

Jenkins End to End Project

Objective: To create a master node where Jenkins server will be running and sharing jobs to an agent node.

GitHub repository used in the project: <https://github.com/BineethSharma/Jenkins-node-todo-cicd.git>

Steps:

1. Generate SSH key in master node:

```
#cd .ssh/
```

```
#ssh-keygen
```

```
ubuntu@ip-172-31-62-246:~$ cd .ssh/
ubuntu@ip-172-31-62-246:~/.ssh$ ls
authorized_keys
ubuntu@ip-172-31-62-246:~/.ssh$ ls -al
total 12
drwx----- 2 ubuntu ubuntu 4096 Sep 26 06:25 .
drwxr-x--- 4 ubuntu ubuntu 4096 Sep 26 06:30 ..
-rw----- 1 ubuntu ubuntu 384 Sep 26 06:25 authorized_keys
ubuntu@ip-172-31-62-246:~/.ssh$ ssh-keygen
Generating public/private rsa key pair.
Enter file in which to save the key (/home/ubuntu/.ssh/id_rsa):
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /home/ubuntu/.ssh/id_rsa
Your public key has been saved in /home/ubuntu/.ssh/id_rsa.pub
The key fingerprint is:
SHA256:7JiZSLO+4xm4018CWXBnMaDYX18Jtvdhfcv1qk1SLw ubuntu@ip-172-31-62-246
The key's randomart image is:
+---[RSA 3072]-----+
| . o++o . . . |
| o + . o o . . o |
| . o . . . + . . o |
| + . o o . + . . |
```

```
i-07a5a8420b2b2058b (master)
```

```
PublicIPs: 100.25.137.244 PrivateIPs: 172.31.62.246
```

Note: Master node will keep the private key and the public key will be shared with the agent node

2. Copy the public key from the master node and paste it in agent node:

```
ubuntu@ip-172-31-62-246:~/.ssh$ ls
authorized_keys id_rsa id_rsa.pub
ubuntu@ip-172-31-62-246:~/.ssh$ cat id_rsa.pub
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAQGDwVso04DsiRiAIPkAwOWUQFz2d9/di5yAa71ZRMXjh0nAjl1k1sSm4z5cbIEHIMENT4zF9173LUM6Kocyb3Fi0DtEa1x7hKtLCXv/c1YUman7JbD0uA+ThvgCFR+fln9ddus
SY0721opPwEYqf5CeyfCm=11aQU/nhrqpb11012PqFh2oYKcA4TSLCUPnWwX7E01nsw1hTaV7FsgT2oICM1LdRovTl1BRDeI+8Cqj1b0WesdV2124u7Lenn3Wxi104PDCn1SLYmuYtub9p/24ROV1PI95dtfowh1nWp
cANJv6IYclTrEaz6c5712oqX8VtZdDcBgaQipBuOGYZwqfqturidi108W2700uImy3t5B84kV0z+/c17XMRz232H1Vz+dt1STo5NmFEcyUPB4Wka9LsoTbpCWDc9CEgqe8SNycy3GkP1msXu+wat8CR0xqrNEM00qbxwz0
31eOk3m1WZqdIrZ0DQm7aR1Nq3WRY1jW= ubuntu@ip-172-31-62-246
ubuntu@ip-172-31-62-246:~/.ssh$
```

```
ubuntu@ip-172-31-48-157:~$ cd .ssh/
ubuntu@ip-172-31-48-157:~/ssh$ ls -al
total 12
drwx----- 2 ubuntu ubuntu 4096 Sep 26 06:27 .
drwxr-x--- 4 ubuntu ubuntu 4096 Sep 26 06:31 ..
-rw----- 1 ubuntu ubuntu 384 Sep 26 06:27 authorized_keys
ubuntu@ip-172-31-48-157:~/ssh$ vim authorized_keys
```

i-0356894d10b8132d6 (agent)

```
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAQCr6g0y3qrFxpLE5LushduWFLYx19cSOia+ATCoBpltvRkAhGOYcmHhM24JGviIEAFLz//KALBL/BYV0xQQBoftc/THC3YWEdKqs+rrJtS/hxQthgU34vrw+CI5IssQjXdIVua
eS115AazCuErpXt7uezXk9nPaDIKLhw+luTmPXTNulyiPb0FEU4taVaQHDNxa1MTau5Xy/wkEt5i9hmK5x4bpmxpY4NLX5pAdtg/G//1GqeGb7c431uARQ9tH8gozEzdvCHXM1QwIN+NQ1ex1gk6wtf4z4icd/yAsXogKAPHK
clk+h9y14T9H2izyS3U089aiIEcscKq/Qfqp nA
```

```
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAQCr6g0y3qrFxpLE5LushduWFLYx19cSOia+ATCoBpltvRkAhGOYcmHhM24JGviIEAFLz//KALBL/BYV0xQQBoftc/THC3YWEdKqs+rrJtS/hxQthgU34vrw+CI5IssQjXdIVua
eS115AazCuErpXt7uezXk9nPaDIKLhw+luTmPXTNulyiPb0FEU4taVaQHDNxa1MTau5Xy/wkEt5i9hmK5x4bpmxpY4NLX5pAdtg/G//1GqeGb7c431uARQ9tH8gozEzdvCHXM1QwIN+NQ1ex1gk6wtf4z4icd/yAsXogKAPHK
clk+h9y14T9H2izyS3U089aiIEcscKq/Qfqp nA
```

```
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAQCr6g0y3qrFxpLE5LushduWFLYx19cSOia+ATCoBpltvRkAhGOYcmHhM24JGviIEAFLz//KALBL/BYV0xQQBoftc/THC3YWEdKqs+rrJtS/hxQthgU34vrw+CI5IssQjXdIVua
eS115AazCuErpXt7uezXk9nPaDIKLhw+luTmPXTNulyiPb0FEU4taVaQHDNxa1MTau5Xy/wkEt5i9hmK5x4bpmxpY4NLX5pAdtg/G//1GqeGb7c431uARQ9tH8gozEzdvCHXM1QwIN+NQ1ex1gk6wtf4z4icd/yAsXogKAPHK
clk+h9y14T9H2izyS3U089aiIEcscKq/Qfqp nA
ubuntu@ip-172-31-62-246
```

3. Installation of Jenkins on the master node:

Java installation:

```
#sudo apt update
```

```
#sudo apt install openjdk-17-jre
```

Jenkins installation:

```
curl -fsSL https://pkg.jenkins.io/debian-stable/jenkins.io-2023.key | sudo tee \
/usr/share/keyrings/jenkins-keyring.asc > /dev/null
```

```
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
```

```
sudo apt-get update
```

sudo apt-get install jenkins

4. Check and add port 8080 in the security group of master node:

Security group rule ID	Type	Protocol	Port range	Source	Description - optional	Actions
sg-0dc95885ad9669730	HTTP	TCP	80	Custom	0.0.0.0/0	Delete
sg-0293b0883473c0807	SSH	TCP	22	Custom	0.0.0.0/0	Delete
sg-037b6b93f92a44a25	HTTPS	TCP	443	Custom	0.0.0.0/0	Delete
-	Custom TCP	TCP	8080	Anyw...	0.0.0.0/0	Delete

Buttons: Add rule, Cancel, Preview changes, Save rules

5. Copy the ip address of master node and paste it along with the port 8080 to view the jenkins page:

Ip_address:8080

Getting Started

Unlock Jenkins

To ensure Jenkins is securely set up by the administrator, a password has been written to the log ([not sure where to find it?](#)) and this file on the server:

```
/var/lib/jenkins/secrets/initialAdminPassword
```

Please copy the password from either location and paste it below.

Administrator password

Continue

6. Copy the password to access jenkins from the following directory:

```
ubuntu@ip-172-31-62-246:~$ sudo cat /var/lib/jenkins/secrets/initialAdminPassword
b317e4c69fb94dc6a878bfc6cd7fcd0
ubuntu@ip-172-31-62-246:~$
```

i-07a5a8420b2b2058b (master)

PublicIPs: 100.25.137.244 PrivateIPs: 172.31.62.246

7. Follow the login steps:

Getting Started

Customize Jenkins

Plugins extend Jenkins with additional features to support many different needs.

Install suggested plugins

Install plugins the Jenkins community finds most useful.

Select plugins to install

Select and install plugins most suitable for your needs.

Jenkins 2.414.2

Getting Started

Create First Admin User

Username

Bineeth

Password

.....

Confirm password

.....

Full name

Bineeth Sharma

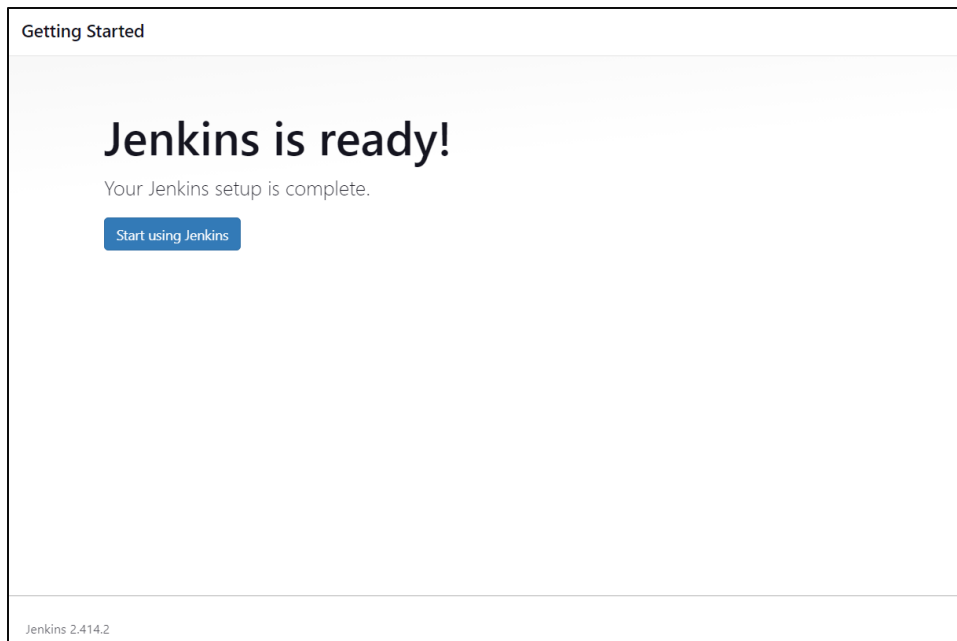
E-mail address

biineethsharma@gmail.com

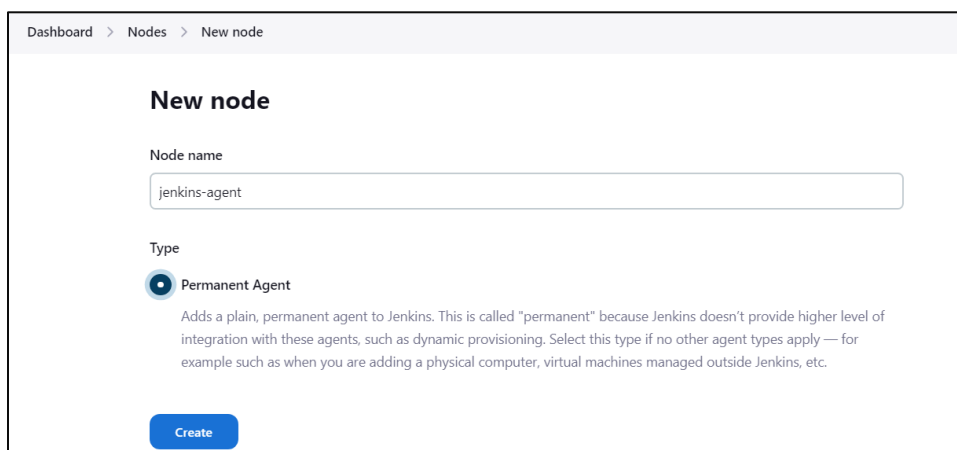
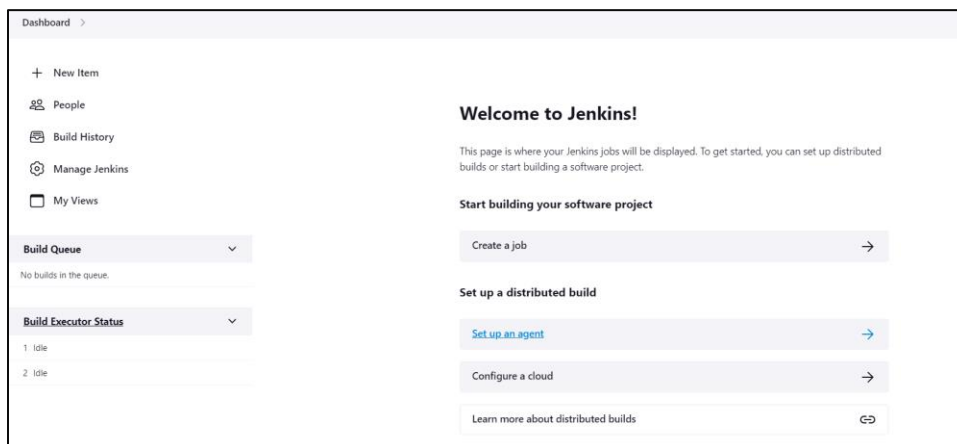
Jenkins 2.414.2

Skip and continue as admin

Save and Continue




8. Select Set up an agent option and enter a name:




9. Enter the following details for connecting with the agent node:

Dashboard > Nodes >


Name 

jenkins-agent


Description 

This is an agent to run Jenkins jobs


Plain text [Preview](#)

Number of executors 


1

Remote root directory 


/home/ubuntu

Labels 


agent

Usage 

Use this node as much as possible

Launch method 

Launch agents via SSH

Host 

3.84.238.220

Note: Here Host refers to the ip address of the agent node

10. Select Jenkins from the credentials section and enter the following details:

Credentials 

- none -

[Add +](#)

 Jenkins

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 

ssh-key

Description ?

This the private key of master

Username

ubuntu

☐ Treat username as secret ?

Private Key

☒ Enter directly

Key

No Stored Value

Add

11. Now, go to the master node, copy the private SSH key and paste it in Jenkins:

#cd ssh/

#cat id_rsa

```
ubuntu@ip-172-31-62-246:~/.ssh$ cat id_rsa
-----BEGIN OPENSSH PRIVATE KEY-----
b3BlbnNzaC1rZXktdjEAAAABG5vbmUAAAABbm9uZQAAAAAAAAABAAAblwAAAAAdzc2gtcn
NhAAAAAwEAAQAAAEYA1bDuA7Iq4gCKSgMNF1BrhXNffw4scgGu4tg1144dJwI5a5NbEpu
M2eXGyBLRzBDU5GxfSO9yxzPCjnsmyItA7RMWtce4ZCrZQ17/3JWFJmp+42wzrgPk4b4A
n0fn25/XXbrkmEO89aKvCBBan0nKgmApsCI2qp1P50a0Km9ZdJdq0LRYdjmJHAOE0rS01A
1gMG8ezw9Z8VooU2md07KvE80CAhzLbXR6L05Z5fEQ3ovnlwkIm1MXknWNi00Luy7Jpy97
14ojvj1HJ9bC2JrmLbgeaf9uGT1SD5Y0XbXzlpIjcAz3ADSB80iGHJU6xGs+nEu49qEF/M
07cwQ+iQYLGk6fLjhmGcEH6i7q4nYtPFme9FLkZst7eQfOJFVK/v3Ne1zChM99h9Vc6/n
bdUk60TZhRHmmlDweFipvS0qE26Q1g3PQhKKhvEjcnMtxpD4prMbvsGrfHEUaManzXzPNK
m8cMztyHjpn5tYlmlULnSM9A0Kjo2kdTat1isiI8DAAAFkJ/6JMCf+iTAAAAAB3NzaC1yc2
EAAAAGBANWw7gOyKuIAikoDDRZQa4VzZ3380LHIBruLYNZeOHScCOWuTWxKbjNnlxsgS0cw
Q1ORsX0jvcsczwo57JvcilQ00TfrXHuGqg2UJe/9yVhSZqfNsm64D5OG+AJ9H59uf1126
5JhDvPWl1XAQWp9JyqpgKbAiNqgdT+dGtCpVWXSXatC0WHY5iRwDhNK0tJQNYDBvHs8PWf
FaKfNpg9OyrxPNAgIcy210ei90WeXxEN6L55cJCJtTF5J1jYtDi7suyacve9eKI749RyFW
wtia5i24Hmn/bhk5Ug+WD12185aSI3AM9wa0m/DohhyVOSRrPpxLuPahBfzDu3MEpOkGCx
pAeny44ZhnBB+ou6uJ2LTxZnvRS5GbLe3kHziRVsv79zXtcwoTPfYfVXov523VJojk2YUR
zJpQ8HhYqb0tKhNukJYNz0ISpB7xi3JzLcaQ+KazG77Bq3xxFGjGp818zzSpvHDM7ch46T
```

i-07a5a8420b2b2058b (master)

Description ?

This the private key of master

Username

ubuntu

☐ Treat username as secret ?


Private Key


☒ Enter directly


Key


Enter New Secret Below


-----END OPENSSH PRIVATE KEY-----


Credentials 

ubuntu (This the private key of master) 


Add 

Host Key Verification Strategy 


Non verifying Verification Strategy 

Advanced 

Availability 

Keep this agent online as much as possible 

Node Properties

☐ Disable deferred wipeout on this node 

☐ Environment variables


☐ Tool Locations

Save

12. Install Java on the agent node to complete the connection:


#sudo apt update

#sudo apt install openjdk-17-jre


	jenkins-agent	Linux (amd64)	In sync	5.34 GB	 0 B	5.34 GB	20ms 
Data obtained	0.23 sec	0.23 sec	0.23 sec	0.23 sec	0.23 sec	0.23 sec	0.23 sec


13. Creating the declarative pipeline in Jenkins:


Enter an item name


todo-app-cicd 

» Required field

 **Freestyle project**
This is the central feature of Jenkins. Jenkins will build your project, combining any SCM with any build system, and this can be even used for something other than software build.

 **Pipeline**
Orchestrates long-running activities that can span multiple build agents. Suitable for building pipelines (formerly known as workflows) and/or organizing complex activities that do not easily fit in free-style job type.

 **Multi-configuration project**
Suitable for projects that need a large number of different configurations, such as testing on multiple environments, platform-specific builds, etc.

 **Folder**
Creates a container that stores nested items in it. Useful for grouping things together. Unlike view, which is just a filter, a folder creates a namespace, so you can have multiple things of the same name as long as they are in different folders.

OK

Dashboard > todo-app-cicd > Configuration

Configure

General **Enabled**

General

Advanced Project Options

Pipeline

Description

This is create a job and run the todo application in the agent node

Plain text [Preview](#)

☐ Discard old builds ?

☐ Do not allow concurrent builds

☐ Do not allow the pipeline to resume if the controller restarts

☒ GitHub project

Project url ?

<https://github.com/BineethSharma/node-todo-cicd.git>

Configure

General **Build Triggers**

Advanced Project Options

Pipeline

☐ Build after other projects are built ?

☐ Build periodically ?

☒ GitHub hook trigger for GITScm polling ?

☐ Poll SCM ?

☐ Quiet period ?

☐ Trigger builds remotely (e.g., from scripts) ?

14. Enter the following pipeline groovy script:

```
pipeline {
  agent {label 'jenkins-agent'}

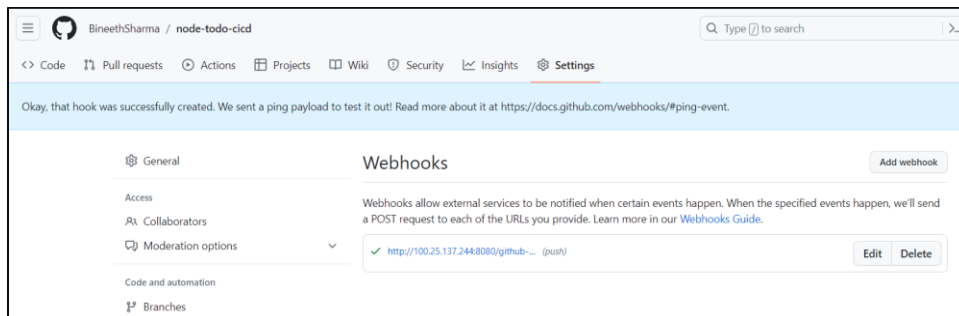
  stages{
    stage("GitHub"){
      steps {
        git url: 'https://github.com/BineethSharma/node-todo-cicd.git' , branch: 'master'
      }
    }
    stage('Build and Test the application'){
      steps{
        sh 'docker build . -t todo-app'
      }
    }
    stage("Deploying the app"){
```

```

steps{
  sh 'docker-compose down && docker-compose up -d'
}
}
}
}
}

```

15. Create a webhook on GitHub to automate the deployment if any changes are pushed:



16. Install docker and docker-compose on agent node:

```

#sudo apt-get install docker.io
#sudo apt-get install docker-compose
#sudo usermod -aG docker $USER
#sudo reboot

```

17. The output received on port 8000 will be:



⚠ Not secure | 3.84.238.220:8000/todo



My Drive - Google...



SharePoint



Password - Google...

My todo application

What shoud I do?

Add