

Name :- Komal Mhetre

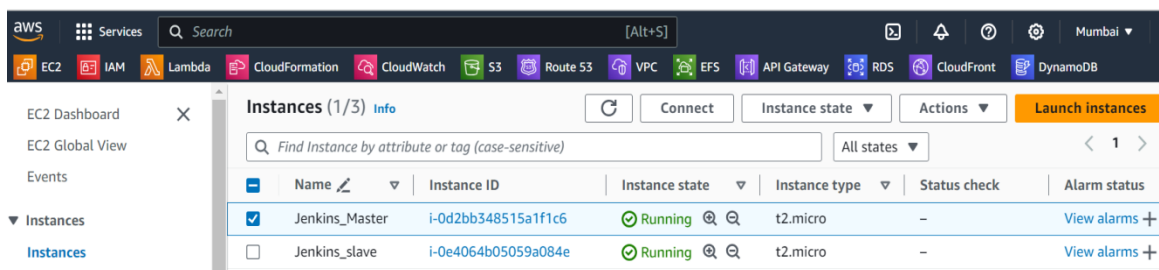
Role :- DevOps Engineer

Task :- Continuous Integration Using Jenkins

➤ **Assignments Continuous Integration Using Jenkins:-**

- **L1 - Create Jenkins Master-Slave Configurations and Create a workspace in Jenkins Slave Node using Jenkins Free-style project.**

1. Create two EC2 instances running Ubuntu: one for the Jenkins master and another for the Jenkins slave.



2. Connect the instance to your terminal using SSH connection.

```
ubuntu@ip-172-31-32-189:~$ curl -fsSL https://pkg.jenkins.io/debian-stable/jenkins.io-2023.key | sudo tee \
/usr/share/keyrings/jenkins-keyring.asc > /dev/null
ubuntu@ip-172-31-32-189:~$ echo deb [signed-by=/usr/share/keyrings/jenkins-keyring.asc] \
https://pkg.jenkins.io/debian-stable binary/ | sudo tee \
/etc/apt/sources.list.d/jenkins.list > /dev/null
ubuntu@ip-172-31-32-189:~$ sudo apt-get update
Hit:1 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble InRelease
Hit:2 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble-updates InRelease
Hit:3 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble-backports InRelease
Ign:4 https://pkg.jenkins.io/debian-stable binary/ InRelease
Get:5 https://pkg.jenkins.io/debian-stable binary/ Release [2044 B]
Get:6 https://pkg.jenkins.io/debian-stable binary/ Release.gpg [833 B]
Hit:7 http://security.ubuntu.com/ubuntu noble-security InRelease
Get:8 https://pkg.jenkins.io/debian-stable binary/ Packages [27.6 kB]
Fetched 30.4 kB in 1s (40.4 kB/s)
Reading package lists... Done
ubuntu@ip-172-31-32-189:~$ sudo apt-get install jenkins
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  net-tools
The following NEW packages will be installed:
  jenkins net-tools
```

3. Check the Jenkins status. Whether it is running or not.

```

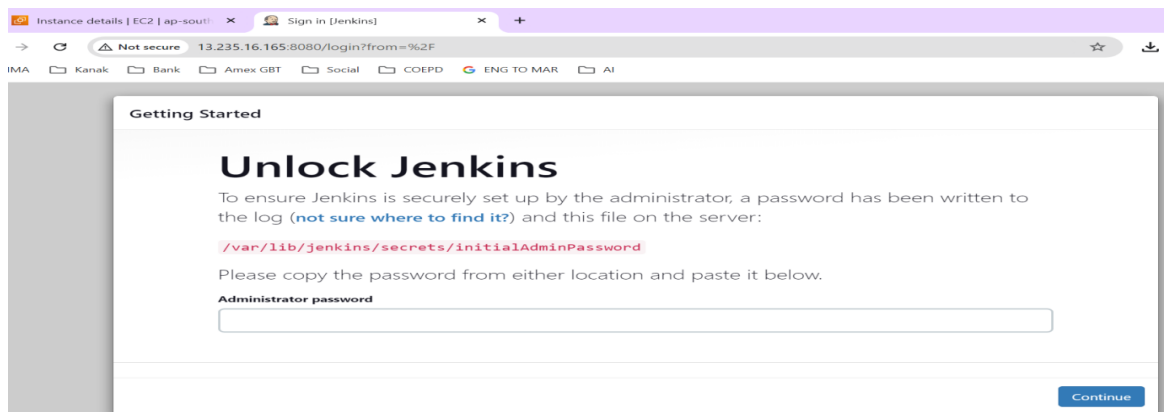
ubuntu@ip-172-31-32-189:~$ sudo systemctl status jenkins
● jenkins.service - Jenkins Continuous Integration Server
   Loaded: loaded (/usr/lib/systemd/system/jenkins.service; enabled; preset: enabled)
   Active: active (running) since Fri 2024-08-09 17:30:35 UTC; 53s ago
     Main PID: 4037 (java)
        Tasks: 44 (limit: 1130)
      Memory: 299.8M (peak: 346.6M)
         CPU: 17.310s
       CGroup: /system.slice/jenkins.service
              └─4037 /usr/bin/java -Djava.awt.headless=true -jar /usr/share/java/jenkins.war --webroot=/var/cac

Aug 09 17:30:26 ip-172-31-32-189 jenkins[4037]: 8d2c76a85ac6469da3a6d23fa074e28d
Aug 09 17:30:26 ip-172-31-32-189 jenkins[4037]: This may also be found at: /var/lib/jenkins/secrets/initialAdminPassword
Aug 09 17:30:26 ip-172-31-32-189 jenkins[4037]: *****
Aug 09 17:30:26 ip-172-31-32-189 jenkins[4037]: *****
Aug 09 17:30:35 ip-172-31-32-189 jenkins[4037]: 2024-08-09 17:30:35.702+0000 [id=31] INFO jenkins
Aug 09 17:30:35 ip-172-31-32-189 jenkins[4037]: 2024-08-09 17:30:35.754+0000 [id=24] INFO hudson
Aug 09 17:30:35 ip-172-31-32-189 systemd[1]: Started jenkins.service - Jenkins Continuous Integration Server.
Aug 09 17:30:36 ip-172-31-32-189 jenkins[4037]: 2024-08-09 17:30:36.661+0000 [id=47] INFO h.m.Dc
Aug 09 17:30:36 ip-172-31-32-189 jenkins[4037]: 2024-08-09 17:30:36.663+0000 [id=47] INFO hudson

```

4. Configure Jenkins master-slave :-

- If port 8080 is not functioning for Jenkins, navigate to the server, choose the security settings edit the inbound rule, and include port 8080. Save the modification and the access it through the browser, it should be operational now.

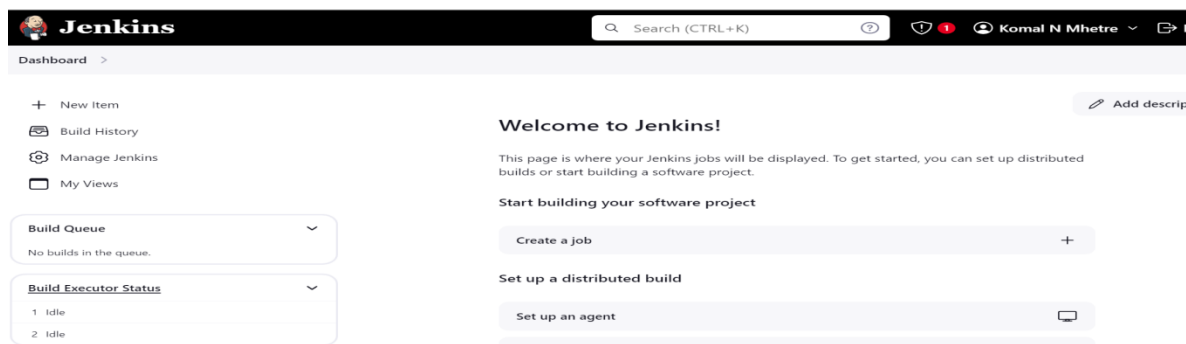
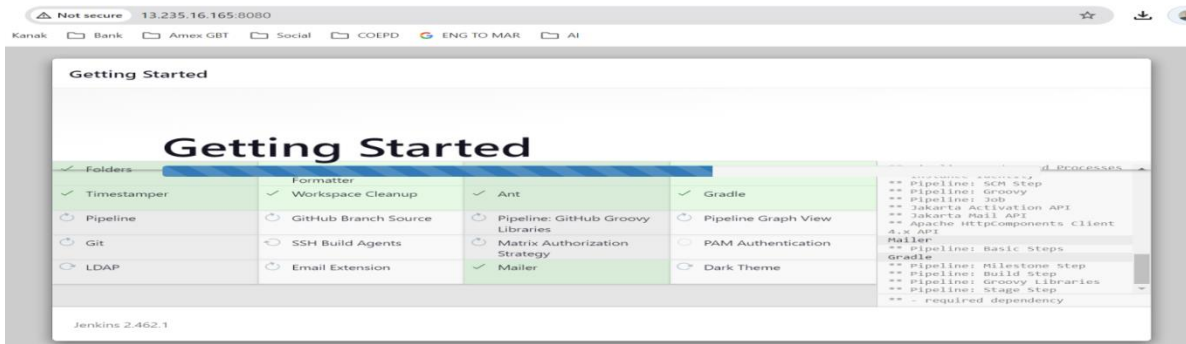


```

ubuntu@ip-172-31-32-189:~$ sudo cat /var/lib/jenkins/secrets/initialAdminPassword
8d2c76a85ac6469da3a6d23fa074e28d
ubuntu@ip-172-31-32-189:~$ |

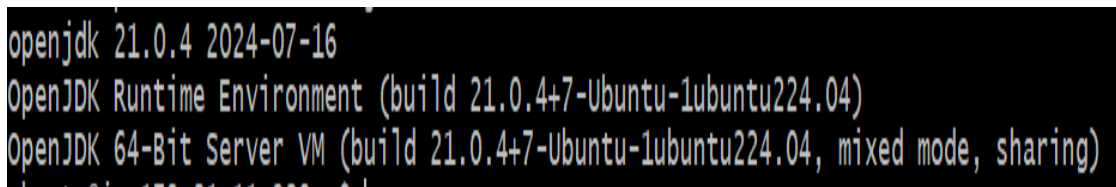
```

- Continue with the Jenkins setup in the web interface, selecting plugins, creating an admin user, And configuring Jenkins.



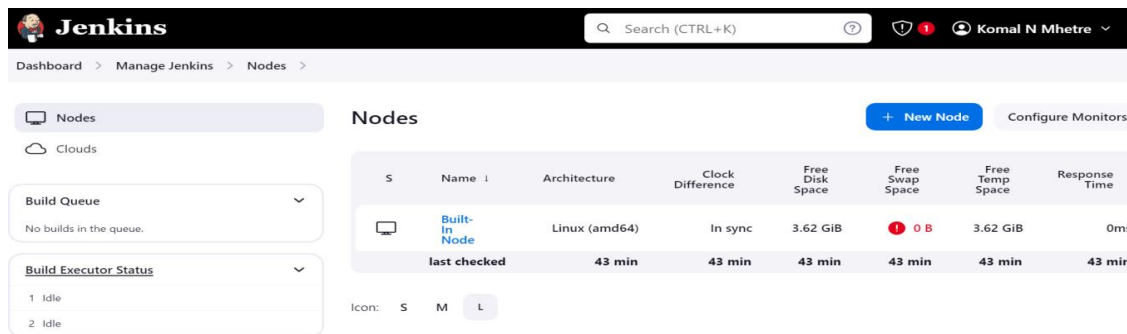
6. Jenkins slave setup :-

- On the slave node ensure java installed.



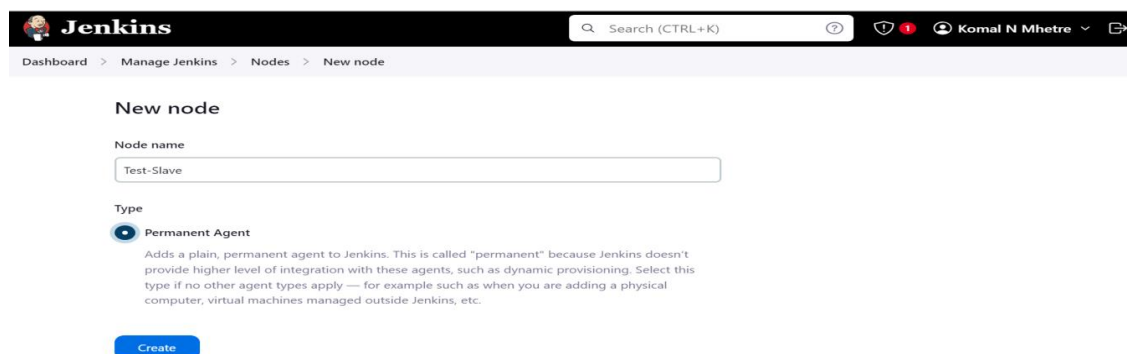
7. Create new node...

Go to "Manage Jenkins"> "Manage Nodes and Clouds"> "New Node".



The screenshot shows the Jenkins 'Nodes' page. On the left, there are two dropdown menus: 'Build Queue' (showing 'No builds in the queue.') and 'Build Executor Status' (showing '1 Idle' and '2 Idle'). The main area is titled 'Nodes' and contains a table with columns: S, Name, Architecture, Clock Difference, Free Disk Space, Free Swap Space, Free Temp Space, and Response Time. A single node is listed with the name 'Built-In Node', architecture 'Linux (amd64)', and various resource metrics. Below the table, there are icons for 'S', 'M', and 'L'.

8. Give the node name and select the type **permanent Agent**.



The screenshot shows the 'New node' form in Jenkins. The 'Node name' field contains 'Test-Slave'. Under the 'Type' section, 'Permanent Agent' is selected with a radio button. Below this, there is a descriptive text about permanent agents. At the bottom, there is a blue 'Create' button.

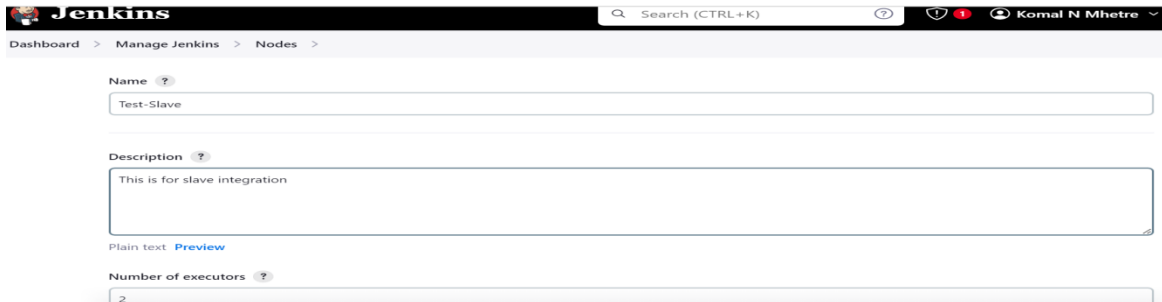
9. First lets create a directory where our Jenkins save the build logs or the work we execute. Create in slave node.

```
ubuntu@ip-172-31-43-31:~$ sudo su
root@ip-172-31-43-31:/home/ubuntu# cd /opt/
root@ip-172-31-43-31:/opt# mkdir jenkins
root@ip-172-31-43-31:/opt# cd jenkins/
root@ip-172-31-43-31:/opt/jenkins# cd ..
root@ip-172-31-43-31:/opt# ls
jenkins
root@ip-172-31-43-31:/opt# chmod 755 jenkins
root@ip-172-31-43-31:/opt# cd jenkins/
root@ip-172-31-43-31:/opt/jenkins# pwd
/opt/jenkins
root@ip-172-31-43-31:/opt/jenkins# |
```

10. Configure the node...

- **Name** : Create for new node and provide "Name"
- **Description** : Add a description for the node (optional)
- **Executors** : Number of executors
- **Remote root directory** : Path of the directory

- **Labels:** Add labels to categorize the node (e.g., slave1)
- **Usage:** Choose "Use this node as much as possible" to make this node available for builds.



Jenkins Search (CTRL+K) Komal N Mhetre

Dashboard > Manage Jenkins > Nodes >

Name ?
Test-Slave

Description ?
This is for slave integration
Plain text [Preview](#)

Number of executors ?
2



Dashboard > Manage Jenkins > Nodes >

Remote root directory ?
/opt/jenkins-slave

Labels ?
qa

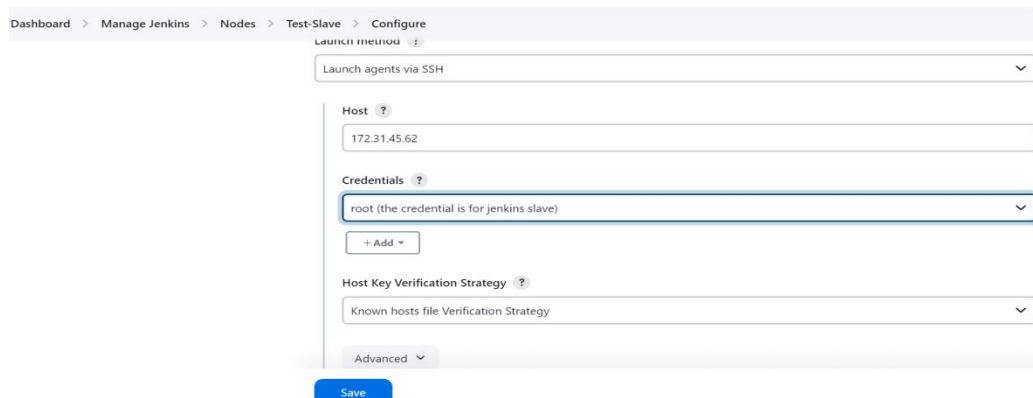
Usage ?
Use this node as much as possible

Launch method ?
Launch agent by connecting it to the controller

Availability ?
Keep this agent online as much as possible

[Save](#)

- Give the hostname and the credentials we created.



Dashboard > Manage Jenkins > Nodes > Test-Slave > Configure

Launch method ?
Launch agents via SSH

Host ?
172.31.45.62

Credentials ?
root (the credential is for jenkins slave)

+ Add

Host Key Verification Strategy ?
Known hosts file Verification Strategy

Advanced

[Save](#)

```

root@ip-172-31-45-62:/opt/jenkins-slave# ssh-keygen
Generating public/private ed25519 key pair.
Enter file in which to save the key (/root/.ssh/id_ed25519):
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /root/.ssh/id_ed25519
Your public key has been saved in /root/.ssh/id_ed25519.pub
The key fingerprint is:
SHA256:8+qNuqdt74Jk3yNss9e840tMr0a8eJC6p841Xz+hryU root@ip-172-31-45-62
The key's randomart image is:
+--[ED25519 256]--+
|
|   . o  S
|   o +.
|  .oo+e+o.o.
|  O+B*=X+=
|  B00+XXXo.
+-----[SHA256]-----+
root@ip-172-31-45-62:/opt/jenkins-slave# ls
root@ip-172-31-45-62:/opt/jenkins-slave# cd /root/.ssh/
root@ip-172-31-45-62:~/ssh# ls
authorized_keys  id_ed25519  id_ed25519.pub
root@ip-172-31-45-62:~/ssh# cat id_ed25519
-----BEGIN OPENSSH PRIVATE KEY-----
b3B1bnNzaC1rZXktZjEAAAAAAAAABG5vbmUAAAAAAAAAeBm9uZQAAAAAAAAABAAAAAwAAAAATzc2gtZW
QYNTUxOQAAACBMMbP3WstImJ1rkubz8oLz/Ex1kpjb1c3qrZ0mFhvyTwAAAJhaLFpQW1xa
UAAAAATzc2gtZWQYNTUxOQAAACBMMbP3WstImJ1rkubz8oLz/Ex1kpjb1c3qrZ0mFhvyTw
AAAEc29wUrpIScILjY8IG9WEM93/sk0tber3Mj5wRfWmVMNEws/daxM1YmKsq5vPygvP8
TGWSmNuVzeqtnSYWg/JPAAAAFHJvb3RAaXAtMTcyLTxLTQ1LTyyAQ==
-----END OPENSSH PRIVATE KEY-----
root@ip-172-31-45-62:~/ssh#

```

- Add credentials for slave-node connection.

Jenkins Credentials Provider: Jenkins

Add Credentials

Domain
Global credentials (unrestricted)

Kind
SSH Username with private key

Scope ?
Global (Jenkins, nodes, items, all child items, etc)

ID ?
jenkins-slave

- Copy and paste private-key under key section and add it.

Jenkins Credentials Provider: Jenkins

Username
root

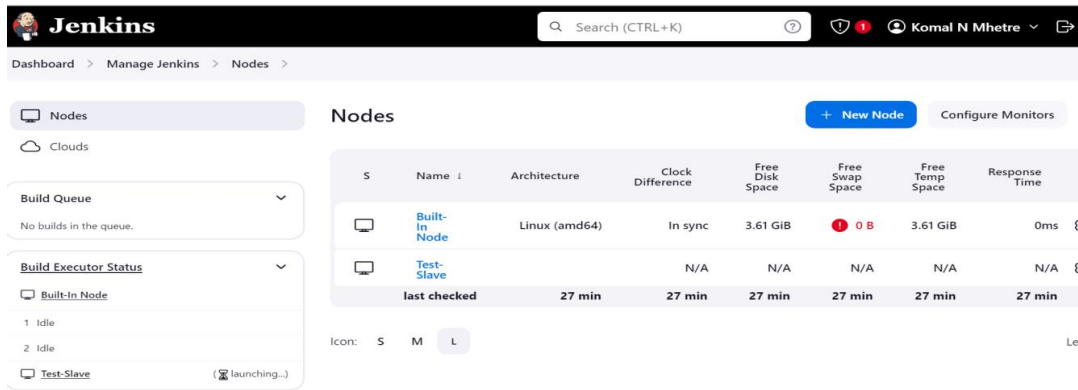
☐ Treat username as secret ?

Private Key
☒ Enter directly

Key
 AAAECz9WUrpIScILjY8IG9WEM93/sk0tber3Mj5wRfWmVMNEws/daxM1YmKsq5vPygvP8
 TGWSmNuVzeqtnSYWg/JPAAAAFHJvb3RAaXAtMTcyLTxLTQ1LTyyAQ==
 -----END OPENSSH PRIVATE KEY-----

Enter New Secret Below

- Save the configuration and start the node. If you're using SSH, Jenkins will automatically connect to the node.

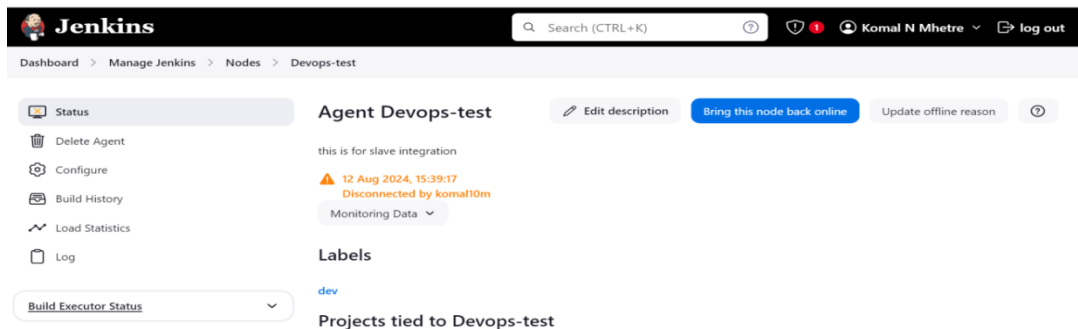


The screenshot shows the Jenkins 'Nodes' page. On the left, there's a sidebar with 'Nodes' selected, showing a 'Build Queue' with no builds and 'Build Executor Status' with two idle executors: 'Built-In Node' and 'Test-Slave'. The main area displays a table of nodes:

S	Name	Architecture	Clock Difference	Free Disk Space	Free Swap Space	Free Temp Space	Response Time
	Built-In Node	Linux (amd64)	In sync	3.61 GiB	0 B	3.61 GiB	0ms
	Test-Slave		N/A	N/A	N/A	N/A	N/A
	last checked	27 min	27 min	27 min	27 min	27 min	27 min

Below the table, there are icons for 'S', 'M', and 'L'.

- The agent is offline and we need to connect it.



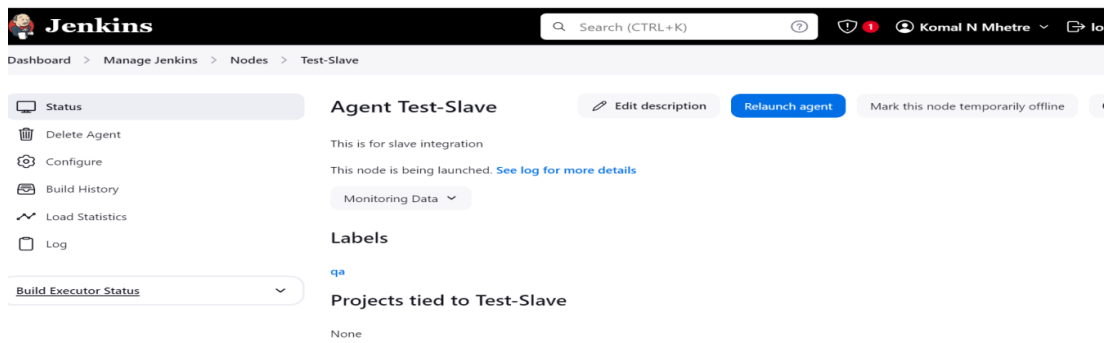
The screenshot shows the Jenkins 'Agent Devops-test' page. The left sidebar has 'Status' selected, showing options like 'Delete Agent', 'Configure', 'Build History', 'Load Statistics', and 'Log'. The main area shows the agent's status: 'this is for slave integration', a warning icon, and a message '12 Aug 2024, 15:39:17 Disconnected by komal10m'. There's a 'Monitoring Data' dropdown, 'Labels' (dev), and 'Projects tied to Devops-test'.

- Inside the slave node copy the public-key under Authorized_keys paste the public-key.

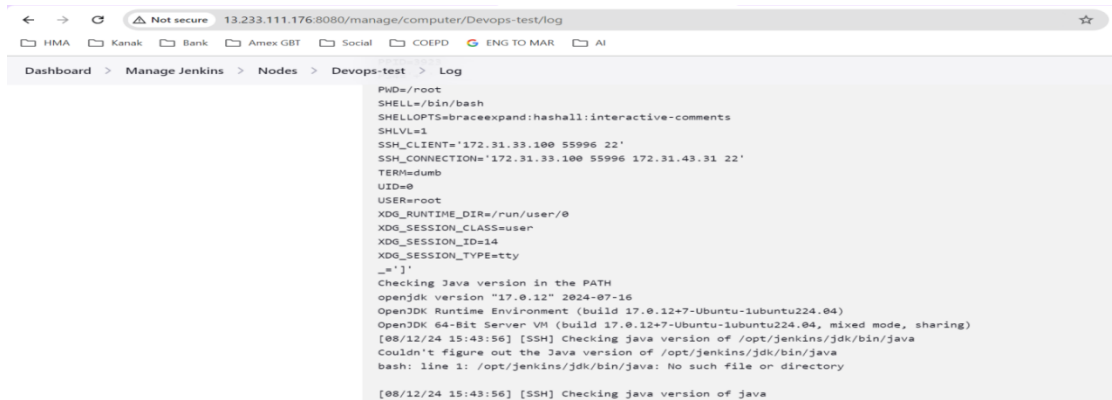
```
root@ip-172-31-45-62:~/.ssh# cat id_ed25519.pub
ssh-ed25519 AAAAC3NzaC1lZDI1NTE5AAAAIEwxs/daxMiYmKsq5vPygvP8TGWSmNuVzeqtnSYWG/JP root@ip-172-31-45-62
root@ip-172-31-45-62:~/.ssh# sudo vi authorized_keys
root@ip-172-31-45-62:~/.ssh#
```

```
AAAAC3NzaC1lZDI1NTE5AAAAIEwxs/daxMiYmKsq5vPygvP8TGWSmNuVzeqtnSYWG/JP root@ip-172-31-45-62
root@ip-172-31-45-62:~/.ssh#
```

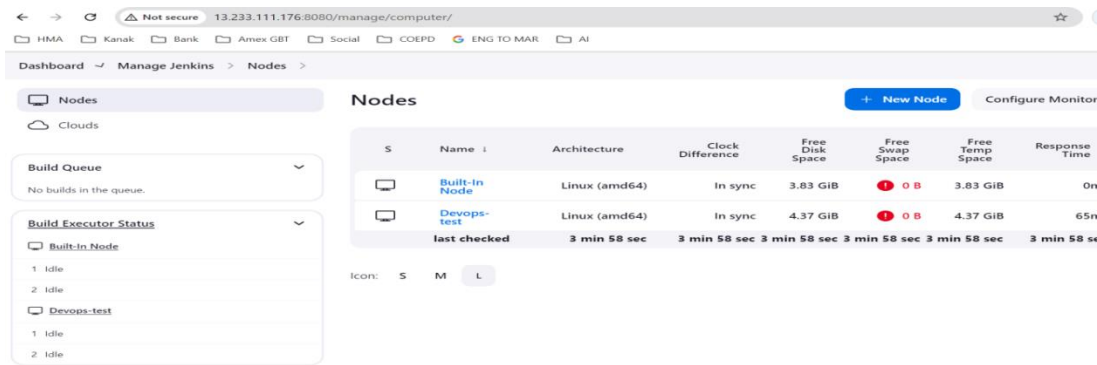
- Now click the **Launch Agent**



- Agent successfully connected.



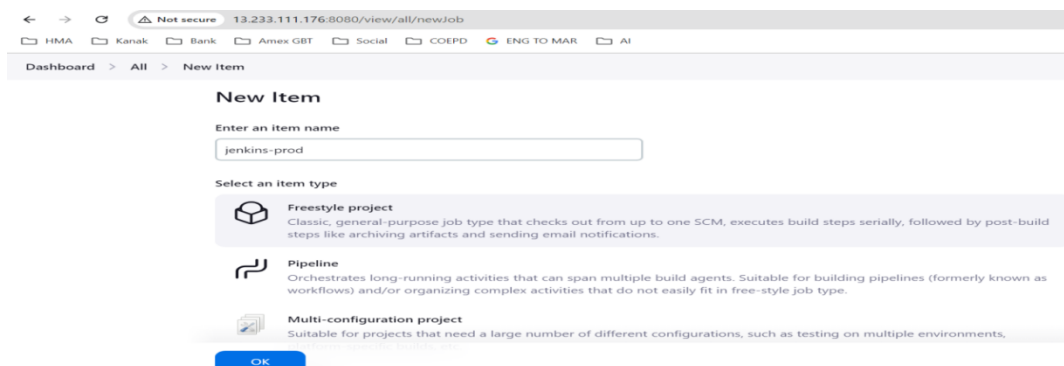
- Now you can see on the dashboard devops-slave in build executor.



- **Create a workspace in Jenkins Slave Node using Jenkins Free-style project.**

a) Create New Job :-

- On the Jenkins dashboard, click **New Item**.
- Enter a name for your project and select **Freestyle project**.
- Click **OK**.



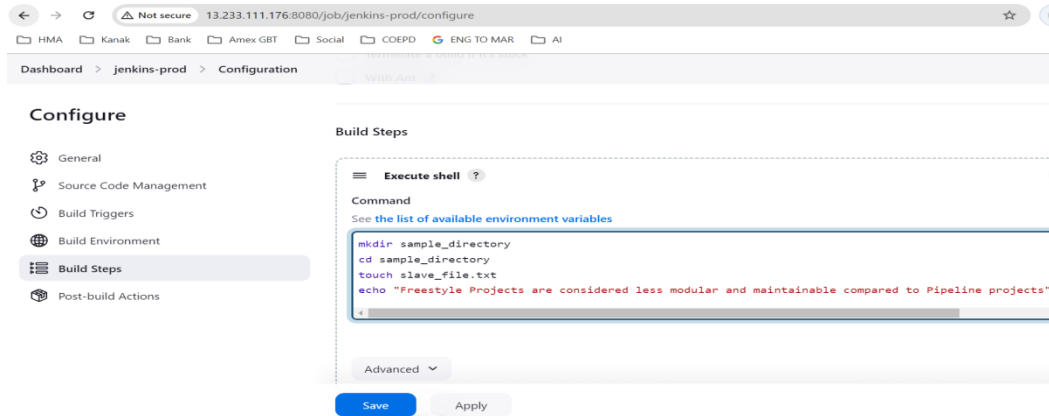
b) Configure the job :-

- **General** : Add a description if needed.
- Scroll down to "**Restrict where this project can be run**" field, enter the label of the slave node you configured.

c) Build section :-

- Scroll down to Build and click Add build step.
- Execute shell and add command as below...
- Mkdir sample_directory

- Cd sample_directory
- Touch slave_file.txt
- Echo "Freestyle projects are considered less modular and maintainable compared to pipeline projects "> slave_file.txt
- Save and run



- Click build now to run the job.

