

Report: Linux cluster

High Performance Computing CSC09

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In this report, it is described about how Linux cluster is reconstructed. The steps are as follows:

1. First of all, **ubuntu 16.04 LTS** OS is installed in server and 3 client nodes. Server is named as **envfs1**.
2. Hostname is given to each client with the following command:
gedit /etc/hostname
In this case, they are named as node01, node02 and node03.
3. After that, network configuration is done for each client nodes and server by using the following command:
gedit /etc/network/interfaces

Since there are only 3 client nodes, we configured the network manually. But, if there are many nodes, it is preferred to use dhcp-3 server which allows network configuration from server.

4. In server, text files containing information of all client nodes are created as shown below:
gedit /etc/hosts
gedit /etc/machines
5. For the keyless entry, openssh-server is installed by:
apt-get install openssh-server

From server node, ssh key is generated with:

```
ssh-keygen  
chmod 600 id_rsa
```

For client nodes, we copied id_rsa.pub to ./ssh and renamed it "authorized_keys" with following:
chmod 600 authorized_keys

Now, we can access client nodes without password.

6. Instead of downloading software on each node manually, we created a script which mimics what is written in the command line on all client nodes. Thus, it will save much time.
gedit /sbin/cluster-fork &

Following lines are included in the script.

```
for NODE in `cat /etc/machines`  
do
```

```
echo $NODE
rsh $NODE $*
done
```

7. Using cluster-fork, we installed NFS server and added new users on all nodes with:
/sbin/cluster-fork apt-get install nfs-common nfs-kernel-server
/sbin/cluster-fork adduser username

8. Then, we exported home directory from server to all nodes.

For the server, these commands are used.

```
gedit /etc/exports  
exportfs -av
```

For client nodes:

```
gedit /etc/fstab
```

9. For each node, hostfile is created including number of processors of each node.

```
cat proc/cpu_info
```

10. Finally, software necessary for running MPI program is installed.

```
apt-get install openmpi-bin  
apt-get install libopenmpi-dev
```

Node03 is not used for running MPI program because it has error.