

Calculator Application deploy it using jenkins

Here we will complete our setup in 6 steps

1.1) In AWS Portal create a new instance as,

Name : Jenkins-server

AMI : Ubuntu

Instance type : t2.medium

Key pair : create

Allow: HTTP & HTTPS

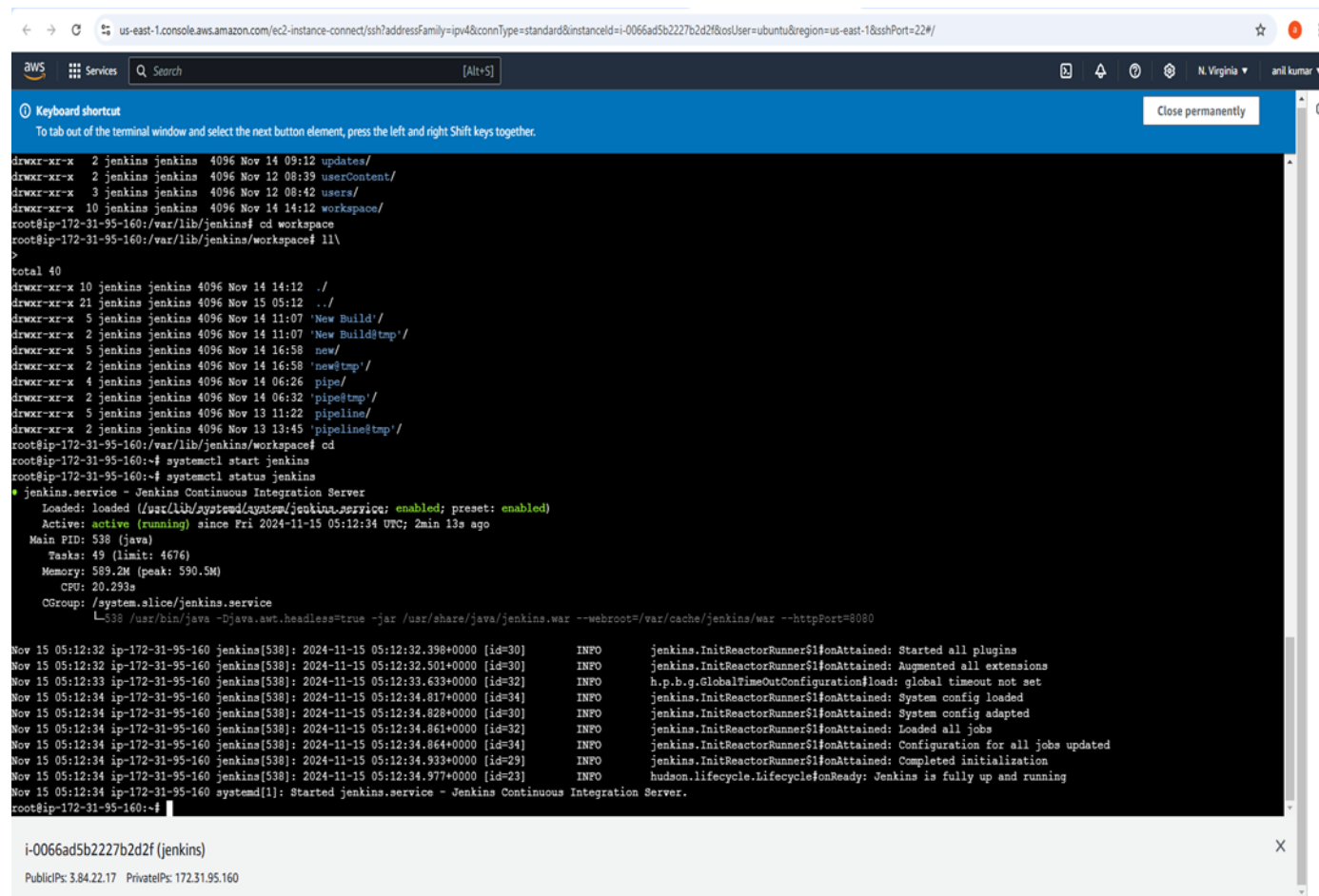
Allow: port number : 8080 (Jenkins default port number)

Allow : SSH 22

1.2) Connect to Ubuntu VM

1.3) Now install Jenkins on the machine, by following this link

<https://www.jenkins.io/doc/book/installing/linux/#debianubuntu>



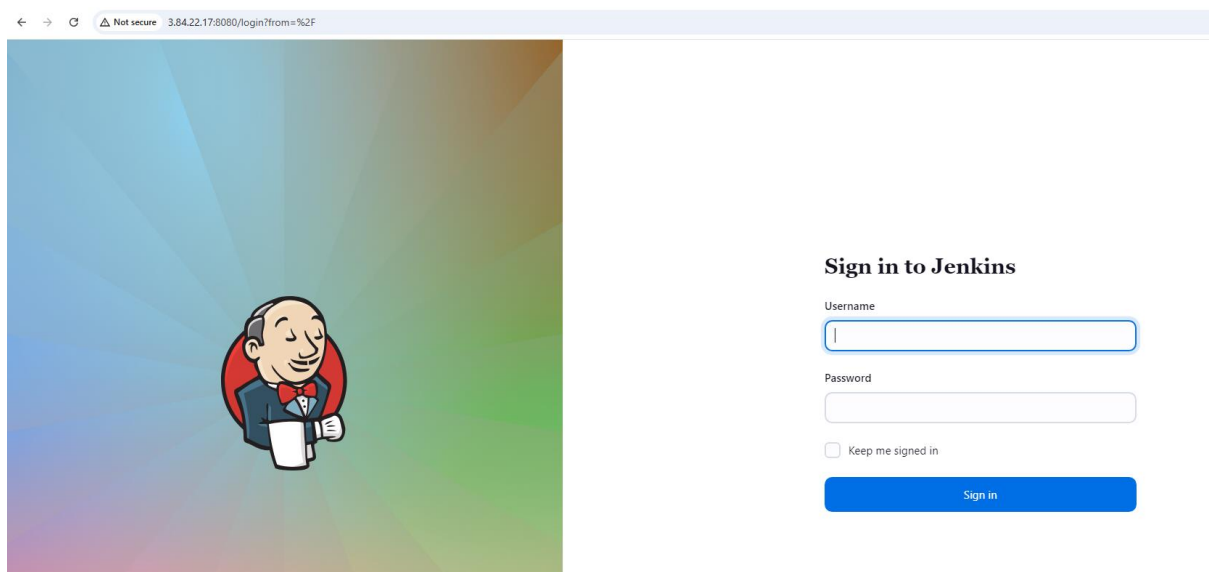
The screenshot shows an AWS console terminal window with the following content:

```
us-east-1.console.aws.amazon.com/ec2-instance-connect/ssh?addressFamily=ipv4&connType=standard&instanceId=i-0066ad5b2227b2d2f&osUser=ubuntu&region=us-east-1&sshPort=22#/  
AWS Services Search [Alt+S]  
Keyboard shortcut  
To tab out of the terminal window and select the next button element, press the left and right Shift keys together.  
Close permanently  
drwxr-xr-x 2 jenkins jenkins 4096 Nov 14 09:12 updates/  
drwxr-xr-x 2 jenkins jenkins 4096 Nov 12 08:39 userContent/  
drwxr-xr-x 3 jenkins jenkins 4096 Nov 12 08:42 users/  
drwxr-xr-x 10 jenkins jenkins 4096 Nov 14 14:12 workspace/  
root@ip-172-31-95-160:/var/lib/jenkins# cd workspace  
root@ip-172-31-95-160:/var/lib/jenkins/workspace# ll  
>  
total 40  
drwxr-xr-x 10 jenkins jenkins 4096 Nov 14 14:12 ./  
drwxr-xr-x 21 jenkins jenkins 4096 Nov 15 05:12 ../  
drwxr-xr-x 5 jenkins jenkins 4096 Nov 14 11:07 'New Build'/  
drwxr-xr-x 2 jenkins jenkins 4096 Nov 14 11:07 'New Build$tmp'/  
drwxr-xr-x 5 jenkins jenkins 4096 Nov 14 16:58 new/  
drwxr-xr-x 2 jenkins jenkins 4096 Nov 14 16:58 'new$tmp'/  
drwxr-xr-x 4 jenkins jenkins 4096 Nov 14 06:26 pipe/  
drwxr-xr-x 2 jenkins jenkins 4096 Nov 14 06:32 'pipe$tmp'/  
drwxr-xr-x 5 jenkins jenkins 4096 Nov 13 11:22 pipeline/  
drwxr-xr-x 2 jenkins jenkins 4096 Nov 13 13:45 'pipeline$tmp'/  
root@ip-172-31-95-160:/var/lib/jenkins/workspace# cd  
root@ip-172-31-95-160:~# systemctl start jenkins  
root@ip-172-31-95-160:~# 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 2024-11-15 05:12:34 UTC; 2min 13s ago  
     Main PID: 538 (java)  
       Tasks: 49 (limit: 4676)  
      Memory: 589.2M (peak: 590.5M)  
         CPU: 20.293s  
    CGroup: /system.slice/jenkins.service  
            └─538 /usr/bin/java -Djava.awt.headless=true -jar /usr/share/java/jenkins.war --webroot=/var/cache/jenkins/war --httpPort=8080  
Nov 15 05:12:32 ip-172-31-95-160 jenkins[538]: 2024-11-15 05:12:32.398+0000 [id=30] INFO jenkins.InitReactorRunner$1onAttained: Started all plugins  
Nov 15 05:12:32 ip-172-31-95-160 jenkins[538]: 2024-11-15 05:12:32.501+0000 [id=30] INFO jenkins.InitReactorRunner$1onAttained: Augmented all extensions  
Nov 15 05:12:33 ip-172-31-95-160 jenkins[538]: 2024-11-15 05:12:33.633+0000 [id=32] INFO h.p.b.g.GlobalTimeoutConfiguration#load: global timeout not set  
Nov 15 05:12:34 ip-172-31-95-160 jenkins[538]: 2024-11-15 05:12:34.817+0000 [id=34] INFO jenkins.InitReactorRunner$1onAttained: System config loaded  
Nov 15 05:12:34 ip-172-31-95-160 jenkins[538]: 2024-11-15 05:12:34.828+0000 [id=30] INFO jenkins.InitReactorRunner$1onAttained: System config adapted  
Nov 15 05:12:34 ip-172-31-95-160 jenkins[538]: 2024-11-15 05:12:34.861+0000 [id=32] INFO jenkins.InitReactorRunner$1onAttained: Loaded all jobs  
Nov 15 05:12:34 ip-172-31-95-160 jenkins[538]: 2024-11-15 05:12:34.864+0000 [id=34] INFO jenkins.InitReactorRunner$1onAttained: Configuration for all jobs updated  
Nov 15 05:12:34 ip-172-31-95-160 jenkins[538]: 2024-11-15 05:12:34.933+0000 [id=29] INFO jenkins.InitReactorRunner$1onAttained: Completed initialization  
Nov 15 05:12:34 ip-172-31-95-160 jenkins[538]: 2024-11-15 05:12:34.977+0000 [id=23] INFO hudson.lifecycle.Lifecycle$onReady: Jenkins is fully up and running  
Nov 15 05:12:34 ip-172-31-95-160 systemd[1]: Started jenkins.service - Jenkins Continuous Integration Server.  
root@ip-172-31-95-160:~#
```

i-0066ad5b2227b2d2f (jenkins)
PublicIPs: 3.84.22.17 PrivateIPs: 172.31.95.160

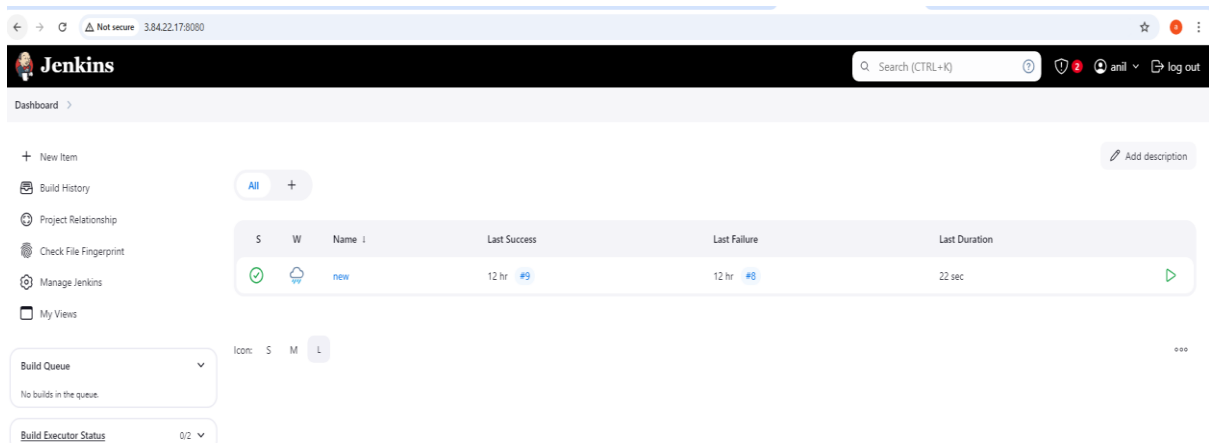
1.4) Now copy the public IP of the machine and paste it to the browser to access the Jenkins Portal.

VM Public IP : 8080



Create a CI/CD Pipeline,

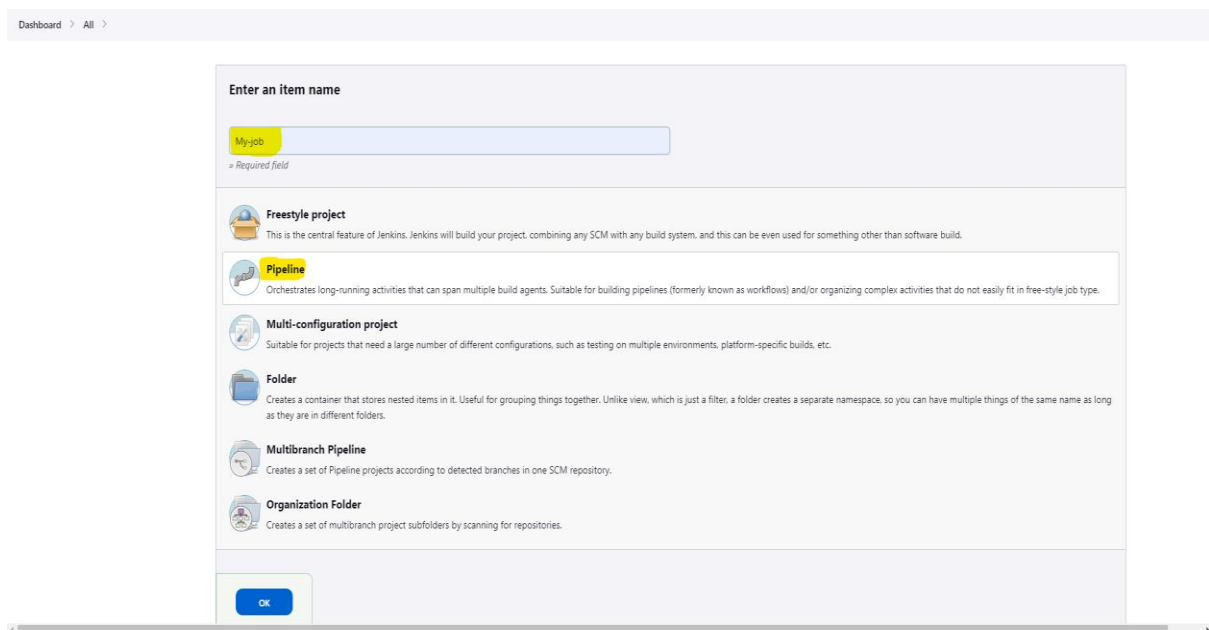
From Jenkins Dashboard click on “New Item”



Create a pipeline for project

Enter an item name --> choose project name

Click on pipeline option --> ok




The screenshot shows the Jenkins 'Enter an item name' dialog box. At the top, there is a text input field containing 'My-job' with a yellow highlight. Below the input field is a small text label '> Required field'. The main area of the dialog lists several project types with icons and descriptions:

- 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** (highlighted in yellow): 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 separate namespace, so you can have multiple things of the same name as long as they are in different folders.
- Multibranch Pipeline**: Creates a set of Pipeline projects according to detected branches in one SCM repository.
- Organization Folder**: Creates a set of multibranch project subfolders by scanning for repositories.

At the bottom of the dialog is a blue 'OK' button.

Step - 2. Source Code Clone from GitHub

2.1) Select pipeline syntax



The screenshot shows the Jenkins configuration page for a pipeline. At the top, there is a text input field containing '1 / 18'. Below the input field is a checkbox labeled 'Use Groovy Sandbox' with a question mark icon. The 'Pipeline Syntax' option is highlighted in yellow. At the bottom of the configuration page are two buttons: 'Save' and 'Apply'.

2.2) Select GitHub Repository URL and add credentials

2.3) Add GitHub pipeline syntax same like below

A screenshot of a code editor showing a Jenkins pipeline script. The script is written in Groovy and defines a pipeline with two stages: 'clone repo' and 'Maven Build'. The 'clone repo' stage clones a repository from GitHub. The 'Maven Build' stage defines a Maven tool, sets the Maven command, and runs a shell command to clean and package the project. The script is displayed in a light-themed editor with line numbers on the left.

```
1 node{  
2  
3 stage('clone repo'){  
4  
5 git branch: 'main', credentialsId: 'jenkins1', url: 'https://github.com/anilvasal23/calculator.git'  
6  
7 }  
8 stage('Maven Build'){  
9     def mavenHome = tool name: 'Maven-3.8.6', type:'maven'  
10    def mavenCMD = "${mavenHome}/bin/mvn"  
11    sh "${mavenCMD} clean package"  
12 }  
13 stage('sonarscan'){  
14     withSonarQubeEnv('sonar'){  
15         def mavenHome = tool name: 'Maven-3.8.6', type:'maven'  
16         def mavenCMD = "${mavenHome}/bin/mvn"  
17         sh "${mavenCMD} clean package"  
18     }  
19 }
```

Step - 3) Maven Build

3.1) Add Maven in Global Tool Configuration

3.2) Select Maven name & Maven version

3.3) Write pipeline syntax to build java project

stage('Maven Build'){

def mavenHome = tool name: "Maven-3.8.6", type:"maven"

def mavenCMD = "\${mavenHome}/bin/mvn"

sh "\${mavenCMD} clean package"

}

3.4) Maven build Success and target folder created

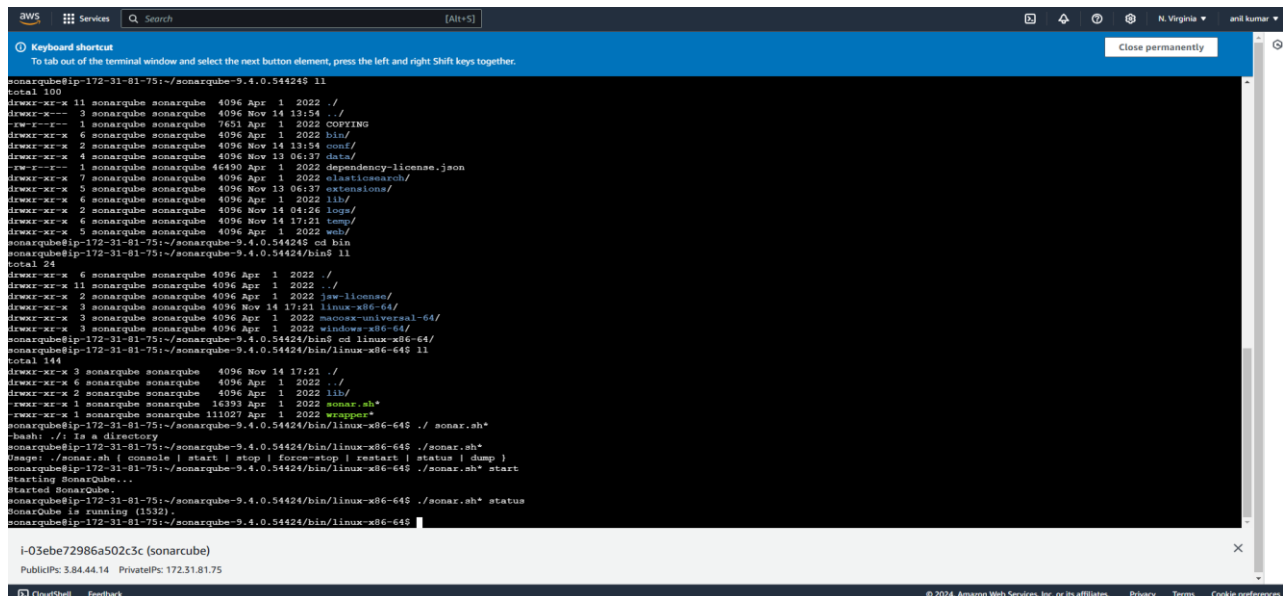
Step - 4) SonarQube Scanner

4.1) In AWS Portal, create a new instance as,

Name : Sonar-Server

Allow: port number: 9000 (SonarQube default port number)

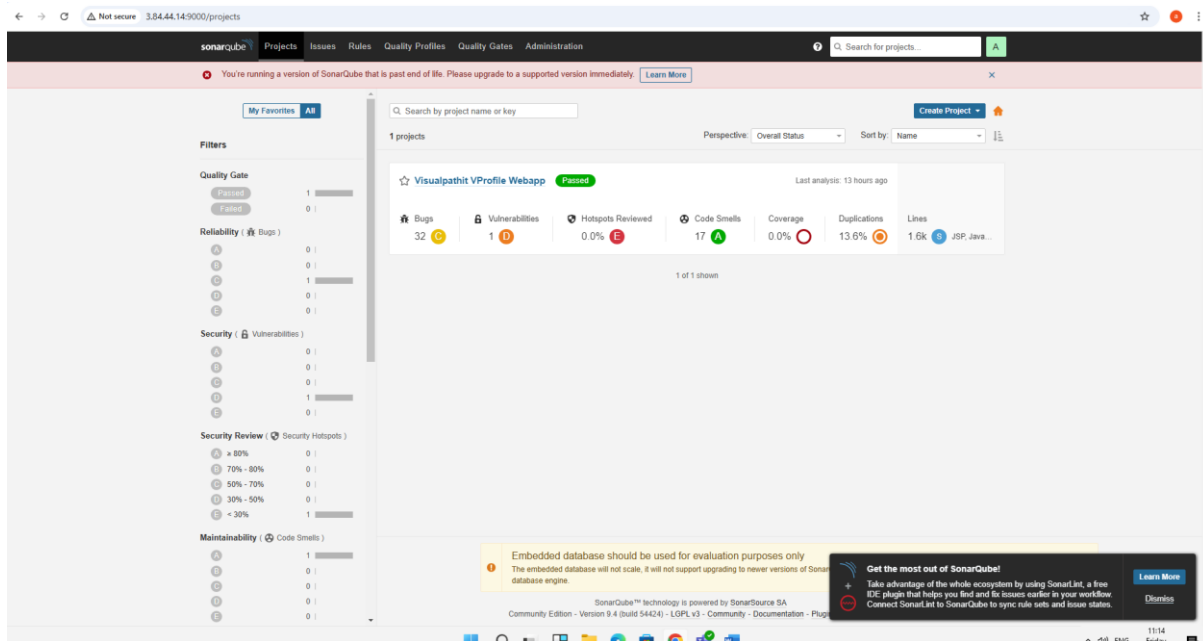
4.2) Install SonarQube software and check sonar running



```
sonarqube@ip-172-31-81-75:~/sonarqube-9.4.0.54424$ ll
total 100
drwxr-xr-x 11 sonarqube sonarqube 4096 Apr 1 2022 ./
drwxr-xr-x  3 sonarqube sonarqube 4096 Nov 14 13:54 ../
-rw-r--r--  1 sonarqube sonarqube 7651 Apr 1 2022 COPYING
drwxr-xr-x  6 sonarqube sonarqube 4096 Apr 1 2022 bin/
drwxr-xr-x  2 sonarqube sonarqube 4096 Nov 14 13:54 conf/
drwxr-xr-x  4 sonarqube sonarqube 4096 Nov 13 06:37 data/
-rw-r--r--  1 sonarqube sonarqube 46490 Apr 1 2022 dependency-license.json
drwxr-xr-x  7 sonarqube sonarqube 4096 Apr 1 2022 elasticsearch/
drwxr-xr-x  5 sonarqube sonarqube 4096 Nov 13 06:37 extensions/
drwxr-xr-x  6 sonarqube sonarqube 4096 Apr 1 2022 lib/
drwxr-xr-x  2 sonarqube sonarqube 4096 Nov 14 04:56 logs/
drwxr-xr-x  6 sonarqube sonarqube 4096 Nov 14 17:21 temp/
drwxr-xr-x  5 sonarqube sonarqube 4096 Apr 1 2022 web/
sonarqube@ip-172-31-81-75:~/sonarqube-9.4.0.54424$ cd bin
sonarqube@ip-172-31-81-75:~/sonarqube-9.4.0.54424/bin$ ll
total 24
drwxr-xr-x  6 sonarqube sonarqube 4096 Apr 1 2022 ./
drwxr-xr-x 11 sonarqube sonarqube 4096 Apr 1 2022 ../
drwxr-xr-x  2 sonarqube sonarqube 4096 Apr 1 2022 jsw-license/
drwxr-xr-x  3 sonarqube sonarqube 4096 Nov 14 17:21 linux-x86-64/
drwxr-xr-x  3 sonarqube sonarqube 4096 Apr 1 2022 macosx-universal-64/
drwxr-xr-x  3 sonarqube sonarqube 4096 Apr 1 2022 windows-x86-64/
sonarqube@ip-172-31-81-75:~/sonarqube-9.4.0.54424/bin$ cd linux-x86-64/
sonarqube@ip-172-31-81-75:~/sonarqube-9.4.0.54424/bin/linux-x86-64$ ll
total 144
drwxr-xr-x  3 sonarqube sonarqube 4096 Nov 14 17:21 ./
drwxr-xr-x  6 sonarqube sonarqube 4096 Apr 1 2022 ../
drwxr-xr-x  2 sonarqube sonarqube 4096 Apr 1 2022 lib/
-rwxr-xr-x  1 sonarqube sonarqube 16393 Apr 1 2022 sonar.sh*
-rwxr-xr-x  1 sonarqube sonarqube 111027 Apr 1 2022 wrapper*
sonarqube@ip-172-31-81-75:~/sonarqube-9.4.0.54424/bin/linux-x86-64$ ./sonar.sh
bash: ./: is a directory
sonarqube@ip-172-31-81-75:~/sonarqube-9.4.0.54424/bin/linux-x86-64$ ./sonar.sh
Usage: ./sonar.sh { console | start | stop | force-stop | restart | status | dump }
sonarqube@ip-172-31-81-75:~/sonarqube-9.4.0.54424/bin/linux-x86-64$ ./sonar.sh start
Starting SonarQube...
Started SonarQube.
sonarqube@ip-172-31-81-75:~/sonarqube-9.4.0.54424/bin/linux-x86-64$ ./sonar.sh status
SonarQube is running (1532).
```

4.3) Now copy the public IP of sonar-server machine and paste it to the browser to access the sonar server

Sonar-server public IP: 9000



- Configure Sonar syntax like below

```
stage('sonarscan'){
    withSonarQubeEnv('sonarqube'){
        def mavenHome = tool name: "Maven-3.8.6",
        type:"maven"
        def mavenCMD = "${mavenHome}/bin/mvn"
        sh "${mavenCMD} sonar:sonar"
```

- SonarQube project uploaded to Sonar portal

Step - 5) Nexus Artifactory

5.1) In AWS Portal, create a new instance as,
Allow: port number: 8081 (Nexus default port number)

5.3) Download nexus software

<https://help.sonatype.com/repomanager3/product-information/download>

5.4) Login to Nexus

5.5) Create Repository to store Artifacts

5.6) Download nexus Plugin from Manage Jenkins

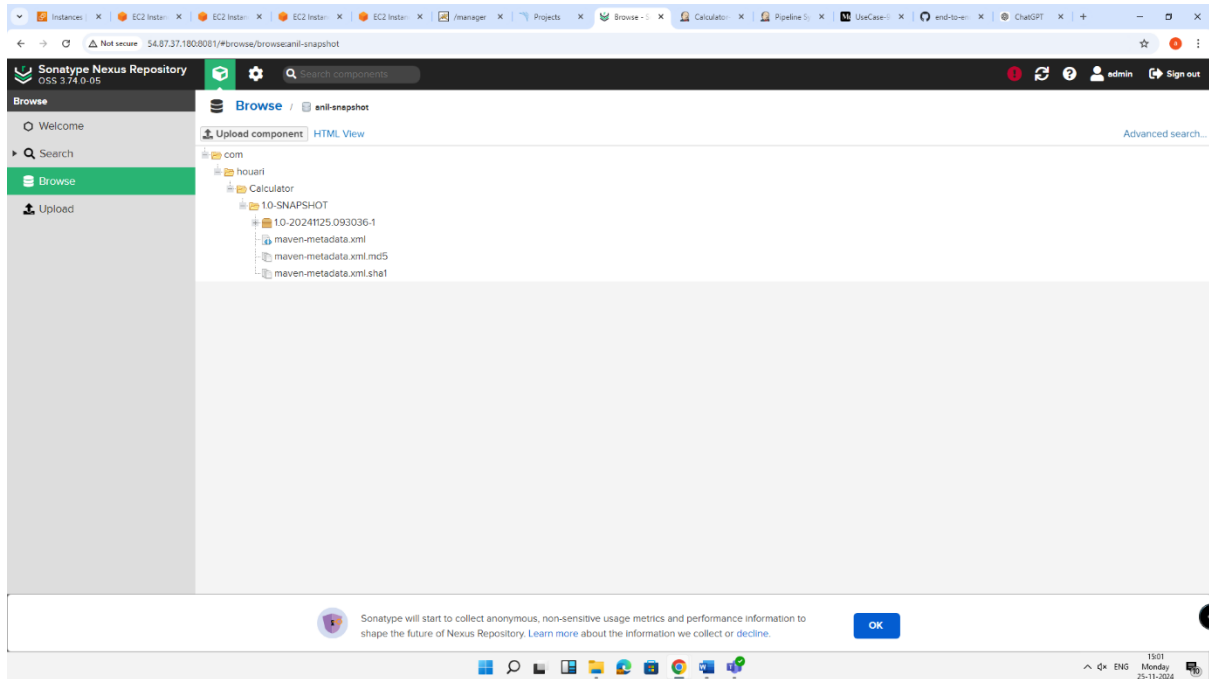
5.7) Select pipeline syntax option

Copy pipeline syntax and paste in script like blow script

```
stage('artifacts-nexus'){
```

```
    nexusArtifactUploader artifacts: [[artifactId:  
'Calculator', classifier: '', file: 'target/Calculator-1.0-  
SNAPSHOT.jar', type: 'jar']], credentialsId: 'nexus',  
groupId: 'com.houari', nexusUrl: '54.87.37.180:8081',  
nexusVersion: 'nexus3', protocol: 'http', repository:  
'anil-snapshot', version: '1.0-SNAPSHOT'
```

5.9) Artifacts uploaded to Nexus Portal



Step - 6) Tomcat Deploy

6.1) In AWS Portal, create a new instance

Allow: port number: 8080 (Nexus default port number)

6.3) Download tomcat server

<https://tomcat.apache.org/download-90.cgi>

6.4) Login into Tomcat server

6.5) Tomcat plugin installation go to Jenkins page

6.6) Tomcat syntax

}

```
stage('Final-deploy'){  
    sshagent(['tomcatnew']) {  
        sh "scp -o StrictHostKeyChecking=no  
target/Calculator-1.0-SNAPSHOT.jar ec2-  
user@54.208.111.160:/opt/apache-tomcat-  
9.0.97/webapps"  
    }  
}
```

6.7) Tomcat build success

6.8) But not showing tomcat server Error