

## How to install Rocks cluster(6.1.1) for GATEv7.0 simulation.

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Written by Jaehee Chun.

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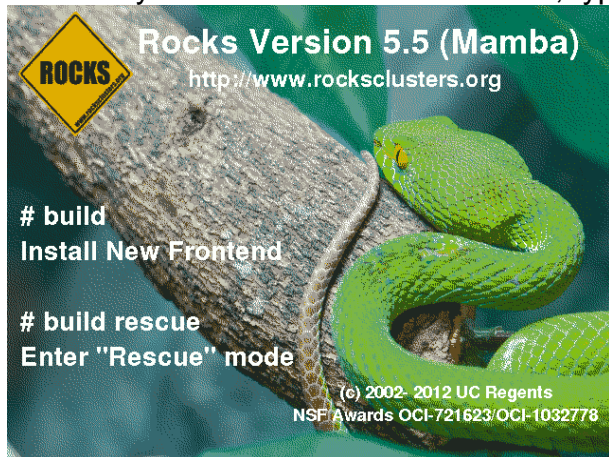
Medical Information Processing Laboratory, Korea University

This document is for the scientists who are not familiar with cluster setup. Before install the Rocks cluster, please try to read the Rocks cluster user guide. Do not spread this document without writer's approval.

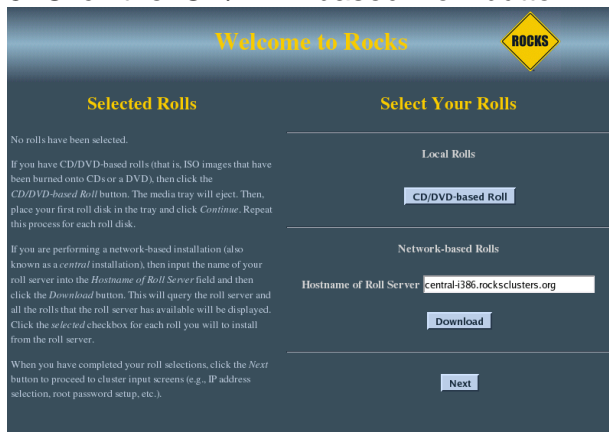
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First you need to install OS and rolls on the frontend node.

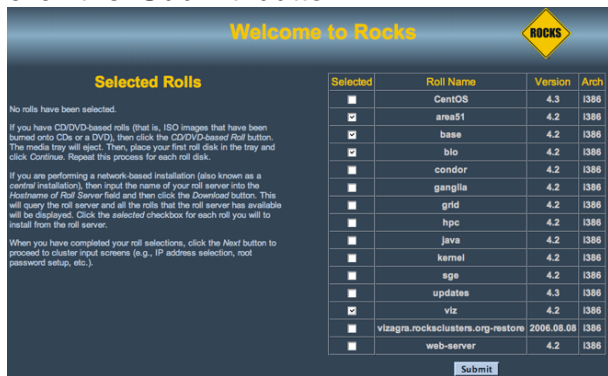
1. Download Rocks cluster with DVD version(6.1.1) which contains whole roll packages.
2. Connect every computing node and master(frontend) node. Frontend node must have two ethernet ports. One for the local network(eth0) which will be used to transfer the data between computing nodes and the other(eth1) for the communication with the outside of local network such as internet.
3. Turn on the frontend node and boot from DVD. After that, you will see:
4. When you see the screen like below, type "build" to install the frontend node.



5. Click the 'CD/DVD-based Roll' button.



6. Select the 'area51, base, htcondor, ganglia, hpc, kernel, os, web-server' rolls and click the 'Submit' button.



7. Click 'Next' button.

8. At the 'Cluster Information' page, type the proper contents.

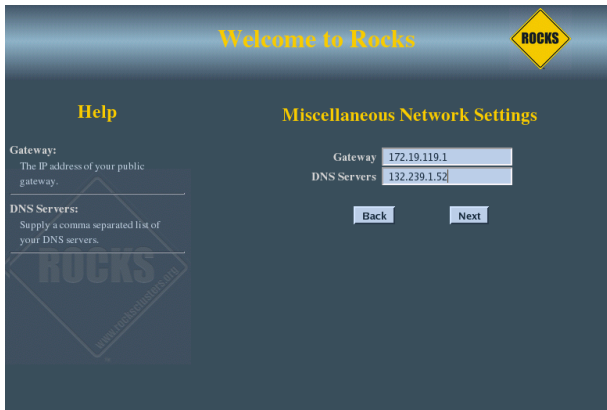


9. For the 'eth1 Ethernet Configuration', specify your IP address and netmask for the internet. I strongly recommend you to use 'static IP address'.

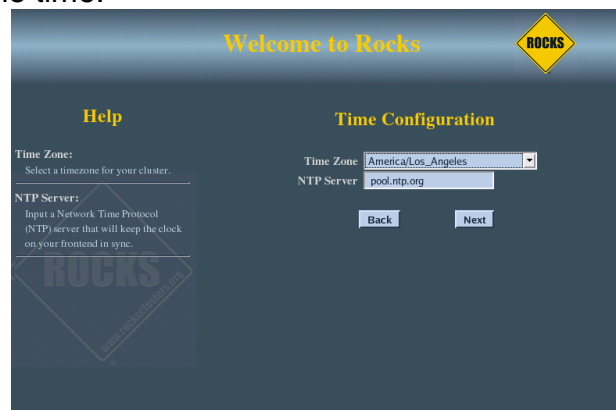
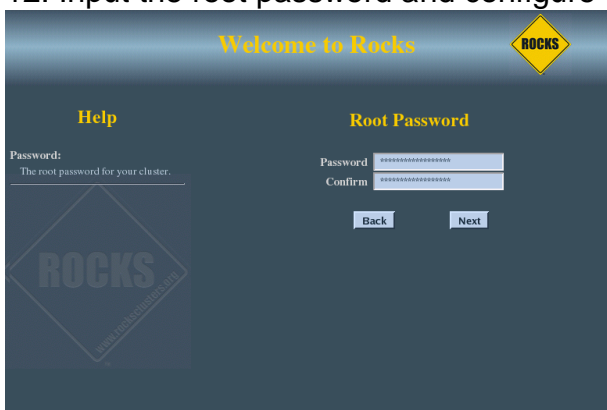


10. For the 'eth0 Ethernet Configuration', do not adjust anything if you are not familiar with the network and class information.

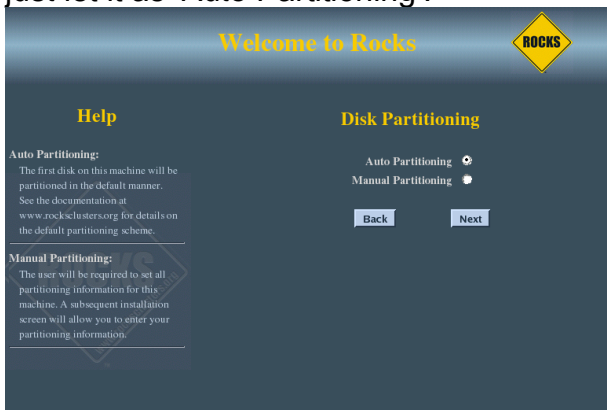
11. Configure the 'Gateway' and 'DNS Servers' entries.



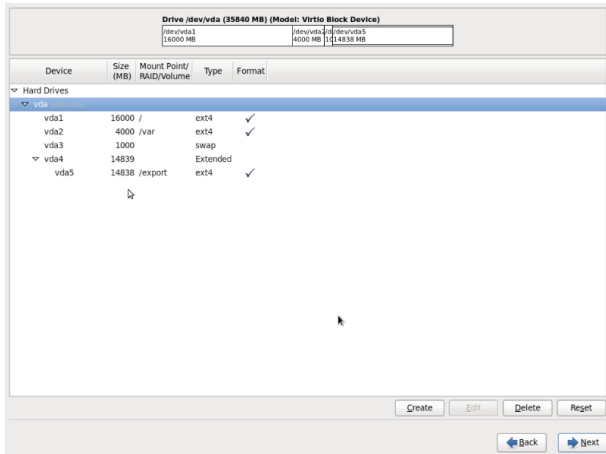
12. Input the root password and configure the time.



13. The final step is disk partitioning. If you are not familiar with the 'Disk Partitioning', just let it as 'Auto Partitioning'.



14. If you selected 'Manual Partitioning', then you will see Red Hat's manual partitioning screen.

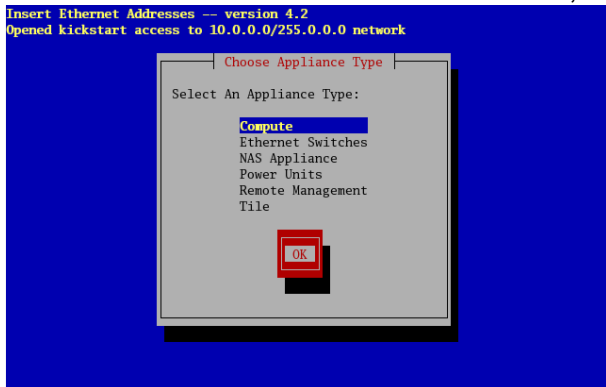


- If you select manual partitioning, you must specify at least 16GBs for the root partition and you must create a separate /export partition.

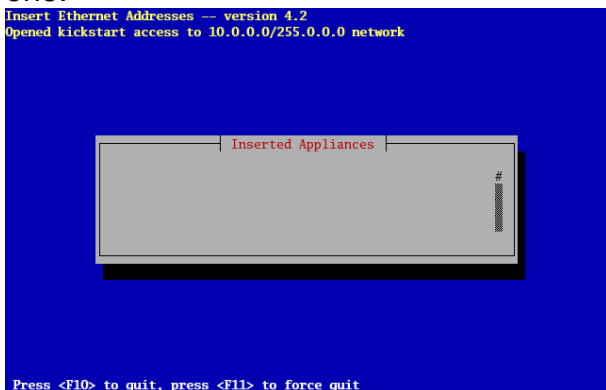
15. Then, Rocks-cluster will be installed on the frontend automatically.

Second, you must setup the compute node also.

1. Log-on as root on the frontend node.
2. Open the terminal at the frontend node.
3. Just type like below to prepare the compute node setup  
# insert-ethers
4. From the blue screen and some texts, choose the 'compute'.



5. Then you'll see the screen below. Turn-on all compute nodes from the first, one by one.

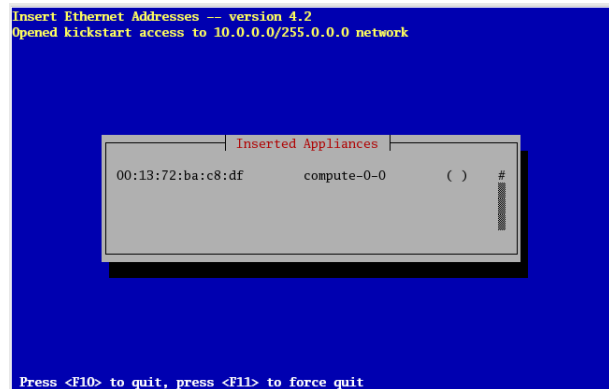
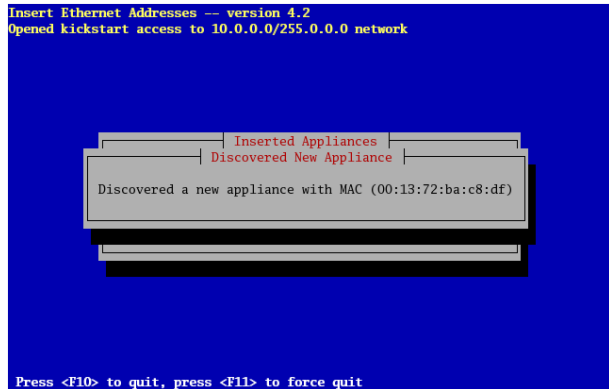


(If you are familiar with network booting... just ignore the contents below.)

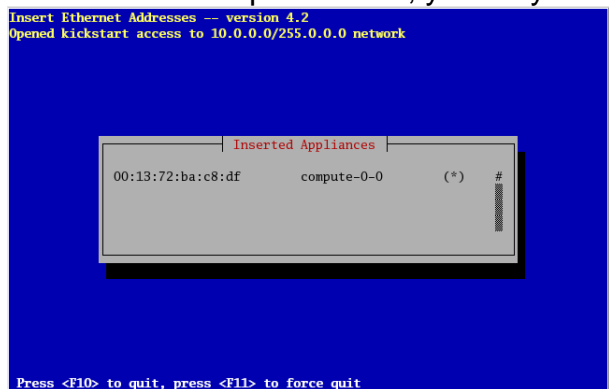
Before turn on the compute nodes, you must check the bios configuration of the mainboard. To set up the bios of your mainboard, press 'Delete' key when turn on the computer. Set as 'On' or 'Enable' for something like... 'boot on LAN' configuration. Set as 'On' or 'Enable' for the 'PXE boot' configuration. Set the first booting device as 'ethernet, PXE or LAN' at boot priority menu.

For the second booting device, choose the HDD on your system. (Actually, each of the mainboard has different ways to setup its bios. Please read the mainboard manual carefully and try to allow the network booting.)

6. Then, you can see the compute nodes(compute-0-...) at the frontend terminal. In around 20 minutes, the all compute nodes will automatically setup the linux OS.



7. If the compute node has successfully been installed, you can see "\*" mark. If there are no more compute nodes, you may now quit insert-ethers by hitting the 'F8' key.



Third, set up the GATE on the frontend.

1. If you are not familiar with setting up the GATE on linux system, please try to read carefully the contents in the link below.

["http://wiki.opengatecollaboration.org/index.php/New\\_Compilation\\_ProcedureV7.0#Installation\\_of\\_cluster\\_tools"](http://wiki.opengatecollaboration.org/index.php/New_Compilation_ProcedureV7.0#Installation_of_cluster_tools)

2. Before installing the GATE, you need to change the log-in user to the normal user(not the super user, root). To make the normal user account, please type like below.

```
# adduser XXXXXXXX (type the user ID)
# passwd XXXXXXXX (type the user ID that you create before)
  (setup the password of the user ID)
# rocks sync users
```

3. In the link above, you need to set the directory to the "/share/apps/Simulation" where all the programs will be installed. For that, you need to make a directory and give the permission.

```
# mkdir /share/apps/Simulation
# cd /share/apps
# chown XXXXXXXX(normal user ID) Simulation
# su XXXXXXXX
```

4. Then you need to install "ROOT", "CLHEP", "Geant4", "GATE".

5. "your\_file.bashrc" in the link means "/etc/bashrc" file, in our case.

6. After you install all the programs, please try to check that the GATE works well as the standalone machine. If everything works fine then you need to compile the jobsplitter and filemerger.

```
$ cd ...../gate_v7.0/cluster_tools/jobsplitter
$ make
$ cd ...../gate_v7.0/cluster_tools/filemerger
$ make
```

7. And append this lines to "/etc/bashrc" file:

```
export GC_GATE_EXE_DIR=...../gate_v7.0-install/bin/
export GC_DOT_GATE_DIR=$HOME
```

8. After all, I recommends you to reboot your frontend node, then reboot compute nodes.

Finally, you can execute GATE with the cluster machine.

1. Copy the 'condor.script file' in your working directory.

Let's assume that the local user name is 'gateuser', you want to set the working directory as '/home/gateuser/test1' and you made your own gate macro script as 'test1.mac' .

```
$ cd /home/gateuser
```

```
$ mkdir test1
```

```
$ cd test1
```

```
$ cp ...../test1.mac ./# (<== copy your whole source code to your working directory)
```

```
$ cp ...../gate_v7.0/cluster_tools/jobsplitter/script/condor.script ./
```

2. Modify the 'condor.script' file.

At the first line.. just add the following sentence.

```
getenv = True
```

3. Split your job into many pieces.

```
$ gjs -numberofsplits 24 -cs condor.script test1.mac
```

- For this line, '24' is the number of pieces that you want to split. You can change it, depending on the capacity of your cluster system. After you split your job, you can see the file named

```
'test1.submit'
```

4. Insert the split jobs into condor queue.

```
$ condor_submit test1.submit
```

- If your queue is empty, the split jobs will be executed right away.

5. Check that your jobs are working correctly.

```
$ condor_q
```

- Also, you can check the running status of your nodes by web. Just open the web-browser and type the 'localhost/ganglia' to the address area. Then you can see the status of the cluster at that website.

6. If your whole jobs are finished, and your output files are based on ROOT, then you can merge your split results into one ROOT file.

```
# gjm -f .Gate/test1/test1.split
```

This is the end of the install guide of GATE. But I recommend you to setup some ftp server(like vsftp) software for your clients. If you do not install ftp server, then your clients(users) should come to the cluster frontend, and type the GATE simulation script or copy the code from personal USB drive. If you setup the ftp server, with the FTP client and terminal software, the users can connect to your cluster more easily and effectively. And also, it is good for the stability of your cluster.