Install Jenkins slaves in the cloud and form a Jenkins cluster

For this let us start by creating two instances(redhat AMI) in AWS cloud environment . Consider One as master and another as slave machine.

Please make a note of the Public IP's of the Instances.

Install Java in master machine.

Install Jenkins in Master machine.

Start the slave agent

- Master node will start the slave agent on the slave machine via SSH .
- Automatic SSH login without password from master node to the slave node is needed.
- Master node will be running as a specific user called Jenkins to start the slave agent.

Using User Name and Password

- Create Ubuntu EC2 Instance ubuntu in AWS.
- Login with pem file using git bash or putty
  - Go to Downloads
  - ssh -i "Jankins-Mast.pem" ubuntu@ec2-52-53-156-213.us-west-1.compute.amazonaws.com
  - sudo -i

Jenkins Setup

Java Installation :

- sudo add-apt-repository ppa:openjdk-r/ppa
- sudo apt-get update
- sudo apt-get install openjdk-8-jdk

Jenkins Installation:

- sudo apt-get install wget
- wget -q -O - https://pkg.jenkins.io/debian/jenkins-ci.org.key | sudo apt-key add –
- sudo sh -c 'echo deb http://pkg.jenkins.io/debian-stable binary/ > /etc/apt/sources.list.d/jenkins.list'
- sudo apt-get update
- sudo apt-get install Jenkins
- go to browser and type IPaddress:8080 ex : 9.180.345.67:8080
- cat /var/lib/jenkins/secrets/initialAdminPassword
- Give the password to browse
- And click on Install suggested plug ins
- And configure your own user id there.
- And able to login our Jenkins successfully.

Now we just our Jenkins Master server setup and we are going to create slave now.

- Create Ubuntu EC2 Instance centos in AWS.
- Login with pem file using git bash or putty
  - Go to Downloads
  - ssh -i "Jankins-Mast.pem" ubuntu@ec2-52-53-156-213.us-west-1.compute.amazonaws.com
  - sudo –i

Java Installation :

- sudo yum search java
- sudo yum install **java**-1.8.0-openjdk.x86_64

- Now we have to create one folder for slave agent and slave Jenkins workspace
- mkdir /opt/Jenkins
- useradd jennode
- passwd jennode
- Enter password 2 times here and it says successfully user created.
- Now we have to own the created directory for created user
- chown jennode:jennode /opt/Jenkins

Now we have to update as password authentication as yes

- vi /etc/ssh/sshd_config

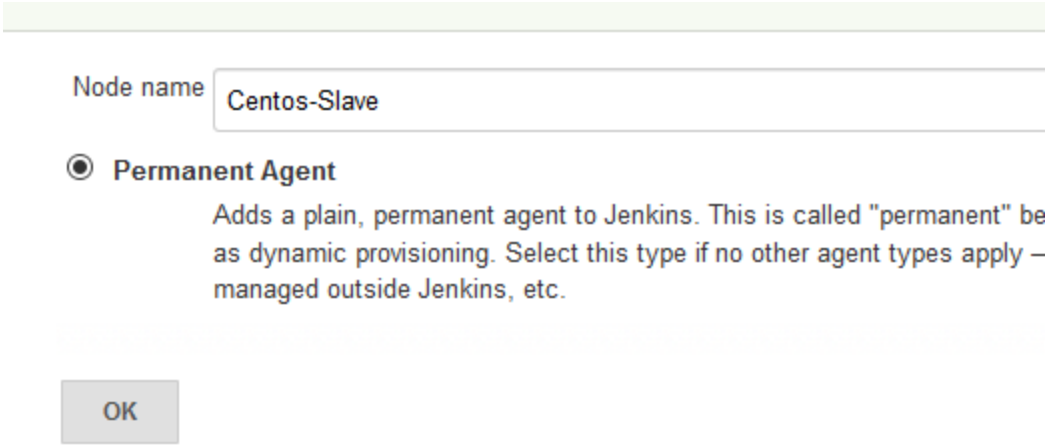
```
# To disable tunneled clear text passwords, change to no here!
#PasswordAuthentication no
#PermitEmptyPasswords no
PasswordAuthentication yes
```

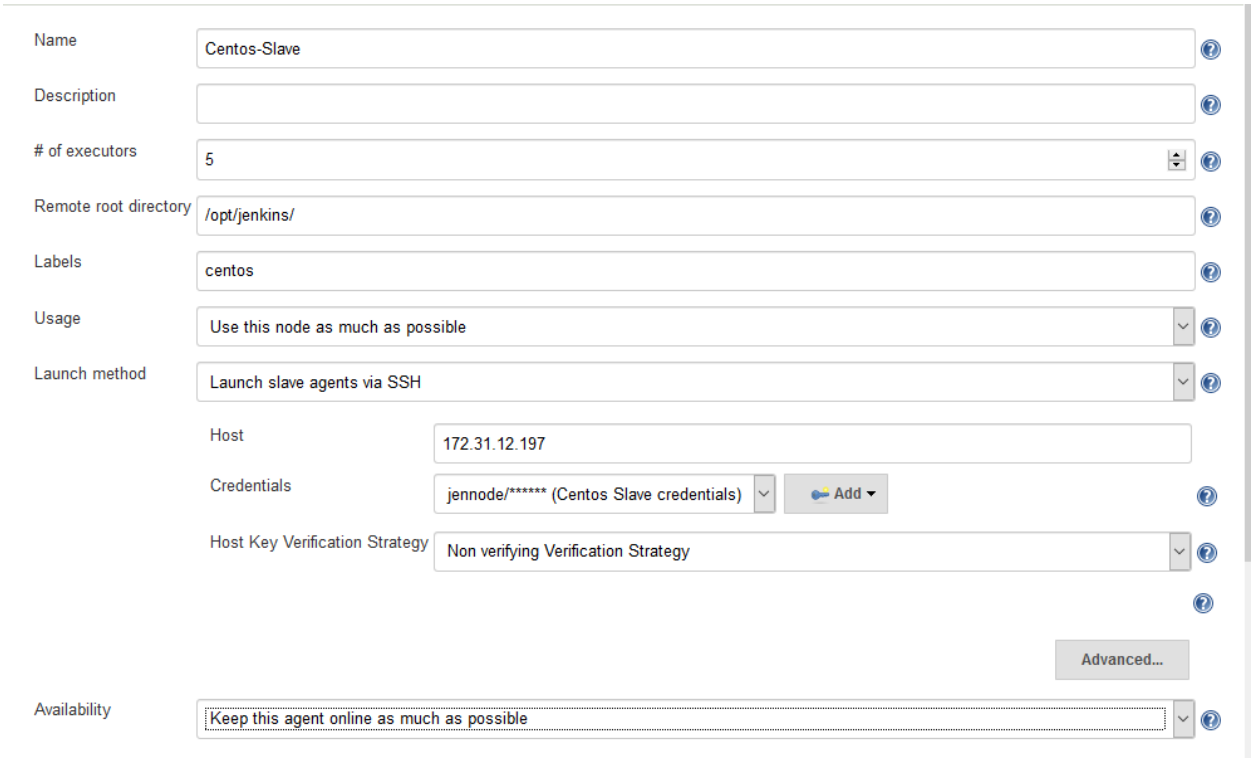
- And restart the sshd service
- service sshd restart

```
[root@ip-172-31-12-197 ~]# mkdir /opt/jenkins
[root@ip-172-31-12-197 ~]# useradd jennode
[root@ip-172-31-12-197 ~]# passwd jennode
Changing password for user jennode.
New password:
BAD PASSWORD: it is based on a dictionary word
BAD PASSWORD: is too simple
Retype new password:
passwd: all authentication tokens updated successfully.
[root@ip-172-31-12-197 ~]#
[root@ip-172-31-12-197 ~]#
[root@ip-172-31-12-197 ~]#
[root@ip-172-31-12-197 ~]#
[root@ip-172-31-12-197 ~]#
[root@ip-172-31-12-197 ~]#
[root@ip-172-31-12-197 ~]#
[root@ip-172-31-12-197 ~]# chown jennode /opt/jenkins
[root@ip-172-31-12-197 ~]# chown jennode:jennode /opt/jenkins
[root@ip-172-31-12-197 ~]# vi /etc/ssh/sshd_config
[root@ip-172-31-12-197 ~]# service sshd restart
Stopping sshd:                                             [  OK  ]
Starting sshd:                                             [  OK  ]
[root@ip-172-31-12-197 ~]#
```

Our required slave set up is done and now we have to create node at Jenkins master server.

- Go to Jenkins Master server browser
- Go to Manage Jenkins
- Click on Manage Nodes
- Create new node.





- Give the configuration details same like above.
- And one more setting we have to take care Master Jenkins should be able to do ssh to slave system so in Slave security group we have to add ssh says custom and from Jenkins Master.
- We have to modify at slave machene security group not at Jenkins master security group.
- Now we have to make sure that GIT and Maven installed in slave and Jobs can be run on this slave successfully.

Using Private key and Public key setup :

Go to the Jenkins user by typing the below command.

$sudo –iu Jenkins /bin/bash

```
root@ubuntu-512mb-nyc3-01:~# sudo -iu jenkins
jenkins@ubuntu-512mb-nyc3-01:~$
```

master node

Now we need to generate the public and private key pair for authentication purpose. For this we need to type the below command in master as below.

$ ssh-keygen –t rsa

And then press enter for all the default options.

```
root@ubuntu-512mb-nyc3-01:~# sudo -iu jenkins
jenkins@ubuntu-512mb-nyc3-01:~$ ssh-keygen -t rsa
Generating public/private rsa key pair.
Enter file in which to save the key (/var/lib/jenkins/.ssh/id_rsa):
Created directory '/var/lib/jenkins/.ssh'.
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /var/lib/jenkins/.ssh/id_rsa.
Your public key has been saved in /var/lib/jenkins/.ssh/id_rsa.pub.
The key fingerprint is:
SHA256:YfdmiLCSWhrru08Hm9AO2gdSzK+7WnqyRgzScYNQt4c jenkins@ubuntu-512mb-nyc3-01
The key's randomart image is:
+---[RSA 2048]----+
|.o...            |
| oo.oo           |
| .+oE.o o .      |
|o..o o + + o     |
|= = B . S . +    |
| * % =     o     |
|o B * .          |
|.=.+ .           |
|==*=.            |
+----[SHA256]-----+
jenkins@ubuntu-512mb-nyc3-01:~$
```

master node

The public key is saved in the location as shown in the below picture

```
root@ubuntu-512mb-nyc3-01:~# sudo -iu jenkins
jenkins@ubuntu-512mb-nyc3-01:~$ ssh-keygen -t rsa
Generating public/private rsa key pair.
Enter file in which to save the key (/var/lib/jenkins/.ssh/id_rsa):
Created directory '/var/lib/jenkins/.ssh'.
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /var/lib/jenkins/.ssh/id_rsa.
Your public key has been saved in /var/lib/jenkins/.ssh/id_rsa.pub.
The key fingerprint is:
SHA256:YfdmiLCSWhrru08Hm9AOZgdSzK+7WnqyRgzScYNQt4c jenkins@ubuntu-512mb-nyc3-01
The key's randomart image is:
+---[RSA 2048]----+
|.o...            |
| oo.oo           |
| .+oE.o.o        |
```

master node

The private key is saved in the location as shown in below picture.

```
root@ubuntu-512mb-nyc3-01:~# sudo -iu jenkins
jenkins@ubuntu-512mb-nyc3-01:~$ ssh-keygen -t rsa
Generating public/private rsa key pair.
Enter file in which to save the key (/var/lib/jenkins/.ssh/id_rsa):
Created directory '/var/lib/jenkins/.ssh'.
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /var/lib/jenkins/.ssh/id_rsa.
Your public key has been saved in /var/lib/jenkins/.ssh/id_rsa.pub.
The key fingerprint is:
SHA256:YfdmiLCSWhrru08Hm9AOZgdSzK+7WnqyRgzScYNQt4c jenkins@ubuntu-512mb-nyc3-01
The key's randomart image is:
+---[RSA 2048]----+
|.o...            |
```

master node

Now from the master node let us create .ssh folder in slave machine as shown below.

$ ssh root@<slave –ip> mkdir –p .ssh

It will ask the root password of the slave machine . enter the root password of slave machine.

```
jenkins@ubuntu-512mb-nyc3-01:~$ ssh root@45.55.229.105 mkdir -p .ssh
root@45.55.229.105's password:
jenkins@ubuntu-512mb-nyc3-01:~$
```

master node

Now we have to copy the public key from the master machine and to .ssh folder in slave machine.

$cat .ssh/id_rsa.pub | ssh root@<slave-ip> ‘cat >> .ssh/authorized-keys’ Press enter and give the root password of slave machine.

```
jenkins@ubuntu-512mb-nyc3-01:~$ ssh root@45.55.229.105 mkdir -p .ssh
root@45.55.229.105's password:
jenkins@ubuntu-512mb-nyc3-01:~$ cat .ssh/id_rsa.pub | ssh root@45.55.229.105 'cat >> .ssh/authorized_keys'
root@45.55.229.105's password:
jenkins@ubuntu-512mb-nyc3-01:~$
```

master node

Now we can switch to slave machine from master machine without root password of slave machine.

```
jenkins@ubuntu-512mb-nyc3-01:~$ ssh root@45.55.229.105 mkdir -p .ssh
root@45.55.229.105's password:
jenkins@ubuntu-512mb-nyc3-01:~$ cat .ssh/id_rsa.pub | ssh root@45.55.229.105 'cat >> .ssh/authorized_keys'
root@45.55.229.105's password:
jenkins@ubuntu-512mb-nyc3-01:~$ ssh root@45.55.229.105
Welcome to Ubuntu 16.04.1 LTS (GNU/Linux 4.4.0-38-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/advantage

0 packages can be updated.
0 updates are security updates.


Last login: Wed Oct  5 20:42:13 2016 from 45.55.86.3
root@ubuntu-512mb-nyc3-01:~#
```

master node

Now login to slave machine and we have to download slave agent from the master where Jenkins has been installed.

In the slave machine create directory bin and change to that directory as below.

```
root@ubuntu-512mb-nyc3-01:~# mkdir bin
root@ubuntu-512mb-nyc3-01:~# cd bin/
root@ubuntu-512mb-nyc3-01:~/bin# pwd
/root/bin
root@ubuntu-512mb-nyc3-01:~/bin#
```

Slave node

Now install the wget command first in the slave by typing the below command.

$ sudo yum install wget(since it is a redhat machine, use apt-get if it is ubuntu)

After installation of wget , download the slave agent by typing the following command.

$wget http://<master-ip>:8080/jnlpJars/slave.jar

```
root@ubuntu-512mb-nyc3-01:~# mkdir bin
root@ubuntu-512mb-nyc3-01:~# cd bin/
root@ubuntu-512mb-nyc3-01:~/bin# pwd
/root/bin
root@ubuntu-512mb-nyc3-01:~/bin# wget http://45.55.86.3:8080/jnlpJars/slave.jar
--2016-10-05 20:46:54--  http://45.55.86.3:8080/jnlpJars/slave.jar
Connecting to 45.55.86.3:8080... connected.
HTTP request sent, awaiting response... 200 OK
Length: 535167 (523K) [application/java-archive]
Saving to: 'slave.jar'

slave.jar                           100%[===================================================================>] 522.62K  --.-KB/s    in 0.007s

2016-10-05 20:46:54 (69.5 MB/s) - 'slave.jar' saved [535167/535167]

root@ubuntu-512mb-nyc3-01:~/bin#
```

Slave node

After the download is completed check whether the slave.jar is there or not.

```
root@ubuntu-512mb-nyc3-01:~# mkdir bin
root@ubuntu-512mb-nyc3-01:~# cd bin/
root@ubuntu-512mb-nyc3-01:~/bin# pwd
/root/bin
root@ubuntu-512mb-nyc3-01:~/bin# wget http://45.55.86.3:8080/jnlpJars/slave.jar
--2016-10-05 20:46:54--  http://45.55.86.3:8080/jnlpJars/slave.jar
Connecting to 45.55.86.3:8080... connected.
HTTP request sent, awaiting response... 200 OK
Length: 535167 (523K) [application/java-archive]
Saving to: 'slave.jar'

slave.jar                           100%[===================================================================================>] 522.62K  --.-KB/s    in 0.007s

2016-10-05 20:46:54 (69.5 MB/s) - 'slave.jar' saved [535167/535167]

root@ubuntu-512mb-nyc3-01:~/bin# ls
slave.jar
root@ubuntu-512mb-nyc3-01:~/bin#
```

Slave node

Now we have to install java on slave machine because the slave.jar is a java program which needs JRE.

$sudo yum install default-jre (if it is ubuntu use apt-get instead of yum)

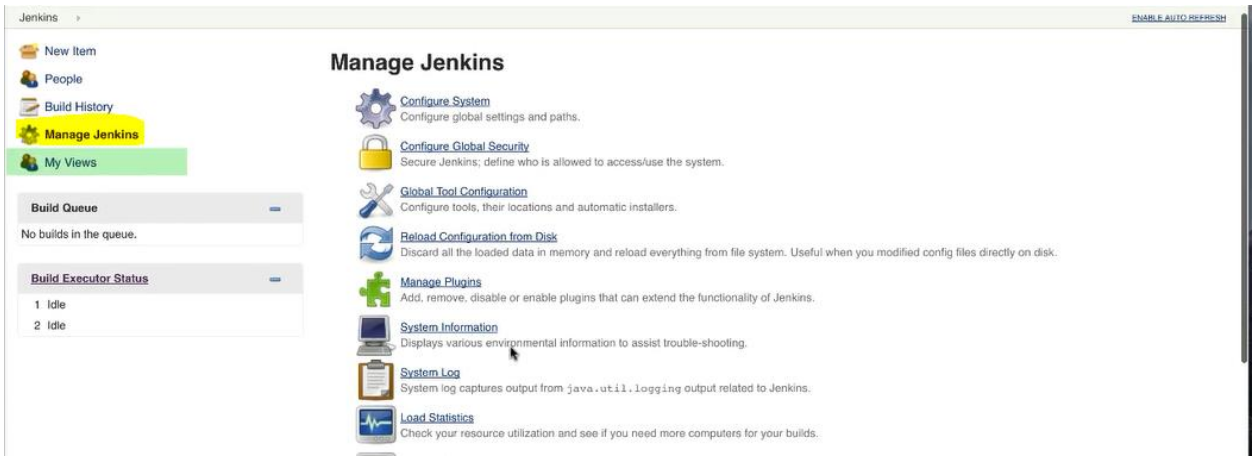
```
root@ubuntu-512mb-nyc3-01:~# mkdir bin
root@ubuntu-512mb-nyc3-01:~# cd bin/
root@ubuntu-512mb-nyc3-01:~/bin# pwd
/root/bin
root@ubuntu-512mb-nyc3-01:~/bin# wget http://45.55.86.3:8080/jnlpJars/slave.jar
--2016-10-05 20:46:54--  http://45.55.86.3:8080/jnlpJars/slave.jar
Connecting to 45.55.86.3:8080... connected.
HTTP request sent, awaiting response... 200 OK
Length: 535167 (523K) [application/java-archive]
Saving to: 'slave.jar'

slave.jar                           100%[===================================================================================>] 522.62K  --.-KB/s    in 0.007s

2016-10-05 20:46:54 (69.5 MB/s) - 'slave.jar' saved [535167/535167]

root@ubuntu-512mb-nyc3-01:~/bin# ls
slave.jar
root@ubuntu-512mb-nyc3-01:~/bin# sudo apt-get install default-jre
```

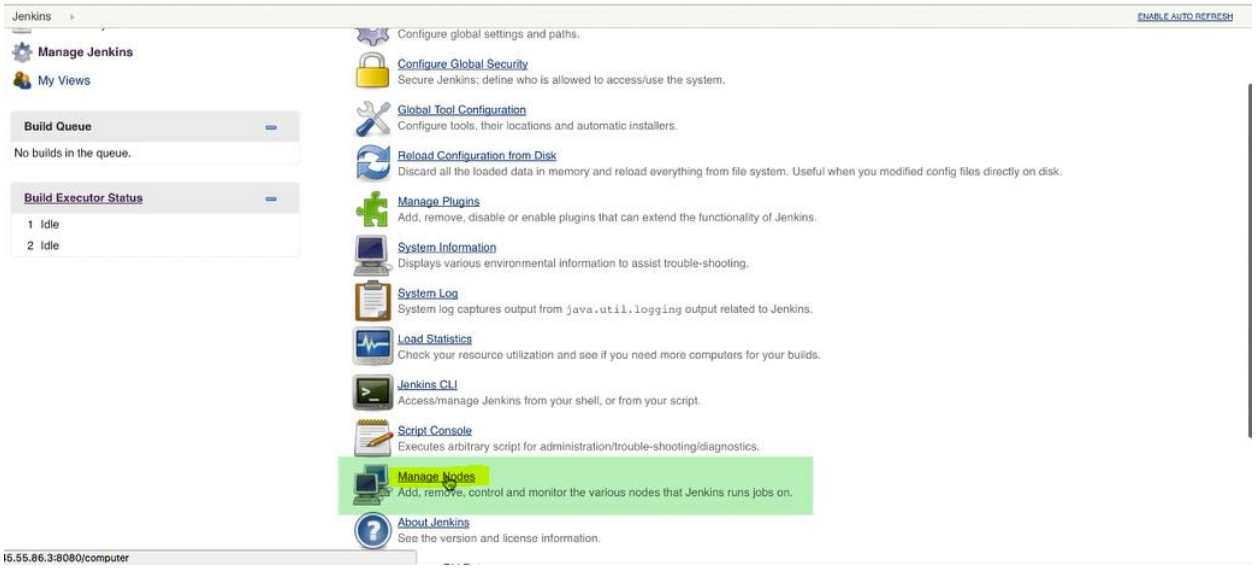
Slave node

Now we have to configure the slave machine in Jenkins.

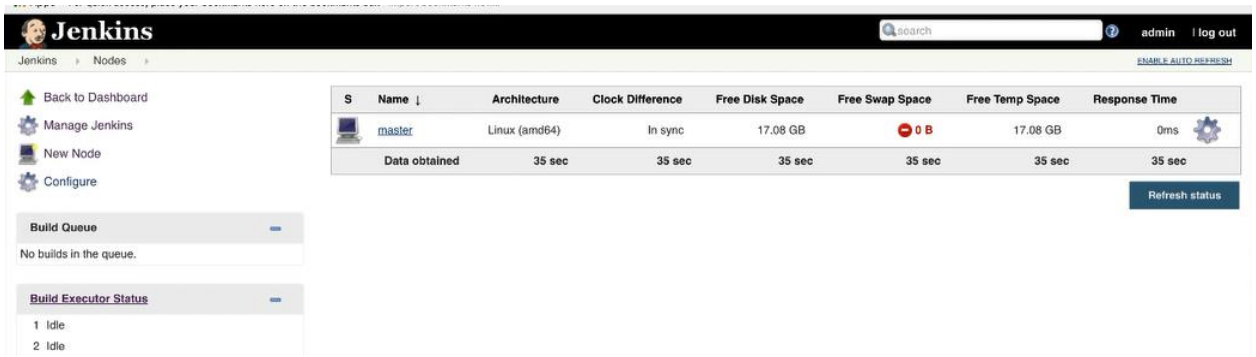
Goto Jenkins home page.

Click on Manage Jenkins –-> click on Manage nodes

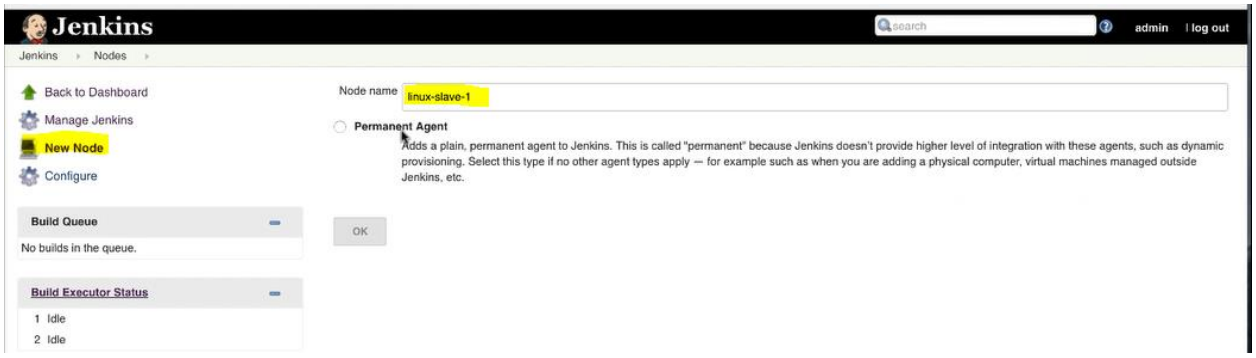




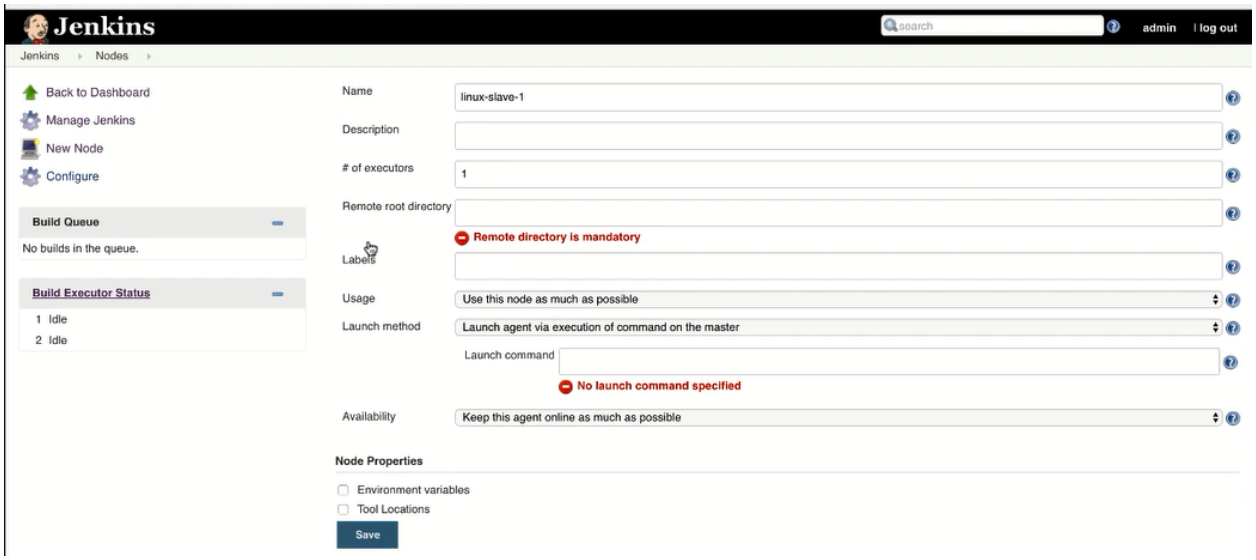
Now the below page will be opened.



Now click on New Node and give the name to the new node as shown below. Select Permanent Agent and then click on OK



Now another page will be opened as below.



Here specify No. of executors.

Executor

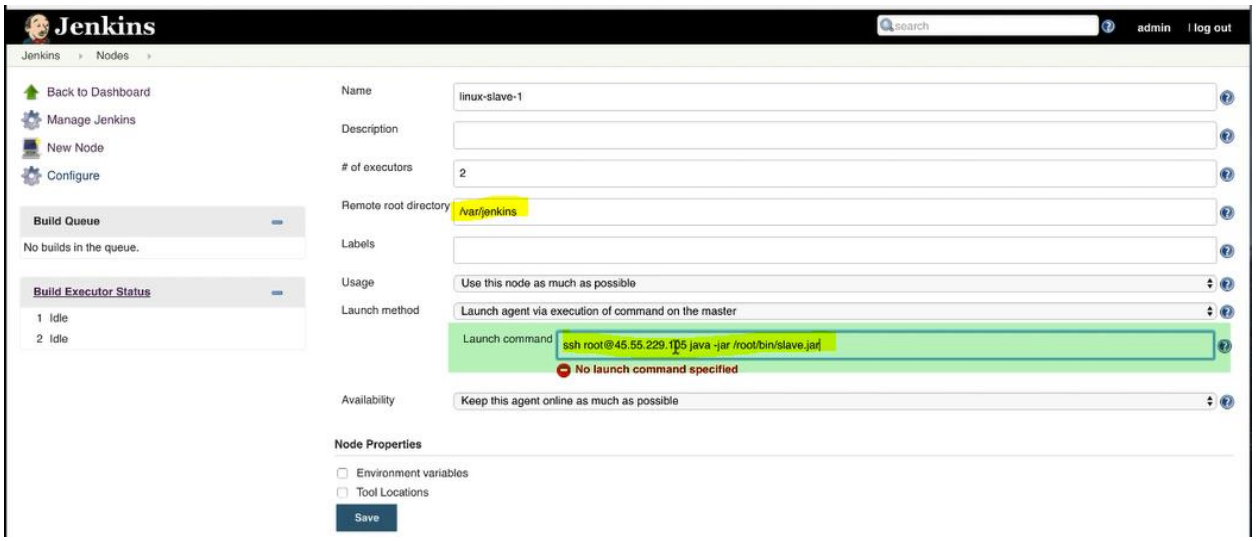
- A Jenkins executor is one of the basic building blocks which allow a build to run on a node.
- Think of an executor as a single "process ID", or as the basic unit of resource that Jenkins executes on your machine to run a build.
- This number executors basically specifies the maximum number of concurrent builds that Jenkins may perform on this agent.
- A good value for the number of executors to start with would be the number of CPU cores on the machine.
- Setting a higher value would cause each build to take longer, but could increase the overall throughput.
- For example, one build might be CPU-bound, while a second build running at the same time might be I/O-bound — so the second build could take advantage of the spare I/O capacity at that moment.

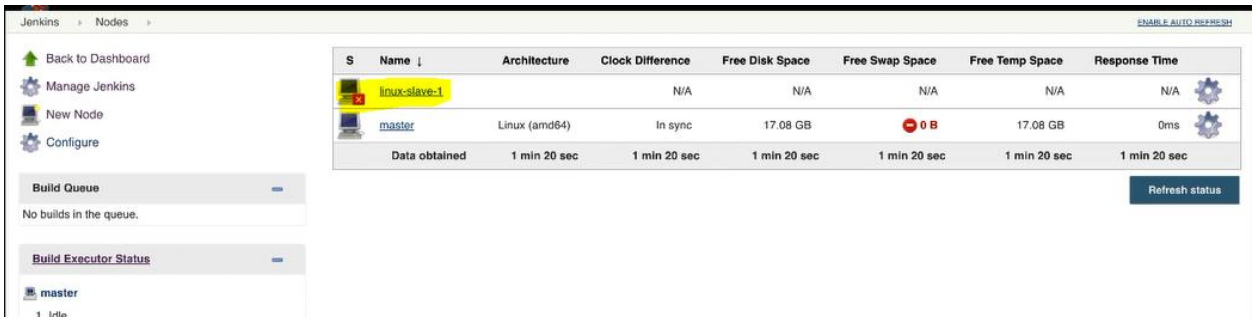
Now in the same page we need to specify the root directory where the builds has to be stored and specify the launch method.

Root directory : /var/jenkins

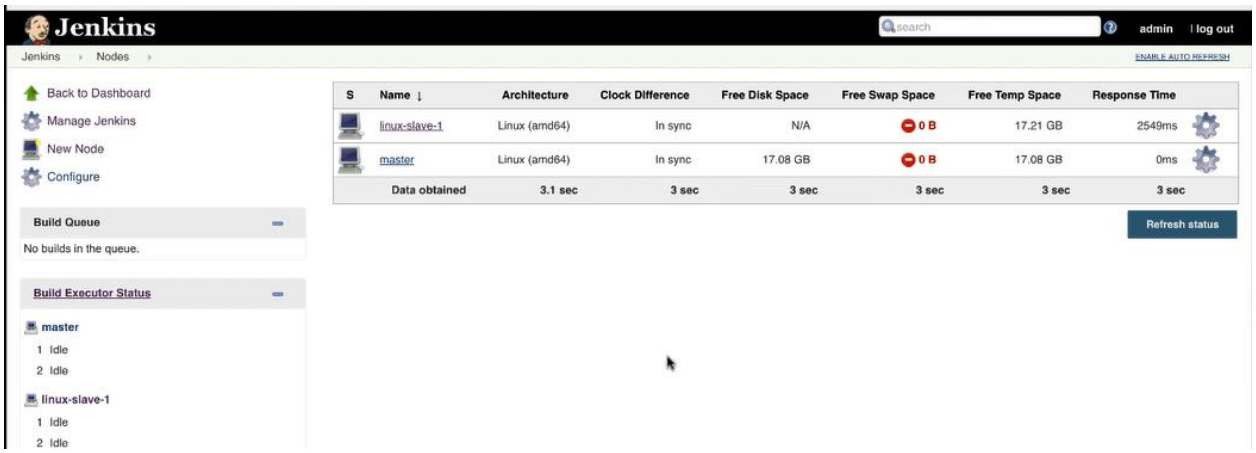
Launch method : ssh root@<slave-ip> java –jar /root/bin/slave.jar

Now click on Save button.





The above picture indicates that the slave machine is not active. After start the slave machine click on Refresh status (or) refresh the page.



The above indicates that slave machine is configured and clustered with the master machine successfully.