> 'globus-simple-ca-388f6778-0.0' dpkg-source: info:

building globus-simple-ca-388f6778 in globus-simple-ca-388f6778_0.0.tar.gz

dpkg-source: info: building globus-simple-ca-388f6778 in globus-simple-ca-388f6778_0.0.dsc

dpkg-source: warning: missing information for output field Standards-Version

debian/rules build

```

test -x debian/rules
mkdir -p "."
debian/rules binary
test -x debian/rules
dh_testroot
dh_clean -k
dh_clean: dh_clean -k is deprecated; use dh_prep instead
dh_installdirs -A
mkdir -p "."
Adding cdbs dependencies to debian/globus-simple-ca-
388f6778.substvars dh_installdirs -pglobus-simple-ca-388f6778 dh_testdir

dh_testroot
dh_clean -k
dh_clean: dh_clean -k is deprecated; use dh_prep instead [ -d
/tmp/globus_simple_ca.FHnB8mnm/globus-simple-ca-388f6778/debian/tmp/etc/grid-
security/certificates ] || \
    mkdir -p /tmp/globus_simple_ca.FHnB8mnm/globus-simple-ca-
388f6778/debian/tmp/etc/grid-security/certificates
rm -f debian/globus-simple-ca-388f6778.install || true
touch debian/globus-simple-ca-388f6778.install
for file in 388f6778.0 388f6778.signing_policy globus-host-ssl.conf.388f6778 globus-
user-ssl.conf.388f6778 grid-security.conf.388f6778; do \
    if [ -f "$file" ]; then \
        cp "$file" "/tmp/globus_simple_ca.FHnB8mnm/globus-simple-ca-
388f6778/debian/tmp/etc/grid-security/certificates" ; \
        echo "debian/tmp/etc/grid-security/certificates/$file" etc/grid-security/certificates
> debian/globus-simple-ca-388f6778.install; \ fi ; \
    done
dh_installdocs -pglobus-simple-ca-388f6778
dh_installexamples -pglobus-simple-ca-388f6778
dh_installman -pglobus-simple-ca-388f6778
dh_installinfo -pglobus-simple-ca-388f6778
dh_installmenu -pglobus-simple-ca-388f6778
dh_installcron -pglobus-simple-ca-388f6778
dh_installinit -pglobus-simple-ca-388f6778
dh_installdebconf -pglobus-simple-ca-388f6778
dh_installemacsen -pglobus-simple-ca-388f6778
dh_installcatalogs -pglobus-simple-ca-388f6778
dh_installpam -pglobus-simple-ca-388f6778
dh_installlogrotate -pglobus-simple-ca-388f6778
dh_installlogcheck -pglobus-simple-ca-388f6778
dh_installchangelogs -pglobus-simple-ca-388f6778
dh_installudev -pglobus-simple-ca-388f6778
dh_lintian -pglobus-simple-ca-388f6778
dh_bugfiles -pglobus-simple-ca-388f6778
dh_install -pglobus-simple-ca-388f6778
dh_link -pglobus-simple-ca-388f6778
dh_installmime -pglobus-simple-ca-388f6778
dh_installgsettings -pglobus-simple-ca-388f6778

```

```

dh_strip -pglobus-simple-ca-388f6778
dh_compress -pglobus-simple-ca-388f6778
dh_fixperms -pglobus-simple-ca-388f6778
dh_makeshlibs -pglobus-simple-ca-388f6778
dh_installdeb -pglobus-simple-ca-388f6778
dh_perl -pglobus-simple-ca-388f6778
dh_shlibdeps -pglobus-simple-ca-388f6778
dh_gencontrol -pglobus-simple-ca-388f6778
dpkg-gencontrol: warning: Depends field of package globus-simple-ca-388f6778: unknown
substitution variable ${shlibs:Depends}
# only call dh_scour for packages in main
if grep -q '^Component:[[:space:]]*main' /CurrentlyBuilding 2>/dev/null; then dh_scour -
pglobus-simple-ca-388f6778 ; fi
dh_md5sums -pglobus-simple-ca-388f6778
dh_builddeb -pglobus-simple-ca-388f6778 dpkg-deb: building package `globus-
simple-ca-388f6778' in `../globus-simple-ca-388f6778_0.0_all.deb'.
dpkg-genchanges      >../globus-simple-ca-388f6778_0.0_amd64.changes
dpkg-genchanges: including full source code in upload dpkg-source --
after-build globus-simple-ca-388f6778
dpkg-buildpackage: full upload; Debian-native package (full source is included)

```

388f6778 -- Can use the same 8digit certificate to all machine

linux@linux:~\$ dpkg -i globus-simple-ca-388f6778_0.0_all.deb ### used for loading to other machines through pendrive

```

linux@linux:~$ sudo dpkg -i globus-simple-ca-388f6778_0.0_all.deb
Selecting previously unselected package globus-simple-ca-388f6778.
(Reading database ... 260415 files and directories currently installed.)
Preparing to unpack globus-simple-ca-388f6778_0.0_all.deb ...
Unpacking globus-simple-ca-388f6778 (0.0) ... Setting up globus-simple-ca-
388f6778 (0.0) ...

```

```

linux@linux:~$ cd .globus/simpleCA/
linux@linux:~$ cd .globus/simpleCA/
linux@linux:~/globus/simpleCA$ sudo cp globus-* grid-* /etc/grid-security/

```

```

linux@linux:~/globus/simpleCA$ ls -l /etc/grid-
security/ total 28
drwxr-xr-x 2 root root 4096 Jul 2 07:50 certificates
-rw-r--r-- 1 root root 2929 Jul 2 07:53 globus-host-ssl.conf
-rw-r--r-- 1 root root 3047 Jul 2 07:53 globus-user-ssl.conf
-rw-r--r-- 1 root root 2929 Jul 2 07:53 grid-ca-ssl.conf
-rw-r--r-- 1 root root 1251 Jul 2 07:53 grid-security.conf
drwxr-xr-x 2 root root 4096 Nov 29 2013 myproxy
lrwxrwxrwx 1 root root 19 Jul 2 02:29 sshftp -> /etc/gridftp-sshftp

```

```
drwxr-xr-x 2 root root 4096 Dec 2 2013 vomsdir
```

```
linux@linux:~/globus/simpleCA$  
hostname Ubuntu
```

```
root@linux:~/globus/simpleCA# gedit /etc/hosts
```

```
192.168.0.28 bala.globus.in  
192.168.0.10 baas.globus.in
```

```
Password -- bala
```

Create the fully qualified domain name

```
linux@linux:~/globus/simpleCA$ sudo bash  
root@linux:~/globus/simpleCA# gedit /etc/hosts
```

```
linux@linux:~$./globus/simpleCA$ grid-cert-request  
Enter your name, e.g., John Smith: bala m  
A certificate request and private key is being created.  
You will be asked to enter a PEM pass phrase. This pass  
phrase is akin to your account password, and is used to  
protect your key file.  
If you forget your pass phrase, you will need  
to obtain a new certificate.
```

```
Generating a 1024 bit RSA private key  
.....+++++  
.....+++++  
writing new private key to '/home/gcclab/.globus/userkey.pem'  
Enter PEM pass phrase:  
140306478339744:error:28069065:lib(40):UI_set_result:result too  
small:ui_lib.c:869:You must type in 4 to 1024 characters  
140306478339744:error:0906406D:PEM routines:PEM_def_callback:problems  
getting password:pem_lib.c:111:  
140306478339744:error:0907E06F:PEM routines:DO_PK8PKEY:read key:pem_pk8.c:130:  
Error number 1 was returned by  
/usr/bin/openssl
```

```
linux@linux:~$./globus/simpleCA$ grid-cert-request -force
```

```
/home/linux/.globus/usercert.pem already exists  
/home/linux/.globus/userkey.pem already exists
```

```
Enter your name, e.g., John Smith: bala m  
A certificate request and private key is being created.  
You will be asked to enter a PEM pass phrase. This pass  
phrase is akin to your account password, and is used to  
protect your key file.
```

If you forget your pass phrase, you will need to obtain a new certificate.

Generating a 1024 bit RSA private key

```
.....+++++
```

```
....+++++
```

writing new private key to '/home/gcclab/.globus/userkey.pem'

Enter PEM pass phrase:

Verifying - Enter PEM pass phrase:

You are about to be asked to enter information that will be incorporated into your certificate request.

What you are about to enter is what is called a Distinguished Name or a DN. There are quite a few fields but you can leave some blank For some fields there will be a default value,

If you enter '', the field will be left blank.

Level 0 Organization [Grid]:Level 0 Organizational Unit [GlobusTest]:Level 1
Organizational Unit [simpleCA-ubuntu]:Level 2 Organizational Unit [local]:Name (E.g.,
John M. Smith) []:

A private key and a certificate request has been generated with the subject:

```
/O=Grid/OU=GlobusTest/OU=simpleCA-ubuntu/OU=local/CN=bala m
```

If the CN=bala m is not appropriate, rerun this script with the -force -cn "Common Name" options.

Your private key is stored in /home/gcclab/.globus/userkey.pem Your request is stored in /home/gcclab/.globus/usercert_request.pem

Please e-mail the request to the Globus Simple CA gcclab@ubuntu
You may use a command similar to the following:

```
cat /home/gcclab/.globus/usercert_request.pem | mail gcclab@ubuntu
```

Only use the above if this machine can send AND receive e-mail. if not, please mail using some other method.

Your certificate will be mailed to you within two working days.
If you receive no response, contact Globus Simple CA at gcclab@ubuntu

```
linux@linux:~/globus/simpleCA$ cd newcerts/  
linux@linux:~/globus/simpleCA/newcerts$ ls  
linux@linux:~/globus/simpleCA/newcerts$ cd ..  
.. linux@linux:~/globus/simpleCA$ pwd  
/home/gcclab/.globus/simpleCA  
linux@linux:~/globus/simpleCA$ cd ..
```

```
linux@linux:~/globus$ pwd  
/home/linux.globus  
linux@linux:~$ ./globus$ ls -l
```

```
total 12
drwx----- 6 gcclab gcclab 4096 Jul 2 07:43 simpleCA
-rw-r--r-- 1 gcclab gcclab 0 Jul 2 08:05 usercert.pem
-rw-r--r-- 1 gcclab gcclab 1351 Jul 2 08:05 usercert_request.pem
-r----- 1 gcclab gcclab 1041 Jul 2 08:05 userkey.pem
```

```
linux@linux:~/globus$ sudo grid-cert-request -host
bala.globus.in Generating a 1024 bit RSA private key
.....+++++
.....+++++
writing new private key to '/etc/grid-security/hostkey.pem'
```

You are about to be asked to enter information that will be incorporated into your certificate request.

What you are about to enter is what is called a Distinguished Name or a DN. There are quite a few fields but you can leave some blank For some fields there will be a default value,

If you enter '.', the field will be left blank.

Level 0 Organization [Grid]:Level 0 Organizational Unit [GlobusTest]:Level 1
Organizational Unit [simpleCA-ubuntu]:Name (E.g., John M. Smith) []:

A private host key and a certificate request has been generated with the subject:

/O=Grid/OU=GlobusTest/OU=simpleCA-ubuntu/CN=host/bala.globus.in

The private key is stored in /etc/grid-security/hostkey.pem
The request is stored in /etc/grid-security/hostcert_request.pem

Please e-mail the request to the Globus Simple CA gcclab@ubuntu
You may use a command similar to the following:

cat /etc/grid-security/hostcert_request.pem | mail gcclab@ubuntu

Only use the above if this machine can send AND receive e-mail. if not,
please mail using some other method.

Your certificate will be mailed to you within two working days.
If you receive no response, contact Globus Simple CA at gcclab@ubuntu

```
glinux@linux:~/globus$ ls -l
total 12
drwx----- 6 gcclab gcclab 4096 Jul 2 07:43 simpleCA
-rw-r--r-- 1 gcclab gcclab 0 Jul 2 08:05 usercert.pem
-rw-r--r-- 1 gcclab gcclab 1351 Jul 2 08:05 usercert_request.pem
-r----- 1 gcclab gcclab 1041 Jul 2 08:05 userkey.pem
```

```
gcclab@ubuntu:~/globus$ ls -l /etc/grid-security/
total 36
drwxr-xr-x 2 root root 4096 Jul 2 07:50 certificates
-rw-r--r-- 1 root root 2929 Jul 2 07:53 globus-host-ssl.conf
-rw-r--r-- 1 root root 3047 Jul 2 07:53 globus-user-ssl.conf
-rw-r--r-- 1 root root 2929 Jul 2 07:53 grid-ca-ssl.conf
-rw-r--r-- 1 root root 1251 Jul 2 07:53 grid-security.conf
-rw-r--r-- 1 root root 0 Jul 2 08:09 hostcert.pem
-rw-r--r-- 1 root root 1349 Jul 2 08:09 hostcert_request.pem
-r----- 1 root root 916 Jul 2 08:09 hostkey.pem
drwxr-xr-x 2 root root 4096 Nov 29 2013 myproxy
lrwxrwxrwx 1 root root 19 Jul 2 02:29 sshftp -> /etc/gridftp-sshftp
drwxr-xr-x 2 root root 4096 Dec 2 2013 vomsdir
```

```
linux@linux:~/globus$ cp usercert_request.pem
usercert.pem gcclab@ubuntu:~/globus$ ls -l /etc/grid-
security/ total 36
drwxr-xr-x 2 root root 4096 Jul 2 07:50 certificates
-rw-r--r-- 1 root root 2929 Jul 2 07:53 globus-host-ssl.conf
-rw-r--r-- 1 root root 3047 Jul 2 07:53 globus-user-ssl.conf
-rw-r--r-- 1 root root 2929 Jul 2 07:53 grid-ca-ssl.conf
-rw-r--r-- 1 root root 1251 Jul 2 07:53 grid-security.conf
-rw-r--r-- 1 root root 0 Jul 2 08:09 hostcert.pem
-rw-r--r-- 1 root root 1349 Jul 2 08:09 hostcert_request.pem
-r----- 1 root root 916 Jul 2 08:09 hostkey.pem
drwxr-xr-x 2 root root 4096 Nov 29 2013 myproxy
lrwxrwxrwx 1 root root 19 Jul 2 02:29 sshftp -> /etc/gridftp-sshftp
drwxr-xr-x 2 root root 4096 Dec 2 2013 vomsdir
gcclab@ubuntu:~/globus$ ls -l
total 16
drwx----- 6 gcclab gcclab 4096 Jul 2 07:43 simpleCA
-rw-r--r-- 1 gcclab gcclab 1351 Jul 2 08:12 usercert.pem
-rw-r--r-- 1 gcclab gcclab 1351 Jul 2 08:05 usercert_request.pem -
r----- 1 gcclab gcclab 1041 Jul 2 08:05 userkey.pem
linux@linux:~/globus$ cp usercert_request.pem usercert.pem
linux@linux:~/globus$ ls -l
total 16
drwx----- 6 gcclab gcclab 4096 Jul 2 07:43 simpleCA
-rw-r--r-- 1 gcclab gcclab 1351 Jul 2 08:13 usercert.pem
-rw-r--r-- 1 gcclab gcclab 1351 Jul 2 08:05 usercert_request.pem -
r----- 1 gcclab gcclab 1041 Jul 2 08:05 userkey.pem
linux@linux:~/globus$ ls -l /etc/grid-
security/ total 36
drwxr-xr-x 2 root root 4096 Jul 2 07:50 certificates
-rw-r--r-- 1 root root 2929 Jul 2 07:53 globus-host-ssl.conf
-rw-r--r-- 1 root root 3047 Jul 2 07:53 globus-user-ssl.conf
-rw-r--r-- 1 root root 2929 Jul 2 07:53 grid-ca-ssl.conf
-rw-r--r-- 1 root root 1251 Jul 2 07:53 grid-security.conf
-rw-r--r-- 1 root root 0 Jul 2 08:09 hostcert.pem
-rw-r--r-- 1 root root 1349 Jul 2 08:09 hostcert_request.pem
```

```
-r----- 1 root root 916 Jul 2 08:09 hostkey.pem
drwxr-xr-x 2 root root 4096 Nov 29 2013 myproxy
lrwxrwxrwx 1 root root 19 Jul 2 02:29 sshftp -> /etc/gridftp-sshftp
drwxr-xr-x 2 root root 4096 Dec 2 2013 vomsdir
```

```
linux@linux:~/globus$ cd /etc/grid-security
gcclab@ubuntu:/etc/grid-security$ sudo cp hostcert_request.pem hostcert.pem
linux@linux:/etc/grid-security$ ls -l
total 40
drwxr-xr-x 2 root root 4096 Jul 2 07:50 certificates
-rw-r--r-- 1 root root 2929 Jul 2 07:53 globus-host-ssl.conf
-rw-r--r-- 1 root root 3047 Jul 2 07:53 globus-user-ssl.conf
-rw-r--r-- 1 root root 2929 Jul 2 07:53 grid-ca-ssl.conf
-rw-r--r-- 1 root root 1251 Jul 2 07:53 grid-security.conf
-rw-r--r-- 1 root root 1349 Jul 2 08:16 hostcert.pem
-rw-r--r-- 1 root root 1349 Jul 2 08:09 hostcert_request.pem
-r----- 1 root root 916 Jul 2 08:09 hostkey.pem
drwxr-xr-x 2 root root 4096 Nov 29 2013 myproxy
lrwxrwxrwx 1 root root 19 Jul 2 02:29 sshftp -> /etc/gridftp-sshftp
drwxr-xr-x 2 root root 4096 Dec 2 2013 vomsdi
```

Result:

Thus the secured applications using basic security mechanism availability in Globus Toolkit has been developed successfully.

RENUGADEVIR