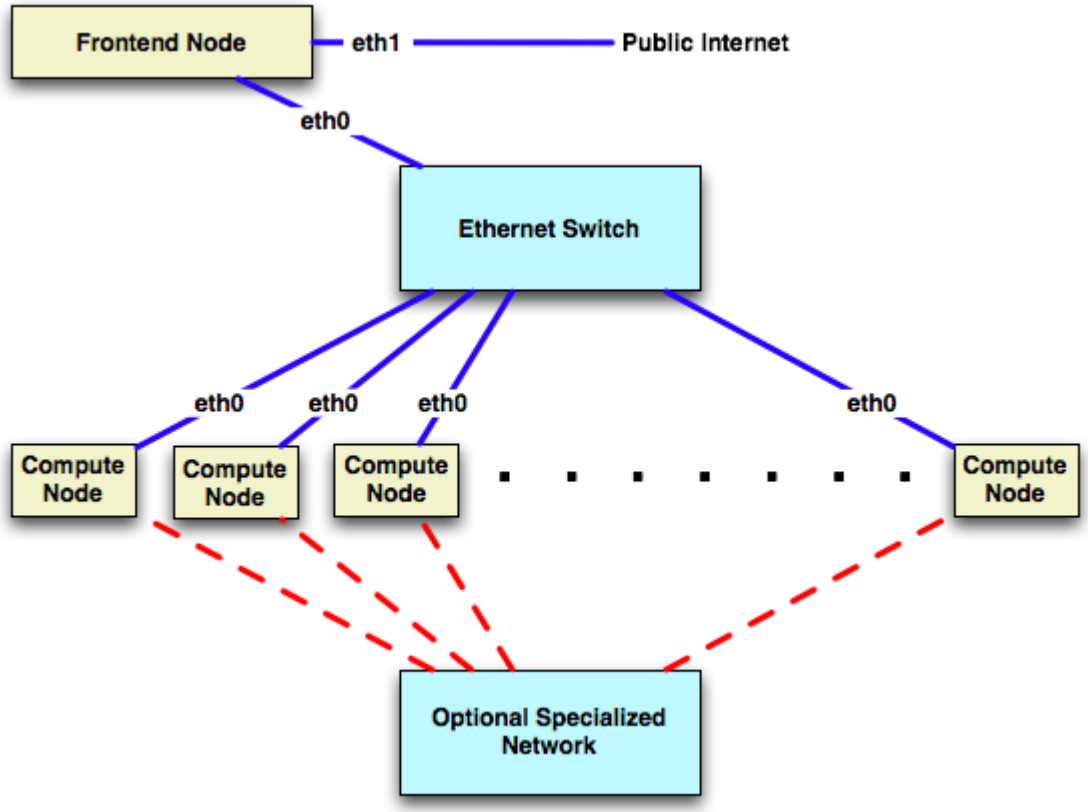
Chapter One

Rocks Installation

We advise you to go through the rocks official documentation [1] before the installation to understand the basic principles of clusters.

Physical Assembly

The first thing to manage is the physical deployment of a cluster.The following diagram shows how the frontend and compute nodes must be connected:



On the Compute nodes (Vm-container), the Ethernet interface that Linux maps to eth0 should be connected to the cluster's Ethernet switch. This network is considered private, i.e, all traffic on this network is physically separated from the external public network (e.g., The Internet).
On the Frontend, at least two ethernet interfaces are required. The interface that Linux maps to eth0 should be connected to the same ethernet network as the compute nodes. The interface that Linux maps to eth1 should be connected to the external network (e.g., the internet or your organization's intranet).

In our case the eth0 is connected to the switch placed within the rack and eth1 of the Frontend is connected to public network under Networks systems lab’s subnet.

Frontend Installation

The installation on the Frontend is done using a disk image either by a DVD or a bootable USB drive.The Jumbo DVD has all the required rolls in one single disk image. The x86 64 version of Rocks 6.1 can be downloaded from here [2]

- Insert the DVD/USB Drive and restart the main node (Frontend). A boot screen will be displayed with a prompt. Enter the following command to start the installation:

  build

- The next screen shows the list of all rolls in the DVD. Select the required rolls from the list. The Kernel, Base, OS and Web-Server rolls are mandatory. Additional rolls can be installed by using DVD based rolls. Hit next to proceed.

- The next screen is for entering Cluster Information. Enter the details for Host name, cluster name, organization, locality, state, country, contact, URL, latitude and longitude. The fully-qualified host name is mandatory and is important for several cluster services.

- The next screen has the option to set the eth1 (which is the interface to public network) IP address. This is the public IP of the cluster(connected to the internet). Enter the public IP as 192.168.41.203.

- The next screen has the option to set the private network eth0 IP address and netmask. This is the IP address of the private network between the Frontend and the nodes. The IP address used is 10.1.1.1 and the netmask is 255.255.0.0.

- Now configure the gateway and DNS. Gateway used is 192.168.41.1 and DNS servers used are 192.168.254.2, 192.168.254.3.

- Enter the root password of the cluster when prompted.

- Configure the time by selecting the time zone for the cluster followed by inputting a Network Time Protocol(NTP) server that will keep the clock on the frontend in sync.

- The next screen shows the option for the partitioning of the hard disk of the Frontend. Select "Manual Partitioning" since the configuration of “Auto Partitioning ” provides insufficient space for the /var partition which is used by the Eucalyptus Cloud to upload Virtual Machine Images.

- **The Partition used for the frontend is :**

Partition Name	Size

/	**170 GB**
/var	**480 GB**
/export	**170 GB**
swap	**1 GB**

External Links:

[1] http://central6.rocksclusters.org/roll-documentation/base/6.1/
[2] http://www.rocksclusters.org/wordpress/?page_id=449

Ethernet Switch Installation

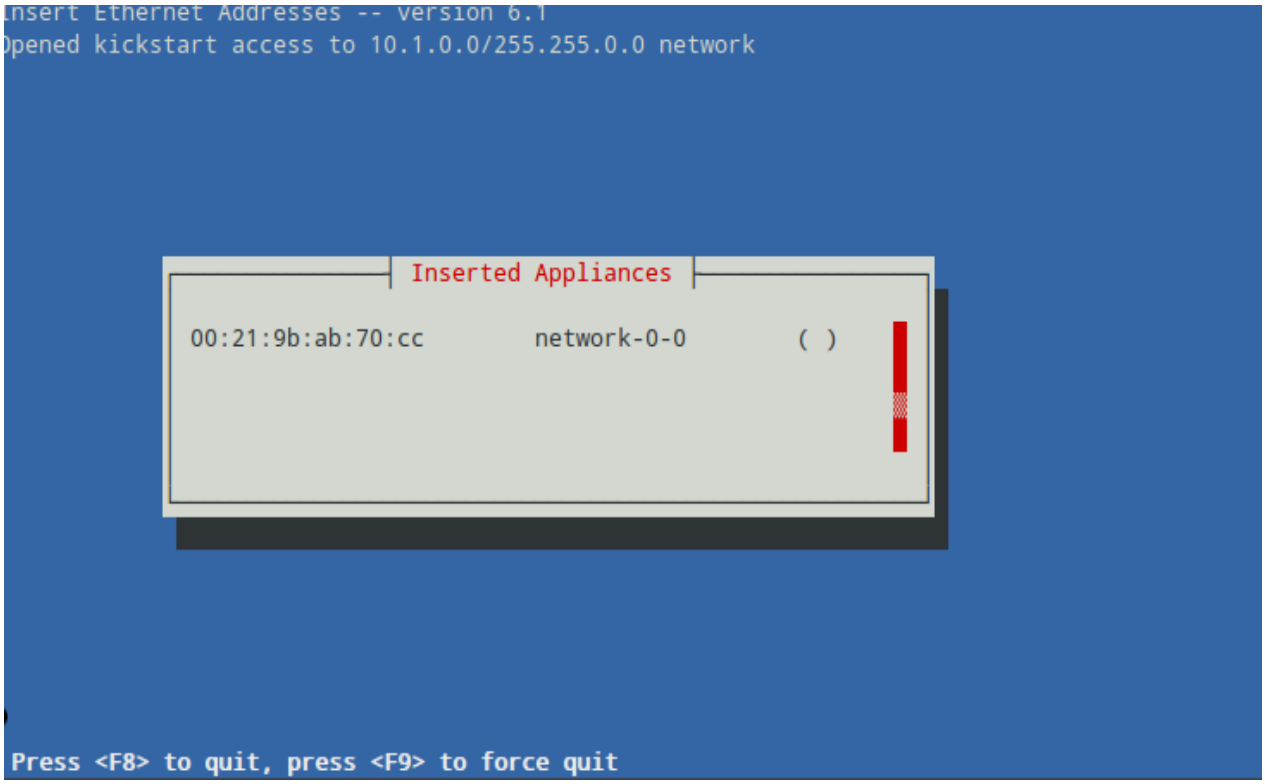
- If the frontend and the vm-containers are connected via an ethernet switch,we have to first run the command

  ```
  insert-ethers
  ```

  and then select **Ethernet Switch** from the list that pops up.

- This is because the default behavior of many managed ethernet switches is to issue DHCP requests in order to receive an IP address that clients can use to configure and monitor the switch.

Note : It will take several minutes for the frontend to identify the ethernet switch.



The above screenshot indicates that the switch has been identified, you may hit the F8 key to end insert-ethers.

Node Installation

Disable the feature that reinstalls compute nodes after a hard reboot.

When compute nodes experience a *hard* reboot (e.g., when the compute node is reset by pushing the power button or after a power failure), they will reformat the root file system and reinstall their base operating environment.

To disable this feature:

- Login to the frontend
- Create a file that will override the default:

```
cd /export/rocks/install
cp rocks-dist/x86_64/build/nodes/auto-kickstart.xml \ site-profiles/
6.1/nodes/replace-auto-kickstart.xml
```

- Edit the file site-profiles/6.1/nodes/replace-auto-kickstart.xml and remove the line:

```
<package>rocks-boot-auto<package>
```

- Rebuild the distribution:

```
cd /export/rocks/install
rocks create distro
```

- By default Rocks does a auto partition with some default values for each partition.We will have to make it manual to utilize maximum of the available space.

- First, run the command

```
cd /export/rocks/install/site-profiles/6.1/nodes/
```

- Copy the file skeleton.xml to replace-partition.xml

```
cp skeleton.xml replace-partition.xml
```

- Open **replace-partition.xml** and replace all content in the <pre> </pre> section with

```
echo "rocks manual" > /tmp/user_partition_info
```

- Run the following commands to write the changes to the rocks distro which will be used to install the nodes.

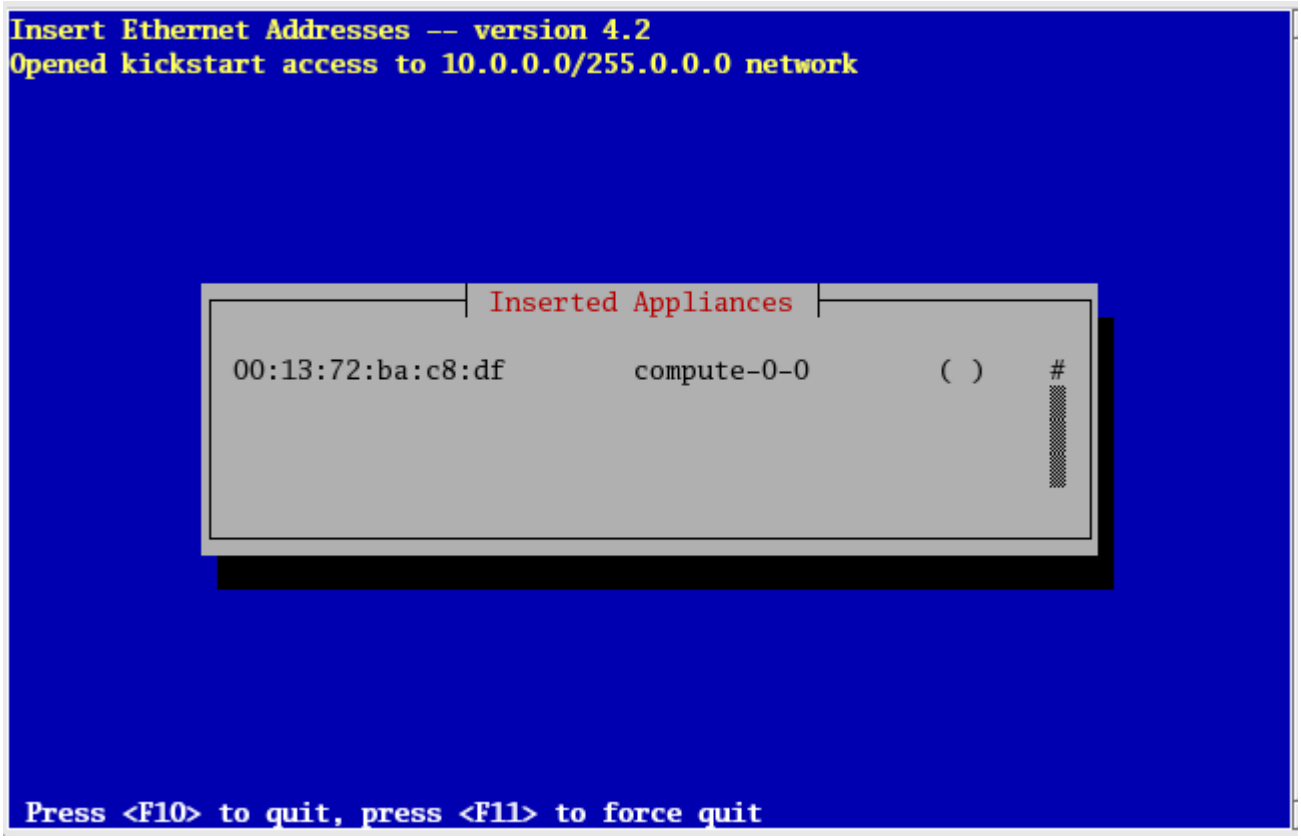
```
cd /export/rocks/install
rocks create distro
```

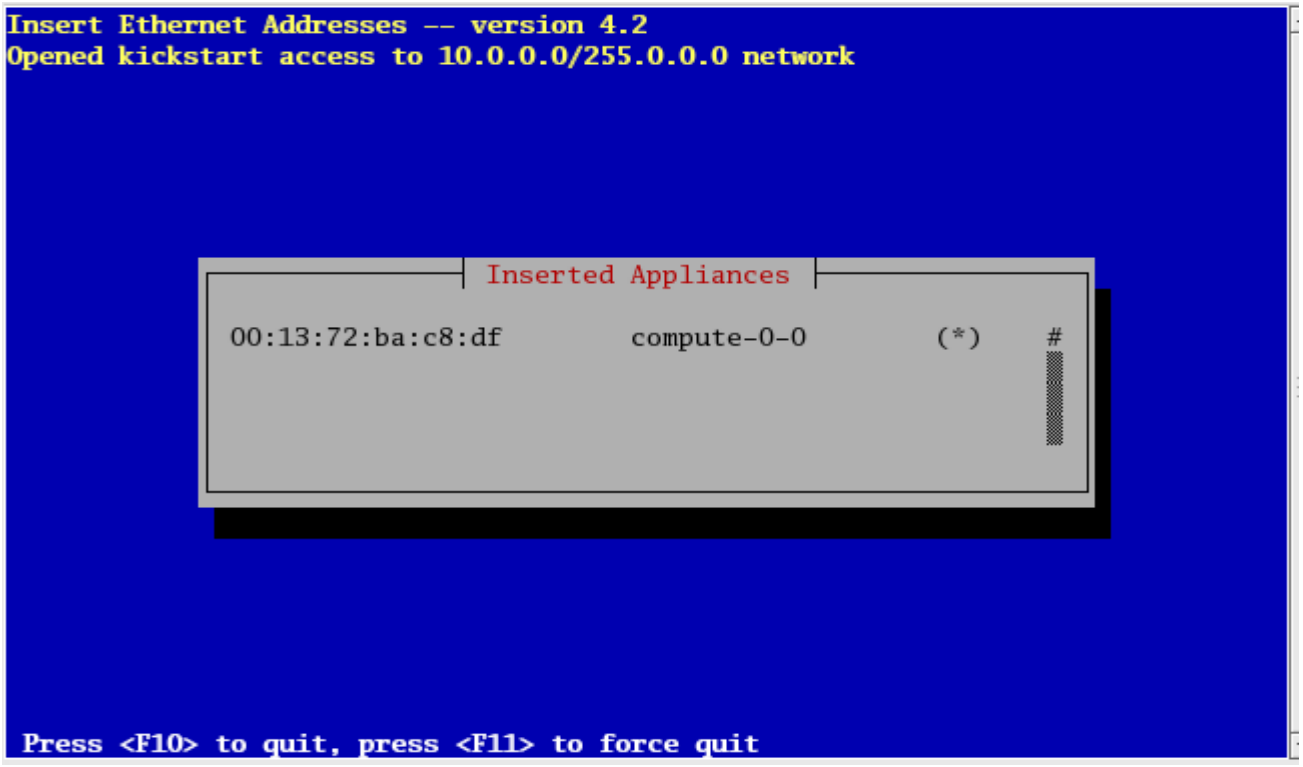
- Installation should be done in a order such that the top node is detected first and then the one below that so that numbering of the vm-container is made according to nodes position in rack.

- Type the command

```
insert-ethers
```

- Select VM Container from the list.
- Start one of the nodes. The node must be booted through PXE Boot, so change the boot preference of the the node to PXE boot in the BIOS.
- When the frontend machine receives the DHCP request from the compute node, the screen shows a discovered appliance.





- Once a (*) mark appears near the discovered device, you can quit insert ethers by pressing F8.

- The node is named as vm-container-X-Y automatically and installation starts on the node. At this point the installation can be monitored from the frontend using the command.

  `rocks-console vm-container-X-Y`

- Using the console window complete the installation, by specifying the partition as per the table given below.

Partition Name	Size
/	70 GB
/var	175 GB
/export	40 GB
swap	1 GB

- Repeat these steps (i.e, the whole installation process for each node)