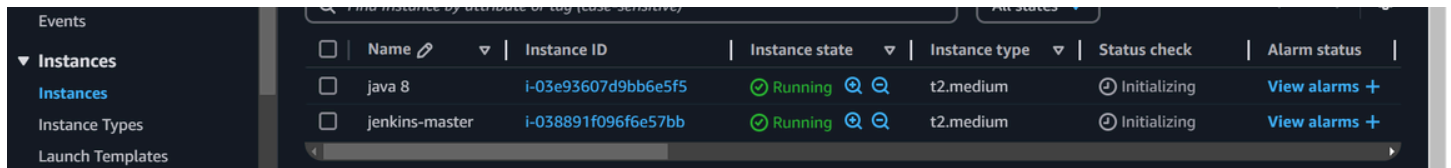


# SETTING UP A JENKINS CI/CD PIPELINE FOR DOCKERIZED JAVA APPLICATIONS WITH MULTIPLE JAVA VERSIONS

## 1. Initial Setup:

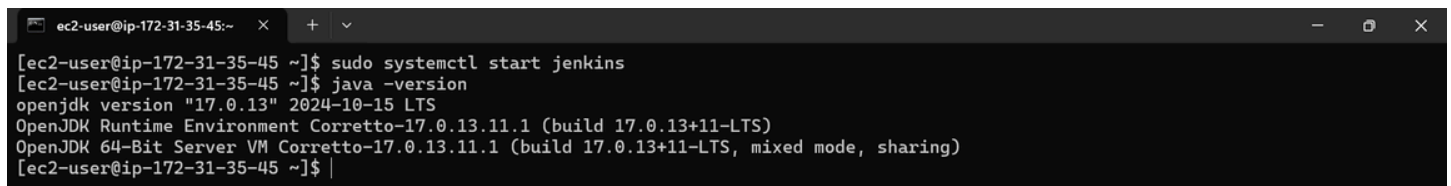
- Jenkins Master (jenkins-masters EC2): You installed Jenkins and Java 17.
- Java 8 Instance (java 8 EC2): You installed Java 1.8.0, Git, Maven, and Docker.



The screenshot shows the AWS Management Console 'Instances' page. A table lists two EC2 instances: 'java 8' and 'jenkins-master'. Both are in a 'Running' state. The 'Status check' column shows 'Initializing' for both. The 'Alarm status' column has a 'View alarms' link for each instance.

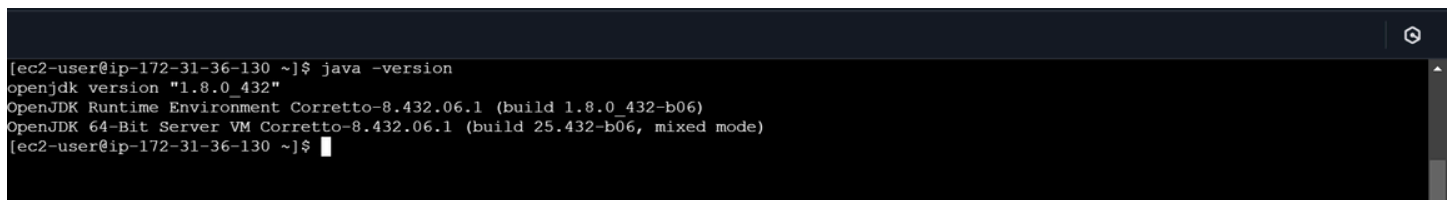
	Name	Instance ID	Instance state	Instance type	Status check	Alarm status
<input type="checkbox"/>	java 8	i-03e93607d9bb6e5f5	Running	t2.medium	Initializing	<a href="#">View alarms +</a>
<input type="checkbox"/>	jenkins-master	i-038891f096f6e57bb	Running	t2.medium	Initializing	<a href="#">View alarms +</a>

## In Jenking master



```
ec2-user@ip-172-31-35-45:~$ sudo systemctl start jenkins
[ec2-user@ip-172-31-35-45 ~]$ java -version
openjdk version "17.0.13" 2024-10-15 LTS
OpenJDK Runtime Environment Corretto-17.0.13.11.1 (build 17.0.13+11-LTS)
OpenJDK 64-Bit Server VM Corretto-17.0.13.11.1 (build 17.0.13+11-LTS, mixed mode, sharing)
[ec2-user@ip-172-31-35-45 ~]$
```

## In Java 8



```
ec2-user@ip-172-31-36-130 ~]$ java -version
openjdk version "1.8.0_432"
OpenJDK Runtime Environment Corretto-8.432.06.1 (build 1.8.0_432-b06)
OpenJDK 64-Bit Server VM Corretto-8.432.06.1 (build 25.432-b06, mixed mode)
[ec2-user@ip-172-31-36-130 ~]$
```

```
ec2-user@ip-172-31-36-130:~  
Verifying      : docker-25.0.6-1.amzn2023.0.2.x86_64      2/18  
Verifying      : git-2.40.1-1.amzn2023.0.3.x86_64        3/18  
Verifying      : git-core-2.40.1-1.amzn2023.0.3.x86_64    4/18  
Verifying      : git-core-doc-2.40.1-1.amzn2023.0.3.noarch 5/18  
Verifying      : iptables-libs-1.8.8-3.amzn2023.0.2.x86_64 6/18  
Verifying      : iptables-nft-1.8.8-3.amzn2023.0.2.x86_64 7/18  
Verifying      : libcgrou-3.0-1.amzn2023.0.1.x86_64       8/18  
Verifying      : libnetfilter_conntrack-1.0.8-2.amzn2023.0.2.x86_64 9/18  
Verifying      : libnfnethlink-1.0.1-19.amzn2023.0.2.x86_64 10/18  
Verifying      : libnfnethnl-1.2.2-2.amzn2023.0.2.x86_64 11/18  
Verifying      : perl-Error-1:0.17029-5.amzn2023.0.2.noarch 12/18  
Verifying      : perl-File-Find-1.37-477.amzn2023.0.6.noarch 13/18  
Verifying      : perl-Git-2.40.1-1.amzn2023.0.3.noarch    14/18  
Verifying      : perl-TermReadKey-2.38-9.amzn2023.0.2.x86_64 15/18  
Verifying      : perl-lib-0.65-477.amzn2023.0.6.x86_64   16/18  
Verifying      : pigz-2.5-1.amzn2023.0.3.x86_64          17/18  
Verifying      : runc-1.1.14-1.amzn2023.0.1.x86_64        18/18  
  
Installed:  
containerd-1.7.23-1.amzn2023.0.1.x86_64  
git-2.40.1-1.amzn2023.0.3.x86_64  
git-core-doc-2.40.1-1.amzn2023.0.3.noarch  
iptables-nft-1.8.8-3.amzn2023.0.2.x86_64  
libnetfilter_conntrack-1.0.8-2.amzn2023.0.2.x86_64  
libnfnethnl-1.2.2-2.amzn2023.0.2.x86_64  
perl-File-Find-1.37-477.amzn2023.0.6.noarch  
perl-TermReadKey-2.38-9.amzn2023.0.2.x86_64  
pigz-2.5-1.amzn2023.0.3.x86_64  
docker-25.0.6-1.amzn2023.0.2.x86_64  
git-core-2.40.1-1.amzn2023.0.3.x86_64  
iptables-libs-1.8.8-3.amzn2023.0.2.x86_64  
libcgrou-3.0-1.amzn2023.0.1.x86_64  
libnfnethlink-1.0.1-19.amzn2023.0.2.x86_64  
perl-Error-1:0.17029-5.amzn2023.0.2.noarch  
perl-Git-2.40.1-1.amzn2023.0.3.noarch  
perl-lib-0.65-477.amzn2023.0.6.x86_64  
runc-1.1.14-1.amzn2023.0.1.x86_64  
  
Complete!  
[ec2-user@ip-172-31-36-130 ~]$ sudo service docker start  
Redirecting to /bin/systemctl start docker.service  
[ec2-user@ip-172-31-36-130 ~]$
```

# installed Java 1.8.0, Git, Maven, and Docker

## 2. Jenkins Setup:

- You connected to the Jenkins master and completed the Jenkins setup using the public IP.
- You installed the **SSH Agent Plugin** on Jenkins to manage SSH keys.

[Report an issue with this plugin](#)

**SSH Agent Plugin** 376.v8933585c69d3

This plugin allows you to provide SSH credentials to builds via a ssh-agent in Jenkins.

[Report an issue with this plugin](#)

## 3. SSH Key Setup:

- You generated a key pair using **ssh-keygen** and added the public key to the authorized\_keys on the Java 8 instance.
- You configured Jenkins credentials using the SSH private key to allow Jenkins to connect to the Java 8 instance.

```
ec2-user@ip-172-31-36-130 ~]$ sudo service docker start
Redirecting to /bin/systemctl start docker.service
[ec2-user@ip-172-31-36-130 ~]$ ssh-keygen
Generating public/private rsa key pair.
Enter file in which to save the key (/home/ec2-user/.ssh/id_rsa):
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /home/ec2-user/.ssh/id_rsa
Your public key has been saved in /home/ec2-user/.ssh/id_rsa.pub
The key fingerprint is:
SHA256:5UuIJSHVW1CbAibsvONyKkp+8TdH5dMKPeUZhOt+Dlw ec2-user@ip-172-31-36-130.ap-south-1.compute.internal
The key's randomart image is:
+---[RSA 3072]-----+
|
|.oo0ooo...
|o* *. o+
|o. = +o+.o
|. +.+.+.o
| . o . S.= E
|o . + . o.=
|o . . o ..+
|. . o ...
|
+---[SHA256]-----+
[ec2-user@ip-172-31-36-130 ~]$
```

```
ec2-user@ip-172-31-36-130: ~, x + v
[ec2-user@ip-172-31-36-130 ~]$ cd ~/.ssh
[ec2-user@ip-172-31-36-130 .ssh]$ ls
authorized_keys id_rsa id_rsa.pub
[ec2-user@ip-172-31-36-130 .ssh]$
```

## vi id\_rsa

```
ec2-user@ip-172-31-36-130: ~, x + v
-----BEGIN OPENSSH PRIVATE KEY-----
b3B1bnNzaC1rZXktZjEAAAABAGSvbmUAAAABbm9uZQAAAAAAAAABAAAblwAAAAZdc2gtcn
NhAAAAAwEAAQAAAYEAgcn79kAa0w8+0Sf0JymCz1L4ZV4UznYFVC16YN6qVSzZ6+0nN5
ce/J5+ehmJULQnkmNvAx3/6vf4TX/40tBrBfPwOLmXswwaHdsdD8Q2E2kc90e3ne1aBtp
vRw2CiTXL+18MoerzAV2pPwBTZiHd/zZ1tXfB88NXf+hmM8a740haSTVqJc7E0eDLwcOP5
Uwrdachdb9yAuKJEG0G0qb5SGBadgggsRzU+0SKh/YoHqKbXbb+Z31gMUYf1m1JLm7ghfrG
K1nqsSgV5j1DGZ+Gvc1ZLuRnCNJuAX1wY8VRBL+1HZJ4wehp2yPolV5a1TBKYM/LnMphI8
+Y7COE81XE2XNH1fFEPA7BNVgF8mC1L86oVABQG3tanaT8HjRtvcP7AmYSTnvV+6bPJa6W
1B20FepP2/AVI6TuAG6/BSrVpD7YR/hpFmP/+0Z6SedDU2Am6g19nekAj3W6NycSeBC7Uh
nae+EmHJkFmnbxex30Y3/BxpUy23mE5f5H6s0JAAAFsJFF/M1RRfz1AAAB3WzaC1yc2
EAAAGBAH3+/ZAQ3pPpjvEnzicpg9y0cGvFMSHMBVQemDeqLUe2avtJzeXBPyeFnoZiV
JUJ5jJbmHd/+38eE1/+NLQa2xtf8DpZ17M3h3bHQ/ENhNpHpdHt53tWgbab0cNgok1y7Y
vDMHgBwFqT1gU2SIQ/82dbV3mfPDV3/ocDPGu+NIWkl1a1XoNhtgy8HDj+VFq3WnIXW/c
gLiIREBEtEG0hgMnYIIEc1PtEiof2KB6im122/md9YDFCH4ptSS5u4IX6xitZ6+EoFeY9
QxmFhr31m7KzWjY7qF4qGPFUQ5/1B2SaMHoadsJ63VoleUwSmFv5ZzKYSPPDWjhPNVnN
LzR4nXRd0wTVYBf3gtS/OqFOAUBt7Wp2k/B40bbwJ+mJm0U571fumzyWulogdjn3qadV2
LS0K7gBuvmUq1aQ+2EF4aX5j//jmeknnQ1NgJueNFZ3pAI91ujcnEngQu1I2ZnsRMBYzJ8
bp2S8Xt9GN/wcabmNtSh0TH+YerD1QAAAAMBAEAAAGAIzNTZU2ab5EqSU6B+not5I102L
JpW17Fq/Lj2BX+10GAbCkeSvirmoThV0awwq/Mu7Mc5LCPb1dmZ30VFydcRu6ztYtJNgwt
wunI2oFnyR+BtzTLDuQ7rKEms/YHSAgG3ntEy5MVSA/BRmsZ2x73XZ0vrb8irrZ+vJm8
1Ay3mnVcn1dJ0x45rkyAJqvyBbY4EwBBGxGxTjcgOLL705nQ8Y6cM5jp+puF40bjyaU/
15F5kudYB8UwL+Ma8HtgghRMqkmQZqK9p17rNUHeQah/Rf20V4WFkmH90ahB/JHXRznru
TBG6f6f8tegtBtkKQ77mp1p5STbanhU5M2DC1KI6LEihHtga0NweVIK+RiFbtP9tUXnQNB
1f76k7BhYv+YII83/Fko+suIfY9UmmFmJvzWiH0zH/G+6qxaNZxy+RrNRLisPtEtGwJi
08WjY926H8xueePDYqQIE10m3mh0dPk3dcesZIEy5t5y6NQWd5rj6X8vkT/r2IT0W7AAAA
wBo/y2FatLPvRad69FjSmrF6/d+b0uENM9prob0at0y8QuL/qhAOfdejjf/wLst4XHYccv
C8/e992oCuhwhYpI9TUj6FMv716F2RZLWJmny/vCkTDUrhout92LL0JtTDHYtmPcm7K
t1f45FXT0sFymXKu4uzkOvdYgM860AKm6QSYO1UPTwuonirRM/dd4KsC107rInbJEOVOM
v50Ua31L5n0TyvDBBDZ+Cdc2zSc5YdHsqVU0xSxe5FIs2ogAAAMEAtZaX3ESjr3JVOeY
10ppjmdT5ZFDDxT8symCc3+0VzRh61Mzz5NYn6XOMG8Xf3QZqTw/b7Nm/LoLxRHQ6vgi7p
S6h0nMZSfAm4dLwyuv8laH2WbHLT73kioKwsJW1g2FkPvBIvzXX957f3Yg0j1poqP+IM/D
01580LHJ+qHBCNB90+NUH9FmLfwhsBmCy72Y0m5YJFBC7U6J274UHFhtHXyzaKfGJTjfy
v//p2LP/f9sWY64tvHYKvBNI4pXqKJAAAAwQC2+WvhkYgF0h0ZOV/AdAxh+tr/UwZqys0h
D+TeWdPgPipw6wTbhNiJXdPzuWhTLBc07eW5PENULUKMTRDFV4nbXgSqXzR3r80Lgy9
VpQondnhdzIQ+9mdL5NxsU8b3yemMOQoAVhDuwlhL1rao67xDeYvvjRKwMJ7/6ilw/mXuI
no1rLrbKLFMS2rjmeSN8oH1CfLz9FQGCnLSR//oyrN3suCtaCc8t5+/rLcJ0SkJpcg9gG
l9050nUozD+MAAAA1ZWMyLXVzZXJAAaXAtMTcyLTmZLTmZLTmZLTmZLTmZLTmZLTmZLTm
bXB1dGUuaw50ZXJuYm90MEBQY=
-----END OPENSSH PRIVATE KEY-----
~
~
~
```

Instances | EC2 | ap-south-1 | EC2 Instance Connect | ap-south-1 | New credentials [Jenkins] | ChatGPT

Not secure 13.233.164.105:8080/manage/credentials/store/system/domain/\_/newCredentials

Google Chrome isn't your default browser Set as default

# Jenkins

Search (CTRL+K) admin log out

Dashboard > Manage Jenkins > Credentials > System > Global credentials (unrestricted)

## New credentials

Kind

- Username with password
- Username with password
- GitHub App
- SSH Username with private key
- Secret file
- Secret text
- Certificate

Create

ID ?

ssh-agent

Description ?

Username

ssh-agent

☐ Treat username as secret ?

☐ Treat username as secret ?

Private Key

☒ Enter directly

Key

Enter New Secret Below

```
no1r1RbKLFM52rjmeSN8oHiCfLz9FQGcn1SR//oyrN3suCtaCc8r5+/r1scJ0SkJpcg9gG
190S0nIUzD+MAAAA1ZWMyLXVzZXJAaXAtMTcyLTMxLTM2LTEzMC5hcC1zb3V0aC0xLmNv
bXB1dGUuaw50ZXJyYm9AgMEBQY=
-----END OPENSSH PRIVATE KEY-----
```

Create

21°C Partly cloudy Search ENG IN 12:23 AM 24-12-2024

## 4. Pipeline Configuration:

You created a Pipeline project in Jenkins, and your pipeline consists of four stages:

- Clone Repository: Clones the Git repository from GitHub to the Java 8 instance.
- Build on Remote EC2: Runs a Maven build on the Java 8 instance to compile the project.
- Build Docker Image: Builds a Docker image on the Java 8 instance using the Dockerfile in the repository.
- Build Docker Image and Run Container on Remote EC2: Builds the Docker image again (if needed), removes any previous containers, and runs a new container from the built image.

Dashboard > All > New Item

## New Item

Enter an item name

ci-cd

Select an item type

- Freestyle project**  
Classic, general-purpose job type that checks out from up to one SCM, executes build steps serially, followed by post-build steps like archiving artifacts and sending email notifications.
- 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.

OK

Dashboard > ci-cd > Configuration

## Configure

- General
- Advanced Project Options
- Pipeline**

**Pipeline**

Definition

Pipeline script

Script ?

```

4 stages {
5   stage('Clone Repository') {
6     steps {
7       sshagent(['ssh-agent']) { // Use your Jenkins SSH credentials ID here
8         sh '''
9           ssh -o StrictHostKeyChecking=no ec2-user@3.109.186.65 "git clone https://github.com/Sushmaa
10          '''
11       }
12     }
13   }
14   stage('Build on Remote EC2') {
15     steps {
16       sshagent(['ssh-agent']) { // Use your Jenkins SSH credentials ID here
17         sh '''
18           ssh -o StrictHostKeyChecking=no ec2-user@3.109.186.65 "cd /home/ec2-user/Java-Springboot &&
19           '''
20       }
21     }
22   }
23 }

```

Save Apply

## 5. Pipeline Script:

The pipeline script uses the SSH Agent to connect to the Java 8 instance and execute the necessary commands remotely.

```
pipeline {  
    agent any  
  
    stages {  
        stage('Clone Repository') {  
            steps {  
                sshagent(['ssh-agent']) {  
                    sh '''  
                        ssh -o StrictHostKeyChecking=no ec2-user@3.109.186.65 "git clone https://github.com/Sushmaa123/Java-Springboot.git /home/ec2-user/Java-Springboot"  
                    '''  
                }  
            }  
        }  
  
        stage('Build on Remote EC2') {  
            steps {  
                sshagent(['ssh-agent']) {  
                    sh '''  
                        ssh -o StrictHostKeyChecking=no ec2-user@3.109.186.65 "cd /home/ec2-user/Java-Springboot && mvn clean  
install"  
                    '''  
                }  
            }  
        }  
  
        stage('Build Docker Image') {
```

```

steps {

    sshagent(['ssh-agent']) {

        sh '''

            ssh -o StrictHostKeyChecking=no ec2-user@3.109.186.65 "cd /home/ec2-user/Java-Springboot && sudo docker
build -t java-springboot-image ."

        '''
    }

}

```

```

stage('Build Docker Image and Run Container on Remote EC2') {

    steps {

        sshagent(['ssh-agent']) {

            sh '''

                ssh -o StrictHostKeyChecking=no ec2-user@3.109.186.65 "

                cd /home/ec2-user/Java-Springboot

                sudo docker build -t java-springboot-image .

                sudo docker stop java-springboot-container || true

                sudo docker rm java-springboot-container || true

                sudo docker run -d --name java-springboot-container -p 8081:8080 java-springboot-image

            '''
        }

    }

}

```

The screenshot shows the Jenkins web interface in a browser. The address bar displays '13.233.164.105:8080/job/ci-cd/'. The Jenkins logo is in the top left, and a search bar is in the top right. The main content area shows the 'ci-cd' pipeline status as 'Success' with a green checkmark. A sidebar on the left contains links for Status, Changes, Build Now, Configure, Delete Pipeline, Stages, Rename, and Pipeline Syntax. A 'Permalinks' section lists various build links with timestamps. A 'Builds' section at the bottom left shows a list of builds with a filter input. The browser's taskbar at the bottom shows the system clock as 01:27 AM on 24-12-2024.

Jenkins

Dashboard > ci-cd >

Status

Changes

Build Now

Configure

Delete Pipeline

Stages

Rename

Pipeline Syntax

ci-cd

Add description

Permalinks

- Last build (#8), 28 min ago
- Last stable build (#8), 28 min ago
- Last successful build (#8), 28 min ago
- Last failed build (#7), 29 min ago
- Last unsuccessful build (#7), 29 min ago
- Last completed build (#8), 28 min ago

Builds

Filter

13.233.164.105:8080/job/ci-cd/build?delay=0sec

22°C Partly cloudy

Search

ENG IN

01:27 AM 24-12-2024

## 6. Result:

**After running the pipeline, Jenkins will create a Docker container on the Java 8 instance, and you should be able to access the container through port 8081 on the instance.**

The screenshot shows the Jenkins login page in a browser. The address bar displays '3.109.186.65:8081/login'. The page has a light gray background with the text 'Please sign in' in the center. Below this text are two input fields for 'Username' and 'Password', and a blue 'Sign in' button. The browser's taskbar at the bottom shows the system clock as 01:02 AM on 24-12-2024.

Please sign in

Username

Password

Sign in

22°C Partly cloudy

Search

ENG IN

01:02 AM 24-12-2024