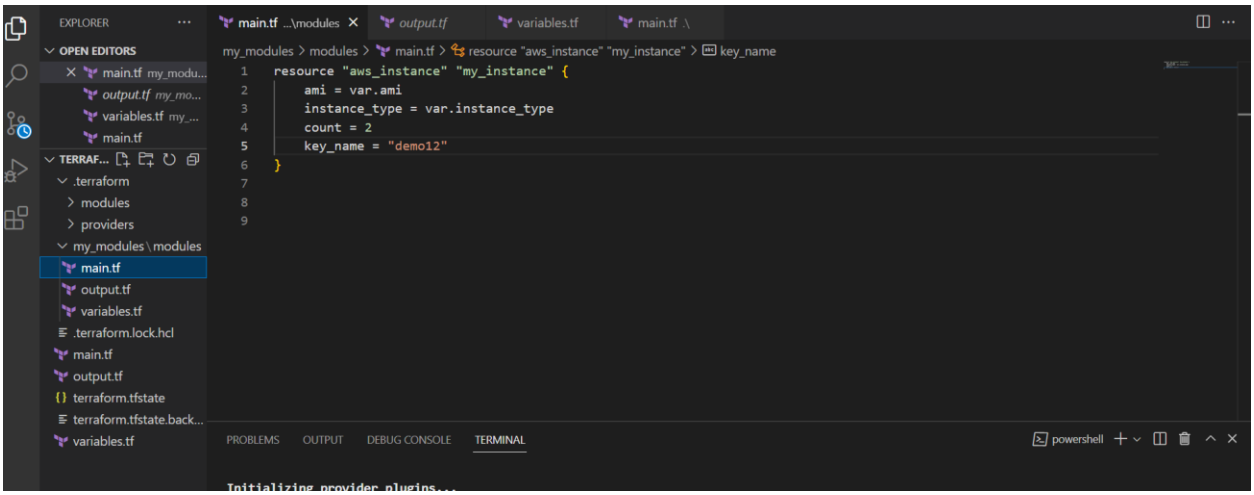
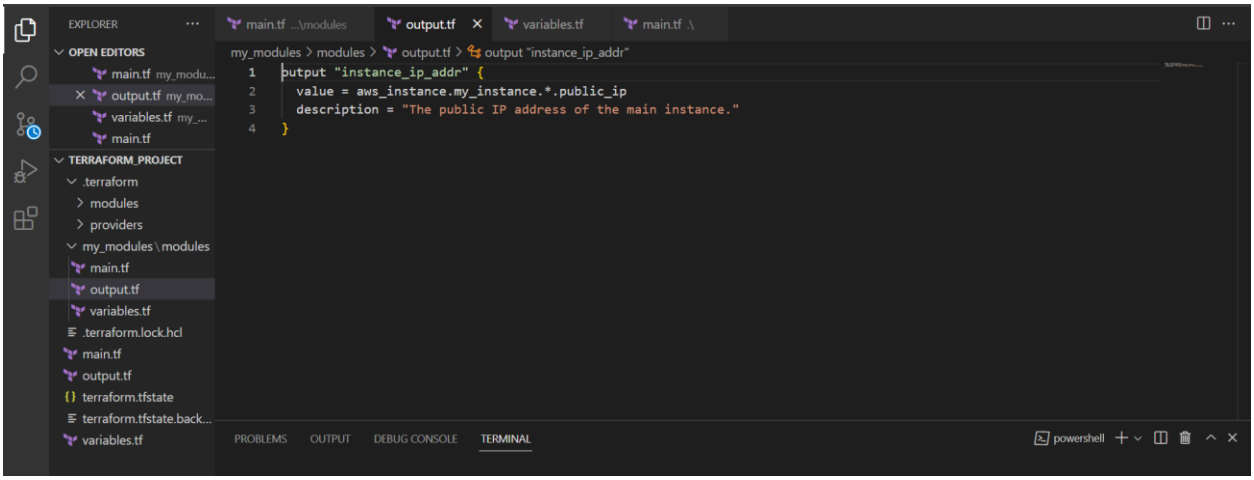
In this project my wrote a terrform to create 2 -EC2 instance with moudules and connect to aws than from aws account connect to console and config the password less connection to that and make one instance as master and other as node now install the ansible in master and in ansible install the jenkins ,in jenkin create the pipeline by the code which is present in my github repository of url https://github.com/archanareddyse/mavenjava.git .so in this projecct I integrated with

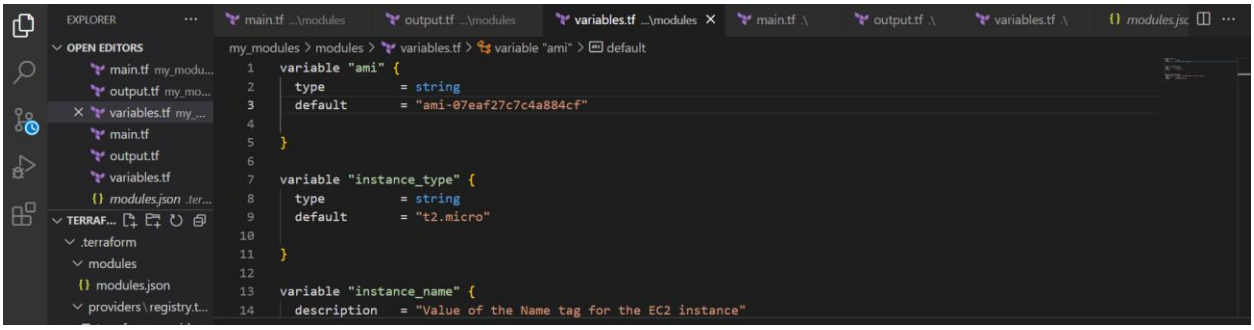
terraform code (modules)
aws
ansible
jenkins
application as code
jenkins CI/CD pipeline

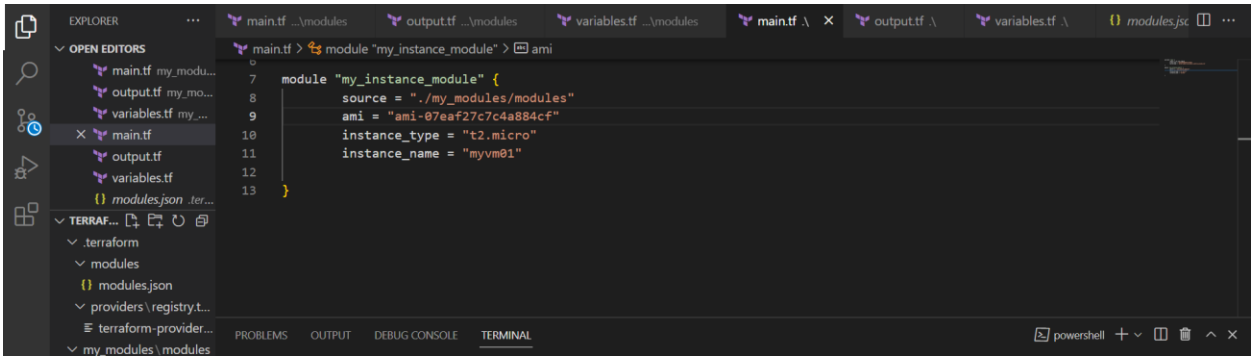
Terraform code ->aws console -> ansible config -> install the jenkins -> in jenkins with application as code by git -> create pipeline

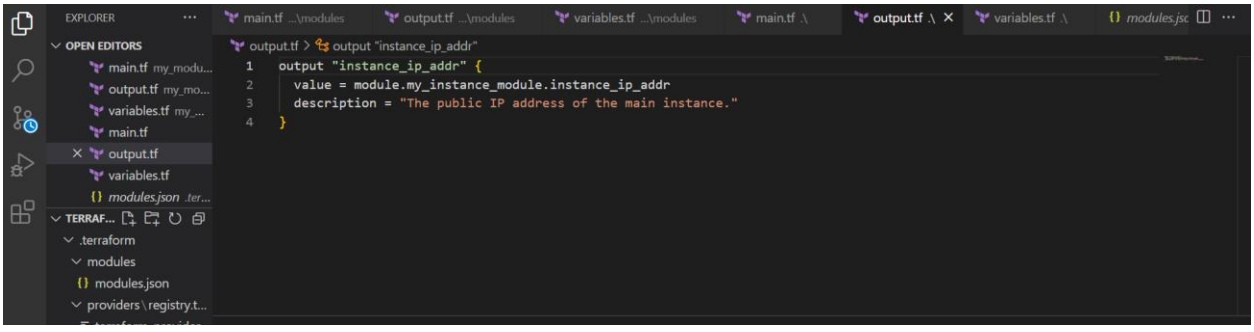
Code in trrraform for EC2 in modules



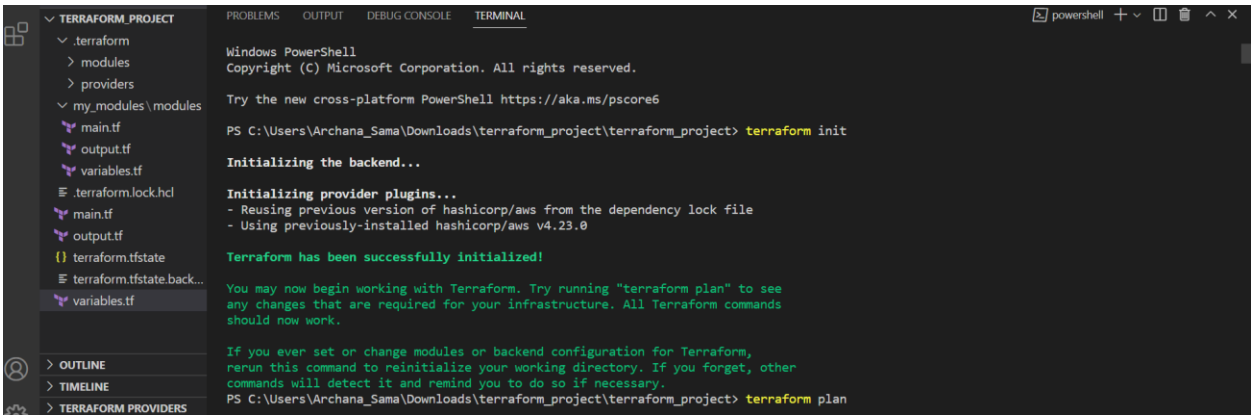






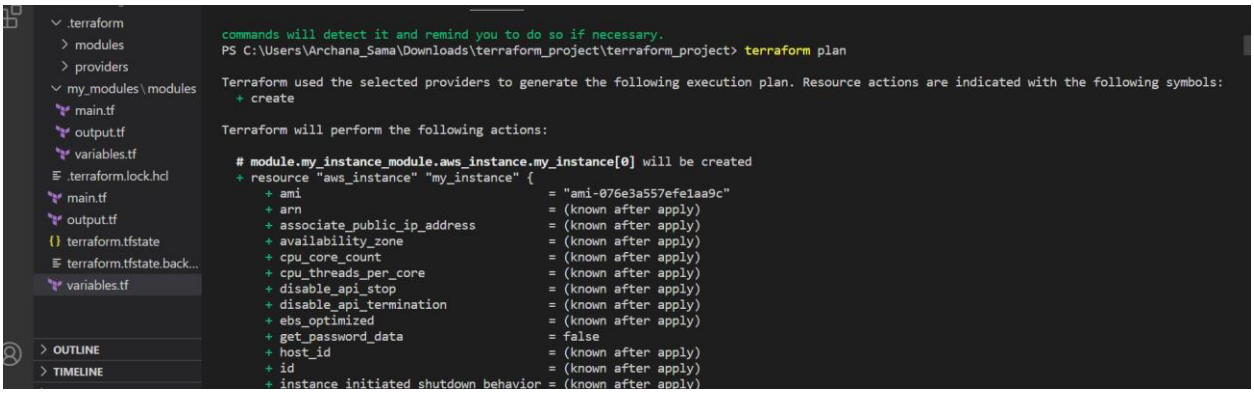


To run the code do terraform init The terraform init command is used to initialize a working directory containing Terraform configuration files. This is the first command that should be run after writing a new Terraform configuration or cloning an existing one from version control. It is safe to run this command multiple times.



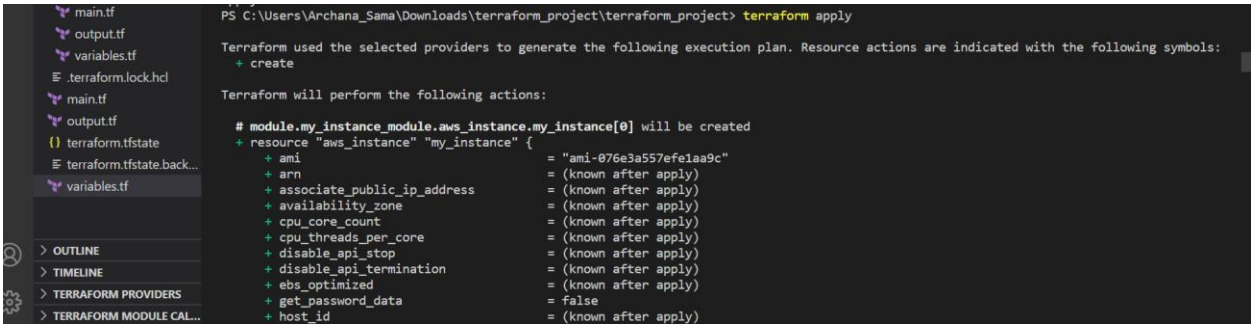
Terraform plan

The terraform plan command evaluates a Terraform configuration to determine the desired state of all the resources it declares, then compares that desired state to the real infrastructure objects being managed with the current working directory and workspace.



Terraform apply

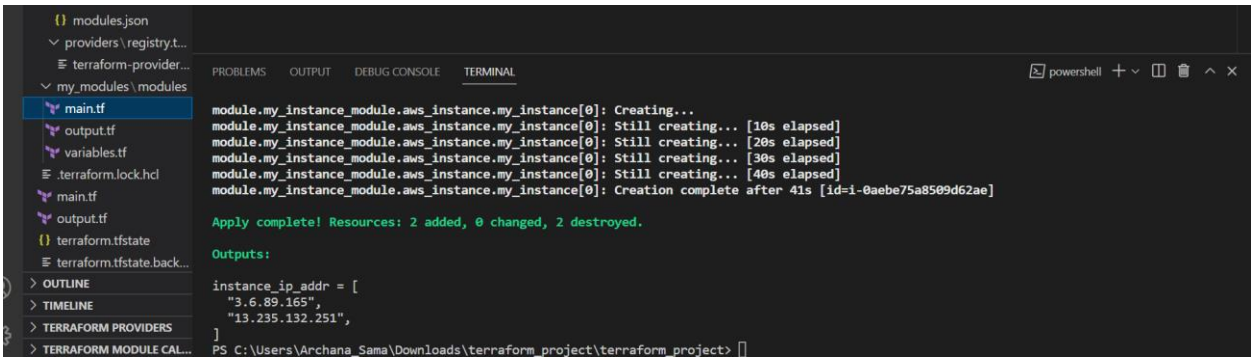
When you run terraform apply without passing a saved plan file, Terraform automatically creates a new execution plan as if you had run terraform plan, prompts you to approve that plan, and takes the indicated actions. You can use all of the planning modes and planning options to customize how Terraform will create the plan.You can pass the -auto-approve option to instruct Terraform to apply the plan without asking for confirmation.



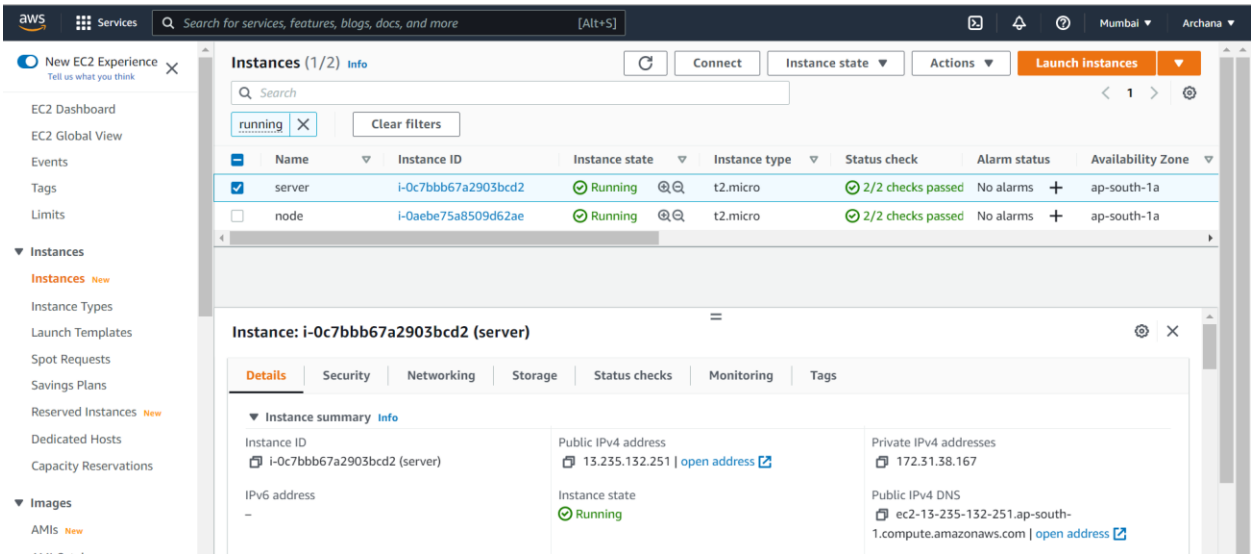
Here we can see the ec2 instance created with ip addresses

Ip address: **3.6.89.165**

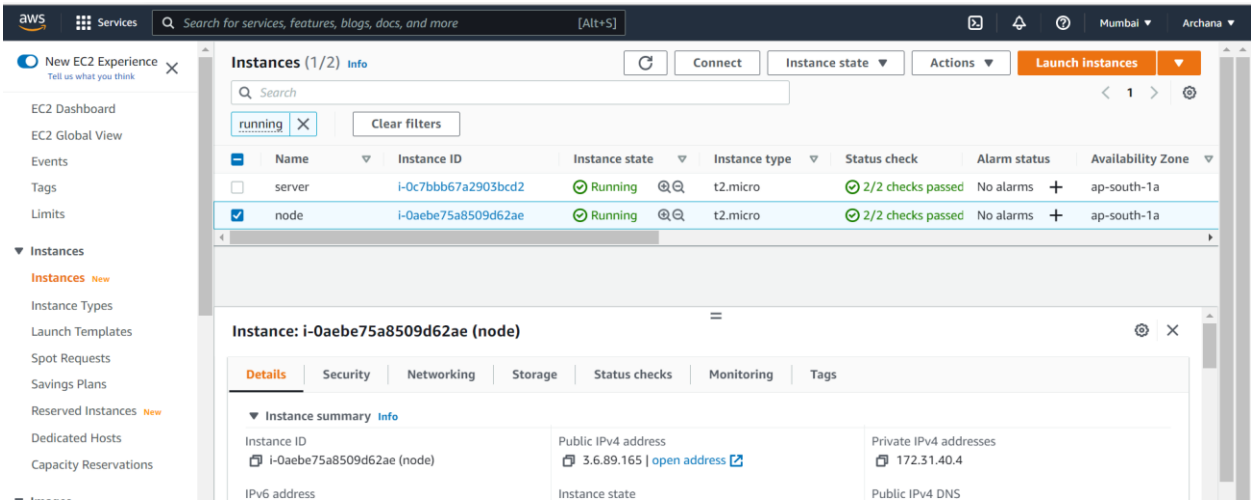
13.235.132.251



Now check in aws we see the instance with ip **13.235.132.251**



we see the instance with ip : **3.6.89.165**



Now connect both the ec2 instance

```
EPAM+Archana_Sama@EPINHYDW0B58 MINGW64 ~/Downloads (master)
$ ssh -i "demo12.pem" ubuntu@ec2-3-6-89-165.ap-south-1.compute.amazonaws.com
Welcome to Ubuntu 18.04.6 LTS (GNU/Linux 5.4.0-1078-aws x86_64)

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

  System information as of Wed Aug  3 15:19:10 UTC 2022

  System load:  0.0               Processes:           93
  Usage of /:   16.4% of 7.58GB   Users logged in:     0
  Memory usage: 19%               IP address for eth0: 172.31.40.4
```

```
EPAM+Archana_Sama@EPINHYDW0B58 MINGW64 ~/Downloads (master)
$ ssh -i "demo12.pem" ubuntu@ec2-3-6-89-165.ap-south-1.compute.amazonaws.com
The authenticity of host 'ec2-3-6-89-165.ap-south-1.compute.amazonaws.com (3.6.8
9.165)' can't be established.
ED25519 key fingerprint is SHA256:0+9RihjO2NO3Kptb7gaCOy+MqX8/VBX9rA1FZTeZTno.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'ec2-3-6-89-165.ap-south-1.compute.amazonaws.com' (ED25519) to the list of known hosts.
Welcome to Ubuntu 18.04.6 LTS (GNU/Linux 5.4.0-1078-aws x86_64)

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

  System information as of Wed Aug  3 07:01:39 UTC 2022
```

Set the password as ubuntu

```
ubuntu@ip-172-31-40-4:~$ sudo passwd ubuntu
Enter new UNIX password:
Retype new UNIX password:
passwd: password updated successfully
ubuntu@ip-172-31-40-4:~$
```

$ sudo vim /etc/ssh/sshd_config

change

PasswordAuthentication yes

Save and QUIT

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

# Change to yes to enable challenge-response passwords (beware issues with
# some PAM modules and threads)
ChallengeResponseAuthentication no
```

$ sudo service ssh restart

$ exit

Repeat the same steps in another if you have

```
EPAM+Archana_Sama@EPINHYDW0B58 MINGW64 ~/Downloads (master)                    m
The authenticity of host 'ec2-13-235-132-251.ap-south-1.compute.amazonaws.com (13.235.132.251)' can't be established.
ED25519 key fingerprint is SHA256:GemwVhMB1/gm9FYUhWJJ9KbKiAtAWotlN3XysSrI/iE.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'ec2-13-235-132-251.ap-south-1.compute.amazonaws.com' (ED25519) to the list of known hosts.
Welcome to Ubuntu 18.04.6 LTS (GNU/Linux 5.4.0-1078-aws x86_64)

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

  System information as of Wed Aug  3 07:05:13 UTC 2022

  System load:  0.0               Processes:           95
```

Now, Connect to server

Now , We need to generate ssh connections

$ ssh-keygen

Now copy the key to managed nodes

$ ssh-copy-id ubuntu@private ip address of node

```
SHA256:NiAw1yttVf9UrMTK6llgPskACM6kLh8+cSCl4Gd1yiO ubuntu@ip-172-31-38-167
The key's randomart image is:
+---[RSA 2048]----+
|. *..+ . ..  . ..|
|oB ++ * .  .  o..|
|+.+o.E.=   ..o.. |
|..o...=.. o oo.  |
|..o .o  S= +  .  |
|.o +   . .* .    |
|  +      . +     |
|   .      o      |
|                 |
+----[SHA256]-----+
ubuntu@ip-172-31-38-167:~$ ssh-copy-id ubuntu@172.31.40.4
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: "/home/ubuntu/.ssh/id_rsa.pub"
The authenticity of host '172.31.40.4 (172.31.40.4)' can't be established.
ECDSA key fingerprint is SHA256:HMCL7icl5H63XugdYJnb75xDJk3sIW8fUVPkrppq9fk.
Are you sure you want to continue connecting (yes/no)? yes
/usr/bin/ssh-copy-id: INFO: attempting to log in with the new key(s), to filter out any that are already installed
/usr/bin/ssh-copy-id: INFO: 1 key(s) remain to be installed -- if you are prompted now it is to install the new keys
ubuntu@172.31.40.4's password:

Number of key(s) added: 1

Now try logging into the machine, with:   "ssh 'ubuntu@172.31.40.4'"
and check to make sure that only the key(s) you wanted were added.
```

Installing ansible now

Connect to server

$ sudo apt-get install software-properties-common

(software-properties-common   , is a base package which is required to install ansible)

```
buntu@ip-172-31-38-167:~$ sudo apt-add-repository ppa:ansible/ansible
Ansible is a radically simple IT automation platform that makes your applications and systems easier to deploy. Avoi
writing scripts or custom code to deploy and update your applications— automate in a language that approaches plain E
glish, using SSH, with no agents to install on remote systems.

ttp://ansible.com/

f you face any issues while installing Ansible PPA, file an issue here:
ttps://github.com/ansible-community/ppa/issues
More info: https://launchpad.net/~ansible/+archive/ubuntu/ansible
```

$ sudo apt-add-repository ppa:ansible/ansible
$ sudo apt-get update
$ sudo apt-get install -y ansible

```
ubuntu@ip-172-31-38-167:~$ sudo apt-get update
Hit:1 http://ppa.launchpad.net/ansible/ansible/ubuntu bionic InRelease
Hit:2 http://security.ubuntu.com/ubuntu bionic-security InRelease
Hit:3 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu bionic InRelease
Hit:4 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu bionic-updates InRelease
Hit:5 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu bionic-backports InRelease
Reading package lists... Done
ubuntu@ip-172-31-38-167:~$ sudo apt-get install -y ansible
Reading package lists... Done
Building dependency tree
Reading state information... Done
```

Check whether ansible is installed or not

```
Processing triggers for man-db (2.8.3-2ubuntu0.1) ...
ubuntu@ip-172-31-38-167:~$ ansible --version
ansible 2.9.27
  config file = /etc/ansible/ansible.cfg
  configured module search path = [u'/home/ubuntu/.ansible/plugins/modules', u'/usr/share/ansible/plugins/modules']
  ansible python module location = /usr/lib/python2.7/dist-packages/ansible
  executable location = /usr/bin/ansible
  python version = 2.7.17 (default, Jul  1 2022, 15:56:32) [GCC 7.5.0]
ubuntu@ip-172-31-38-167:~$
```

$ cd /etc/ansible

$ ls

```
ubuntu@ip-172-31-38-167:~$ cd /etc/ansible
ubuntu@ip-172-31-38-167:/etc/ansible$ ls
ansible.cfg  hosts  roles
ubuntu@ip-172-31-38-167:/etc/ansible$ sudo vim hosts
```

$ sudo vim hosts
insert the private ip addresss of 3 servers
save and quit

```
ubuntu@ip-172-31-38-167: /etc/ansible
172.31.40.4

# This is the default ansible 'hosts' file.
#
# It should live in /etc/ansible/hosts
#
#   - Comments begin with the '#' character
#   - Blank lines are ignored
#   - Groups of hosts are delimited by [header] elements
```

$ ls -la (to see the list in the current machine)
$ ansible all -a 'ls -la' (you will get the list of the files in all managed nodes)

```
ubuntu@ip-172-31-38-167:/etc/ansible$ ls
ansible.cfg  hosts  roles
ubuntu@ip-172-31-38-167:/etc/ansible$ ls -la
total 36
drwxr-xr-x  3 root root  4096 Aug  3 07:12 .
drwxr-xr-x 94 root root  4096 Aug  3 07:09 ..
-rw-r--r--  1 root root 19985 Oct 11  2021 ansible.cfg
-rw-r--r--  1 root root  1029 Aug  3 07:12 hosts
drwxr-xr-x  2 root root  4096 Oct 11  2021 roles
ubuntu@ip-172-31-38-167:/etc/ansible$ ansible all -a 'ls -la'
172.31.40.4 | CHANGED | rc=0 >>
total 44
drwxr-xr-x 6 ubuntu ubuntu 4096 Aug  3 07:13 .
drwxr-xr-x 3 root   root   4096 Aug  3 06:59 ..
drwx------ 3 ubuntu ubuntu 4096 Aug  3 07:13 .ansible
-rw------- 1 ubuntu ubuntu  112 Aug  3 07:04 .bash_history
-rw-r--r-- 1 ubuntu ubuntu  220 Apr  4  2018 .bash_logout
-rw-r--r-- 1 ubuntu ubuntu 3771 Apr  4  2018 .bashrc
drwx------ 2 ubuntu ubuntu 4096 Aug  3 07:01 .cache
drwx------ 3 ubuntu ubuntu 4096 Aug  3 07:01 .gnupg
-rw-r--r-- 1 ubuntu ubuntu  807 Apr  4  2018 .profile
drwx------ 2 ubuntu ubuntu 4096 Aug  3 06:59 .ssh
-rw-r--r-- 1 ubuntu ubuntu    0 Aug  3 07:02 .sudo_as_admin_successful
-rw------- 1 root   root   1118 Aug  3 07:04 .viminfo
ubuntu@ip-172-31-38-167:/etc/ansible$
```

In order to install jenkins we need install git and maven

1) Update the apt repository

sudo apt update

2) sudo apt install openjdk-8-jdk -y

3) Check the Java Version

java -version

4) Install Maven & Git

sudo apt-get install -y git maven

5) Check the Verion of Git & Maven

For Git : git --version

For Maven : mvn --version

```
Building dependency tree
Reading state information... Done
35 packages can be upgraded. Run 'apt list --upgradable' to see them.
ubuntu@ip-172-31-38-167:/etc/ansible$ sudo apt install openjdk-8-jdk -y
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  adwaita-icon-theme at-spi2-core ca-certificates-java fontconfig fontconfig-config fonts-dejavu-core
```

To ckeck whether git and maven installed or not

```
ubuntu@ip-172-31-38-167:/etc/ansible$ git --version
git version 2.17.1
ubuntu@ip-172-31-38-167:/etc/ansible$ mvn --version
Apache Maven 3.6.0
Maven home: /usr/share/maven
Java version: 1.8.0_312, vendor: Private Build, runtime: /usr/lib/jvm/java-8-openjdk-amd64/jre
Default locale: en, platform encoding: UTF-8
OS name: "linux", version: "5.4.0-1078-aws", arch: "amd64", family: "unix"
ubuntu@ip-172-31-38-167:/etc/ansible$
```

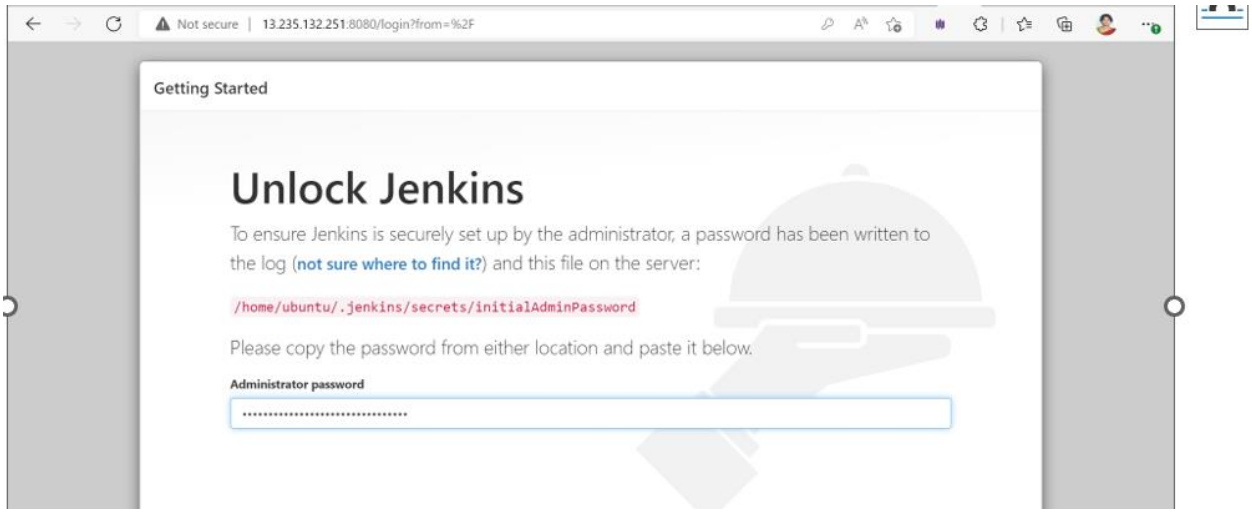
Now install jenkins wget https://get.jenkins.io/war-stable/2.277.2/jenkins.war

```
ubuntu@ip-172-31-38-167:/etc/ansible$ wget  https://get.jenkins.io/war-stable/2.277.2/jenkins.war
--2022-08-03 07:27:52--  https://get.jenkins.io/war-stable/2.277.2/jenkins.war
Resolving get.jenkins.io (get.jenkins.io)... 52.167.253.43
Connecting to get.jenkins.io (get.jenkins.io)|52.167.253.43|:443... connected.
HTTP request sent, awaiting response... 302 Found
Location: https://mirror.gruenehoelle.nl/jenkins/war-stable/2.277.2/jenkins.war [following]
--2022-08-03 07:27:53--  https://mirror.gruenehoelle.nl/jenkins/war-stable/2.277.2/jenkins.war
Resolving mirror.gruenehoelle.nl (mirror.gruenehoelle.nl)... 185.132.179.22, 2a00:7c80:0:de::2
Connecting to mirror.gruenehoelle.nl (mirror.gruenehoelle.nl)|185.132.179.22|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 70887351 (68M) [application/java-archive]
jenkins.war: Permission denied

Cannot write to 'jenkins.war' (Success).
```

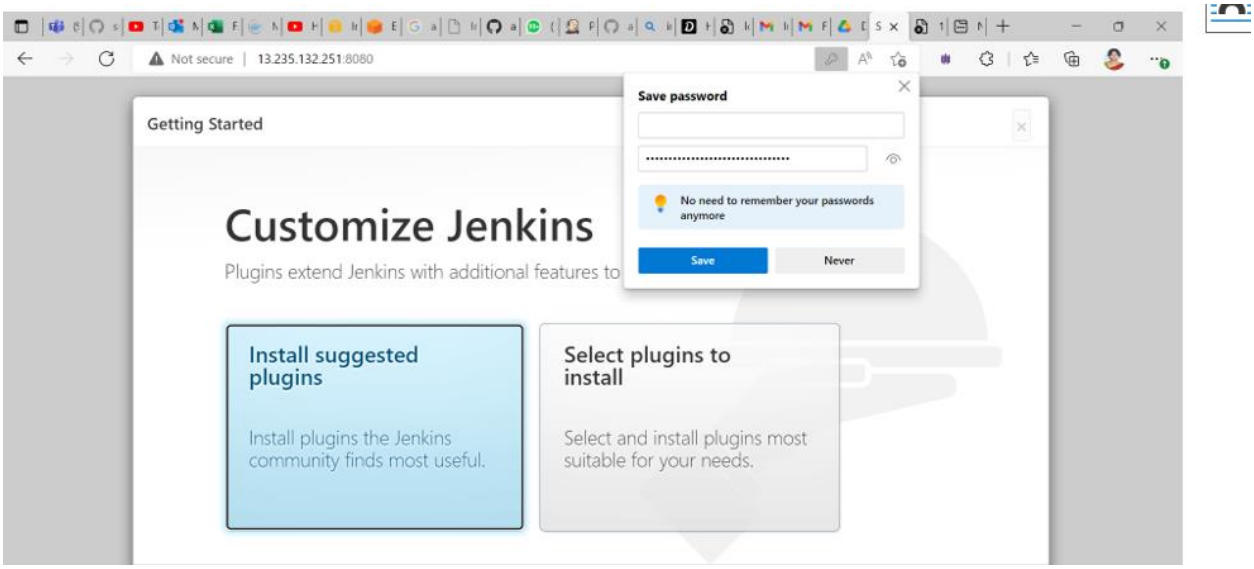
To start the Jenkins java -jar jenkins.war

```
ubuntu@ip-172-31-38-167:/etc/ansible$ sudo wget  https://get.jenkins.io/war-stable/2.277.2/jenkins.war
--2022-08-03 07:31:55--  https://get.jenkins.io/war-stable/2.277.2/jenkins.war
Resolving get.jenkins.io (get.jenkins.io)... 52.167.253.43
Connecting to get.jenkins.io (get.jenkins.io)|52.167.253.43|:443... connected.
HTTP request sent, awaiting response... 302 Found
Location: https://mirror.gruenehoelle.nl/jenkins/war-stable/2.277.2/jenkins.war [following]
--2022-08-03 07:31:56--  https://mirror.gruenehoelle.nl/jenkins/war-stable/2.277.2/jenkins.war
Resolving mirror.gruenehoelle.nl (mirror.gruenehoelle.nl)... 185.132.179.22, 2a00:7c80:0:de::2
Connecting to mirror.gruenehoelle.nl (mirror.gruenehoelle.nl)|185.132.179.22|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 70887351 (68M) [application/java-archive]
Saving to: 'jenkins.war'

jenkins.war                 100%[=============================================>]  67.60M  8.32MB/s    in 9.1s

2022-08-03 07:32:06 (7.44 MB/s) - 'jenkins.war' saved [70887351/70887351]
```

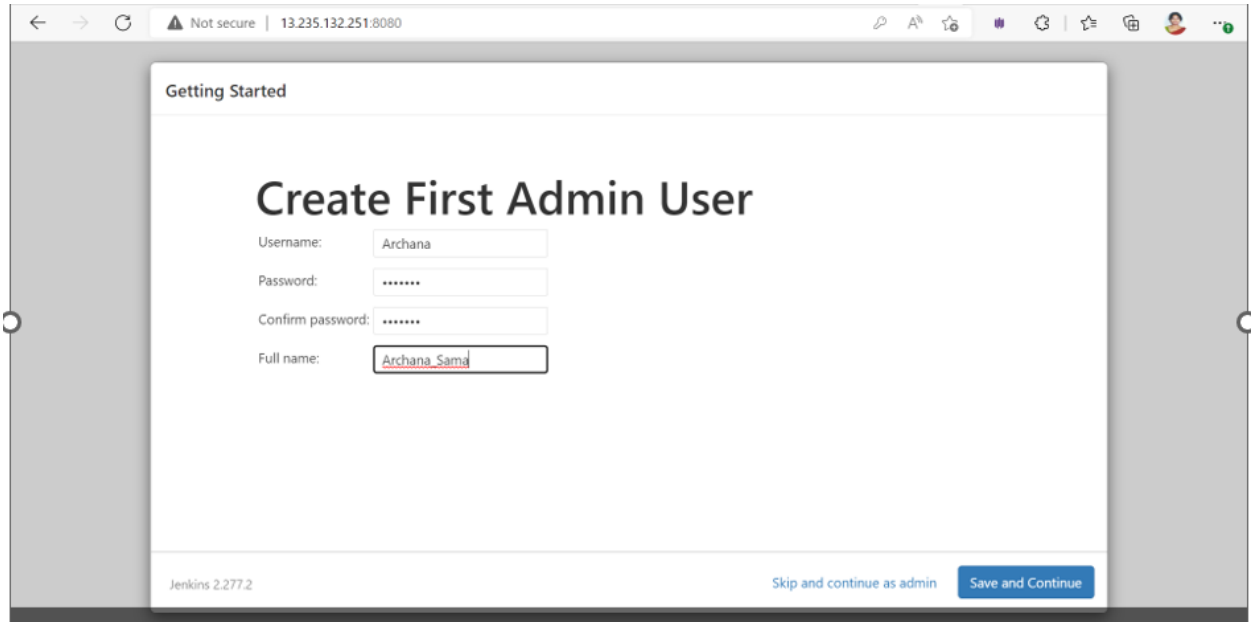
Copy the admin password in the following path or it will get in cnsole



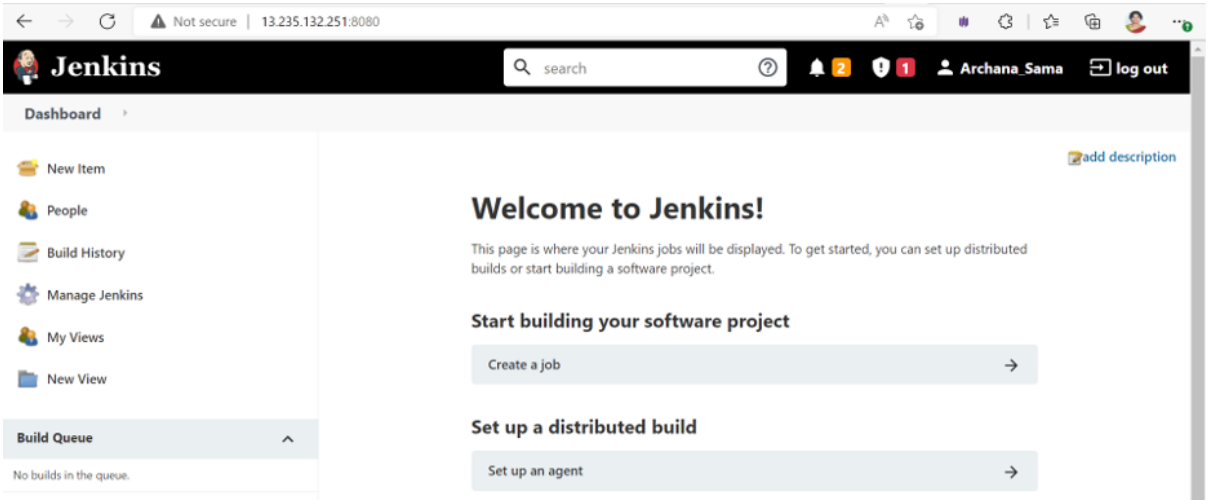
In order to connect with Jenkins copy the ip address with 8080, it start installing the default plugins



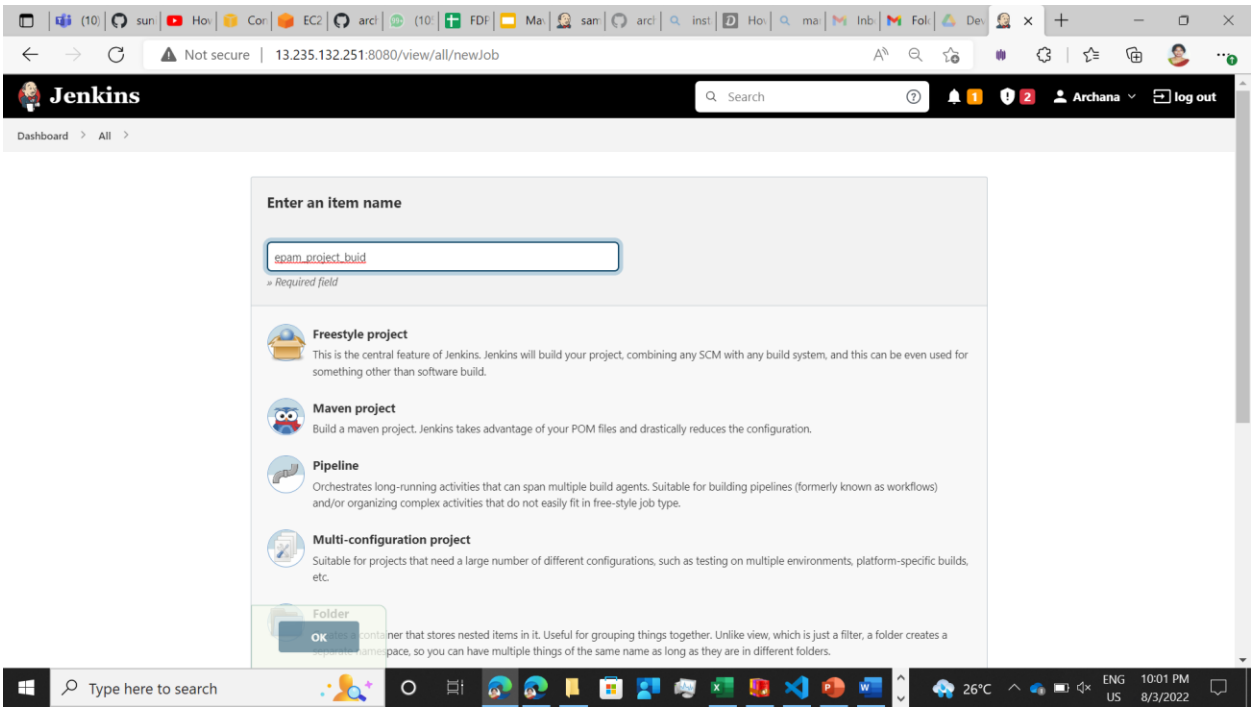
After installing it will open the login page provide it with credentials



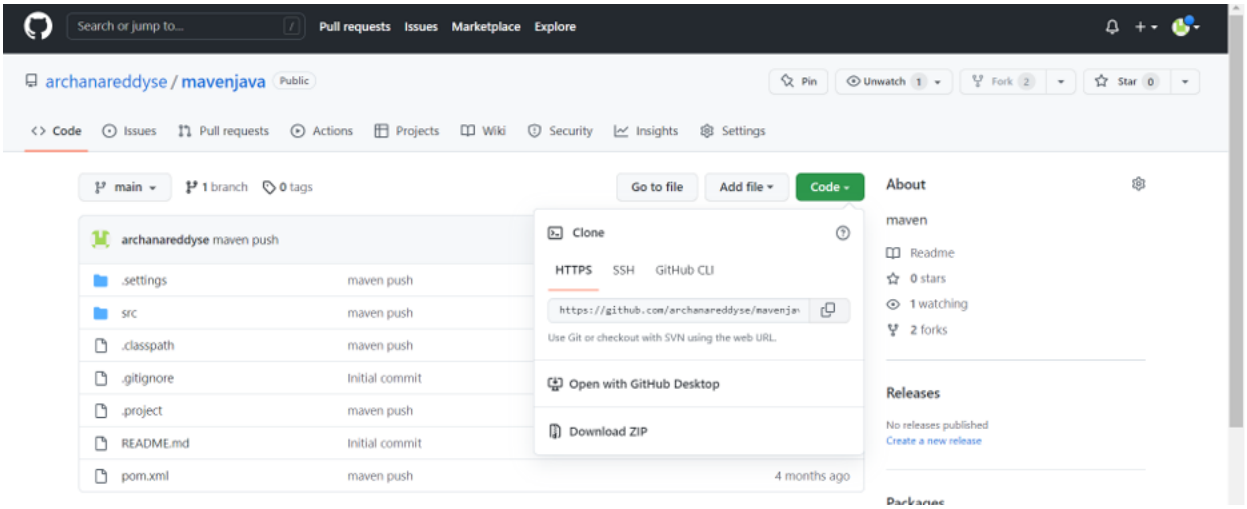
It will provide us with dashboard of Jenkins



Create a new Freestyle Project and click ok

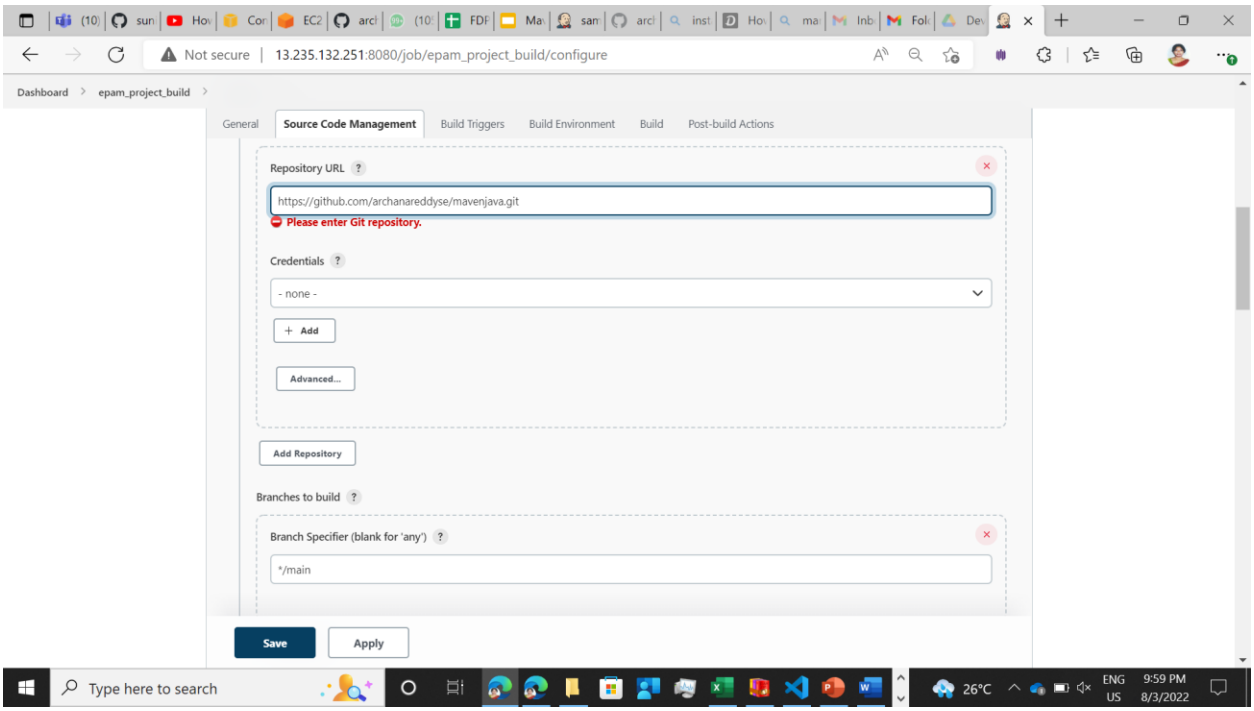


Copy the url from git the git hub repository



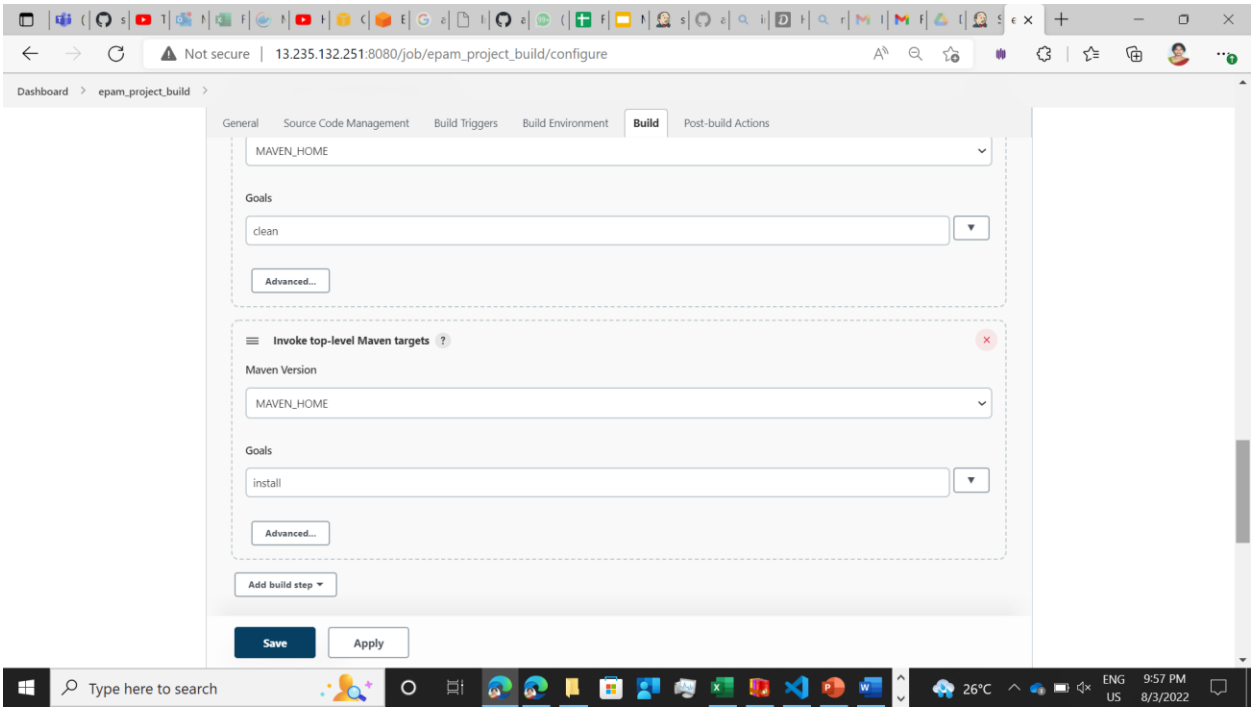
After adding the repository URL, Specify the Branch as either Master/Main as it is in the GitHub

My project is in main branch so I have mentioned main



Now in Build, Invoke top-level Maven targets

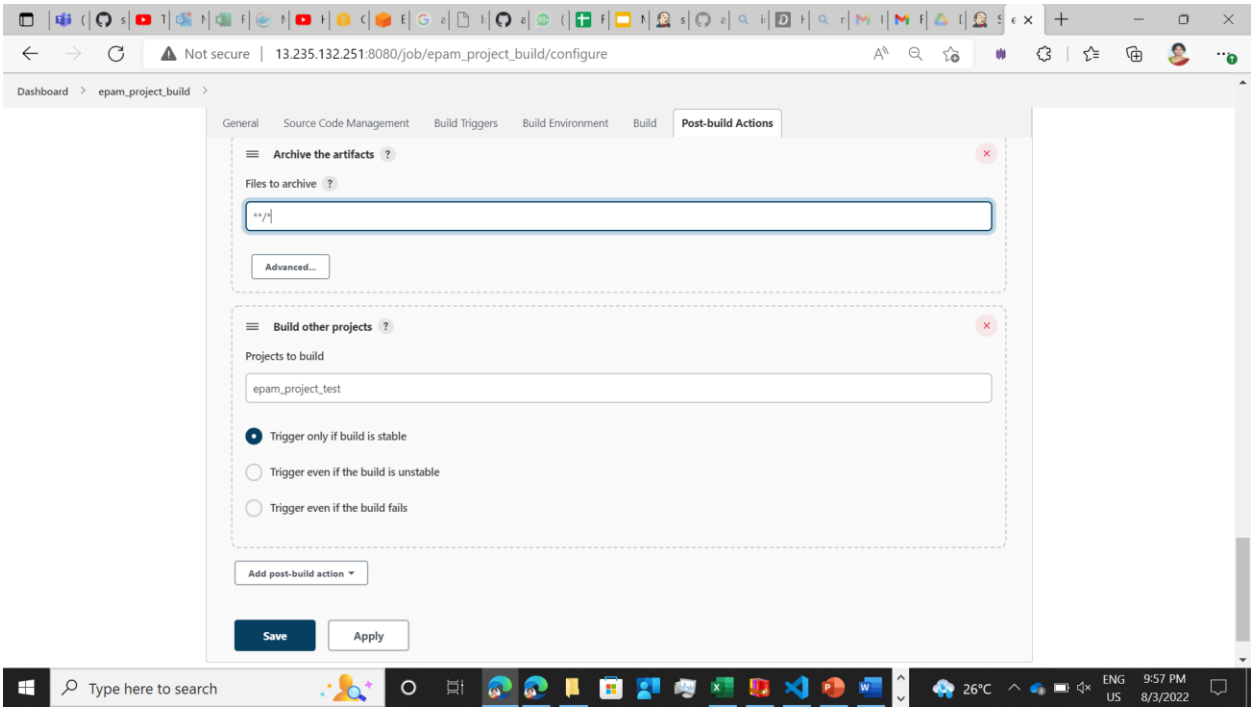
Select the Maven path which is already set in the global credentials in Manage Jenkins
Follow the same goals as done in eclipse starting with clean and install



Now in post build actions-> select Archive the artifacts, to send the output of build project to the testing team

If we want to archive all the artifacts type **/* as shown

Now the next step is to build other projects, where we will create a test project which will be triggered by the build project



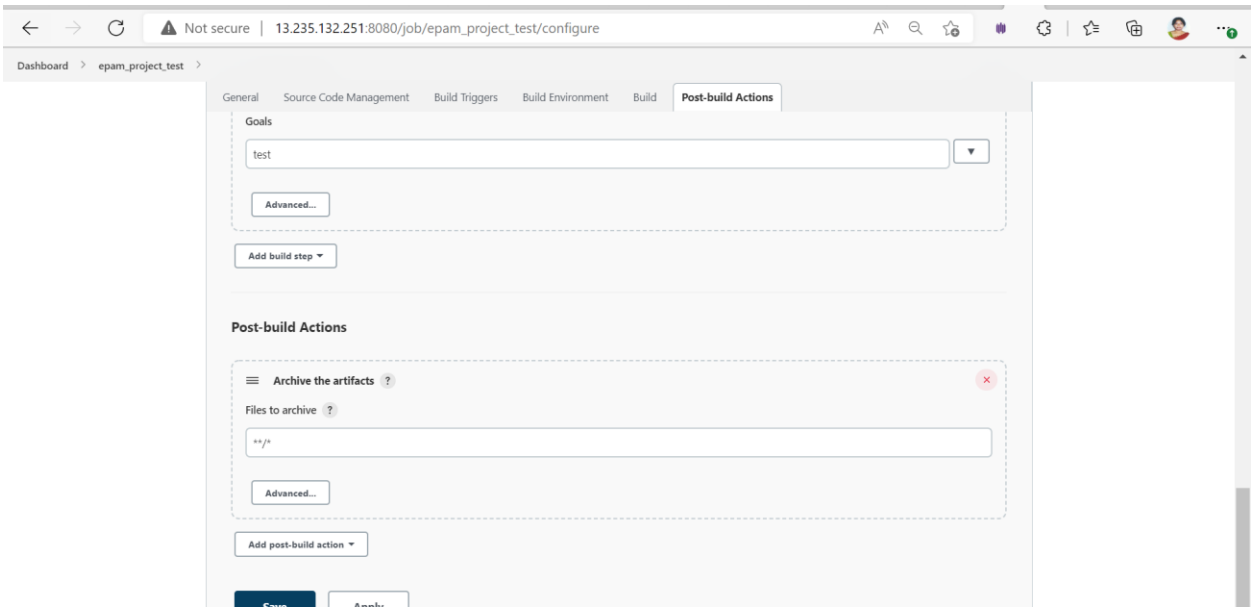
Create a new freestyle project test as shown and click ok

This time we need not mention the git repository so select None

In Build environment check the box as shown below, this is to discard old builds

To forward the artifacts of the previous project to the current test project, select copy the artifacts from another project in Build as shown

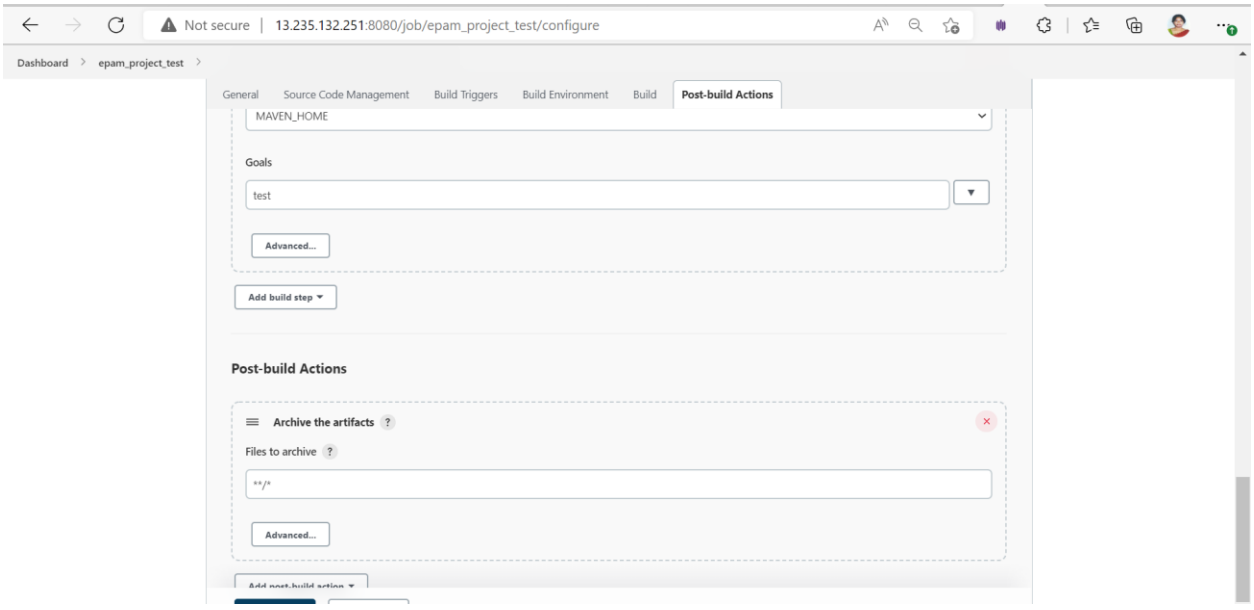
Give the name of the project from which we want to copy the artifacts and check the box ->stable build only->to copy all the artifacts type **/*



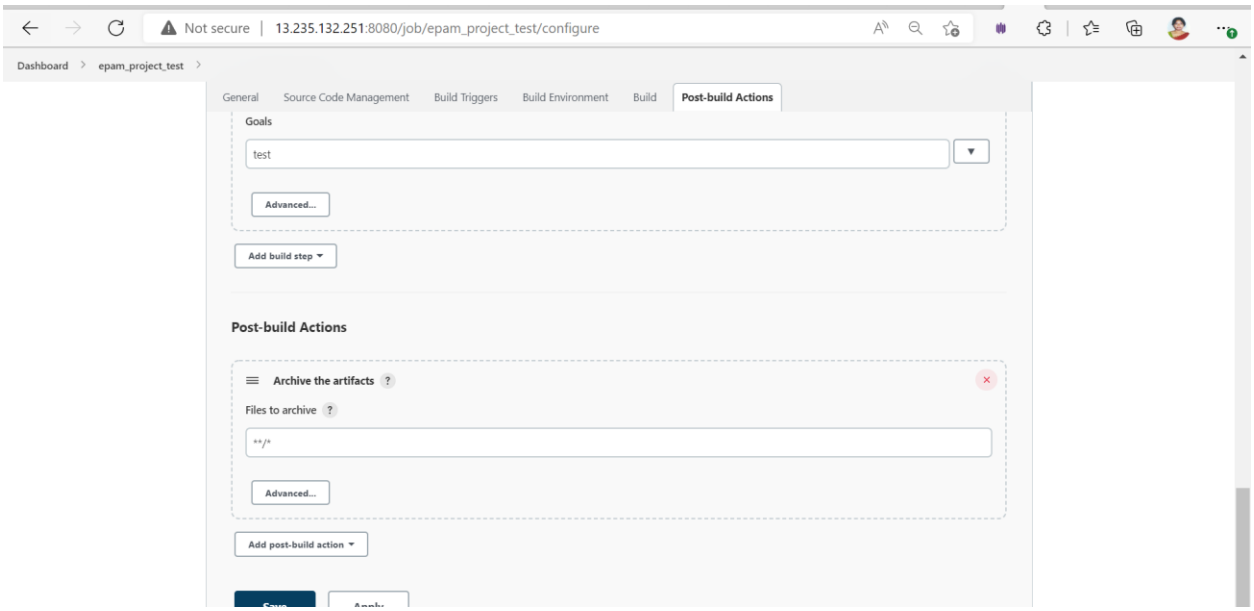
Now select Invoke top-level Maven targets in build

This time give the goal as test after selecting the Maven version

In post-build actions->select Archive the artifacts



To save all the artifacts->type **/* and Apply->Save

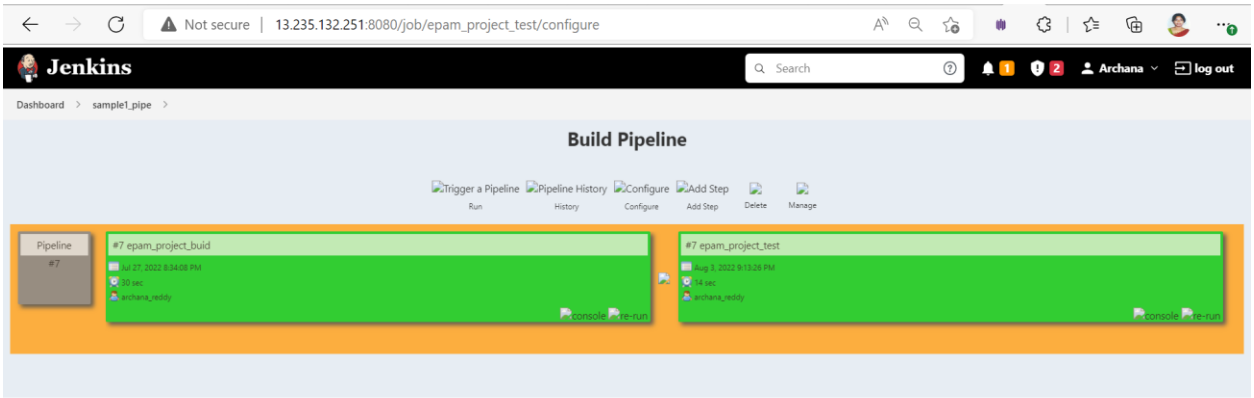


Create a pipeline by clicking on + symbol in the dashboard ->a pipeline is a collection of events or jobs which are interlinked with one another in a sequence

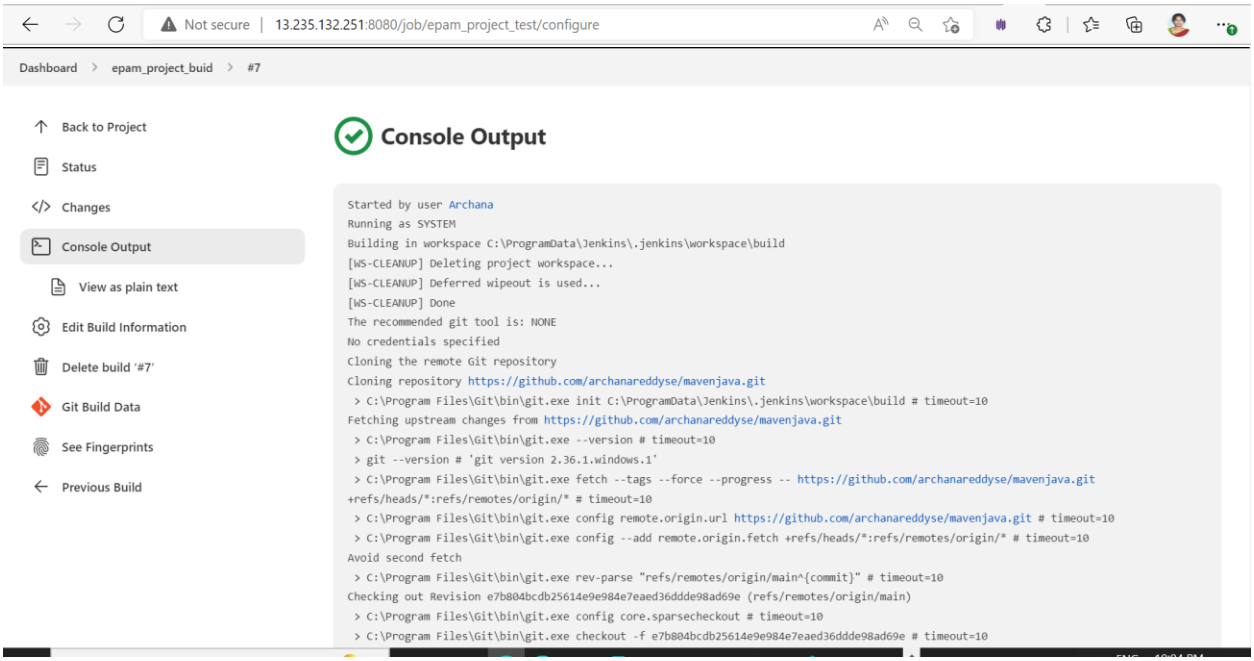
Give a name to the pipeline->select Build Pipeline View->create

Select the first project to trigger the execution->build project

Click on Run -> click on the small black box to open the console to check if the build is success



We can see that the build is success and the test project is also automatically triggered



Dashboard > epam_project_buid > #7

```
[INFO] Scanning for projects...
[INFO]
[INFO] ----------------------< com.test.maven:mavenjava >----------------------
[INFO] Building mavenjava 0.0.1-SNAPSHOT
[INFO] --------------------------------[ jar ]---------------------------------
[INFO]
[INFO] --- maven-clean-plugin:3.1.0:clean (default-clean) @ mavenjava ---
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time:  0.547 s
[INFO] Finished at: 2022-07-27T20:34:27+05:30
[INFO] ------------------------------------------------------------------------
[build] $ cmd.exe /C "C:\Users\Archana_Sama\Downloads\apache-maven-3.8.6-bin\apache-maven-3.8.6\bin\mvn.cmd install && exit
%%ERRORLEVEL%%"
[INFO] Scanning for projects...
[INFO]
[INFO] ----------------------< com.test.maven:mavenjava >----------------------
[INFO] Building mavenjava 0.0.1-SNAPSHOT
[INFO] --------------------------------[ jar ]---------------------------------
[INFO]
[INFO] --- maven-resources-plugin:3.0.2:resources (default-resources) @ mavenjava ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] skip non existing resourceDirectory C:\ProgramData\Jenkins\.jenkins\workspace\build\src\main\resources
[INFO]
[INFO] --- maven-compiler-plugin:3.8.0:compile (default-compile) @ mavenjava ---
[INFO] Changes detected - recompiling the module!
[INFO] Compiling 1 source file to C:\ProgramData\Jenkins\.jenkins\workspace\build\target\classes
[INFO]
[INFO] Results:
[INFO]
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[INFO]
[INFO] --- maven-jar-plugin:3.0.2:jar (default-jar) @ mavenjava ---
[INFO] Building jar: C:\ProgramData\Jenkins\.jenkins\workspace\build\target\mavenjava-0.0.1-SNAPSHOT.jar
[INFO]
[INFO] --- maven-install-plugin:2.5.2:install (default-install) @ mavenjava ---
[INFO] Installing C:\ProgramData\Jenkins\.jenkins\workspace\build\target\mavenjava-0.0.1-SNAPSHOT.jar to
C:\Windows\system32\config\systemprofile\.m2\repository\com\test\maven\mavenjava\0.0.1-SNAPSHOT\mavenjava-0.0.1-SNAPSHOT.jar
[INFO] Installing C:\ProgramData\Jenkins\.jenkins\workspace\build\pom.xml to
C:\Windows\system32\config\systemprofile\.m2\repository\com\test\maven\mavenjava\0.0.1-SNAPSHOT\mavenjava-0.0.1-SNAPSHOT.pom
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time:  6.717 s
[INFO] Finished at: 2022-07-27T20:34:36+05:30
[INFO] ------------------------------------------------------------------------
Archiving artifacts
Triggering a new build of sample_test
Finished: SUCCESS
```