DEVOPS Capstone Projects-01

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CAPSTONE PROJECTS

You have been Hired Sr. DevOps Engineer in Abode Software. They want to implement DevOps Lifecycle in their company. You have been asked to implement this lifecycle as fast as possible. Abode Software is a product-based company, their product is available on this GitHub link.

https://github.com/hshar/website.git

Following are the specifications of the lifecycle:

1. Install the necessary software on the machines using a configuration management tool.
2. Git Workflow has to be implemented.

3.Code Build should automatically be triggered once commit is made to master branch or develop branch.

- If commit is made to master branch, test and push to prod.
- If commit is made to develop branch, just test the product, do not push to prod.

4.The Code should be containerized with the help of a Dockerfile. The Dockerfile should be built every time there is a push to Git-Hub. Use the following pre-built container for your application:
hshar/webapp
The code should reside in '/var/www/html'
5.The above tasks should be defined in a Jenkins Pipeline, with the following jobs:
Job1 : build
Job2: test
Job3 : prod

Prerequisites

1. Infrastructure Setup

- Ensure that you have a server (EC2 instance) to install and run Jenkins.
- Install a configuration management tool (**Ansible**) to automate software installation.
- Ensure that Docker is installed on the machine running Jenkins.

2. Version Control System

- Set up a **GitHub repository** for the source code.
- Implement a **Git workflow**, ensuring branches like master and develop exist.
- Developers should commit and push their code to these branches following best practices.

3. Jenkins Installation and Configuration

- Install **Jenkins** on the server.
- Install necessary plugins:
  - **Pipeline Plugin**
- Configure **webhook integration** between GitHub and Jenkins to trigger builds on commits.

4. Docker Setup

- Ensure **Docker Engine** is installed on the Jenkins server.
- Verify that the user running Jenkins has permissions to execute Docker commands.

5. Jenkins Pipeline Dependencies

- Ensure the Jenkins pipeline script (Jenkinsfile) includes three jobs:
  - **Job 1: Build** – Pull code from GitHub, create a Docker image.
  - **Job 2: Test** – Run test cases inside the container.
  - **Job 3: Prod** – Deploy the containerized application (only for master branch commits).

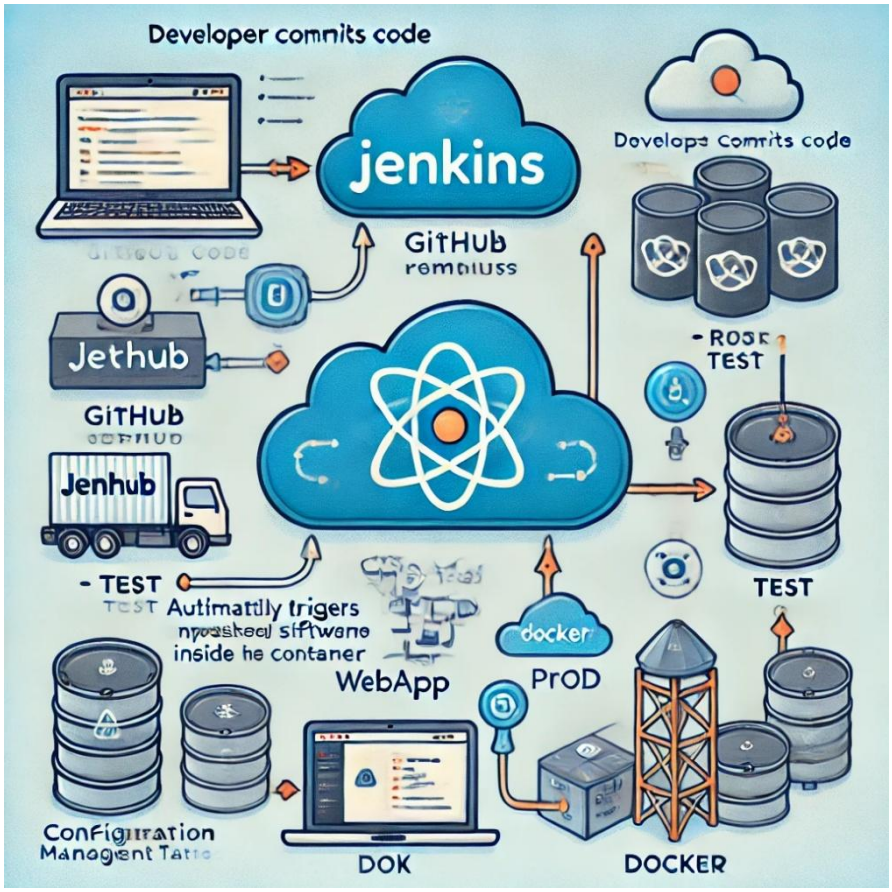
6. Web Application Code Placement

- Ensure that the application code is placed in /var/www/html inside the container as per the requirement.

ARCHITECHTURE OF THIS PROJECT

Components in the Architecture:

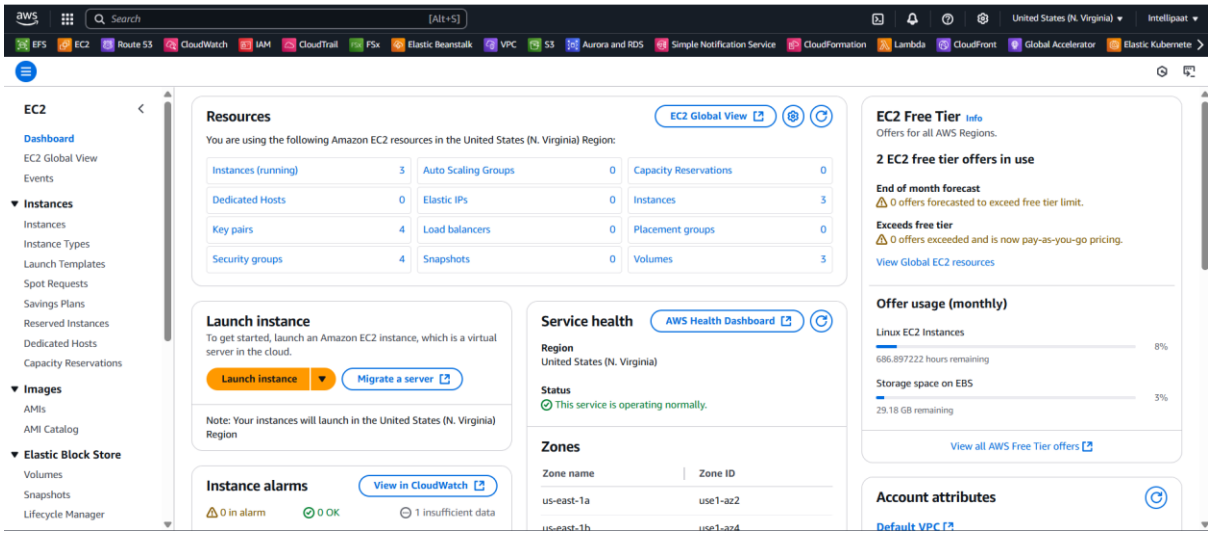
1. Developer commits code to GitHub (master or develop branch).
2. GitHub Webhook triggers Jenkins Pipeline, which executes:
    - Job 1: Build – Clones the repository and builds a Docker image.
    - Job 2: Test – Runs tests inside the container.
    - Job 3: Prod (only for master branch) – Pushes the container to production.
3. Dockerized Application Deployment using the pre-built container (hshar/webapp).
4. Configuration Management Tool installs necessary software on target machines.



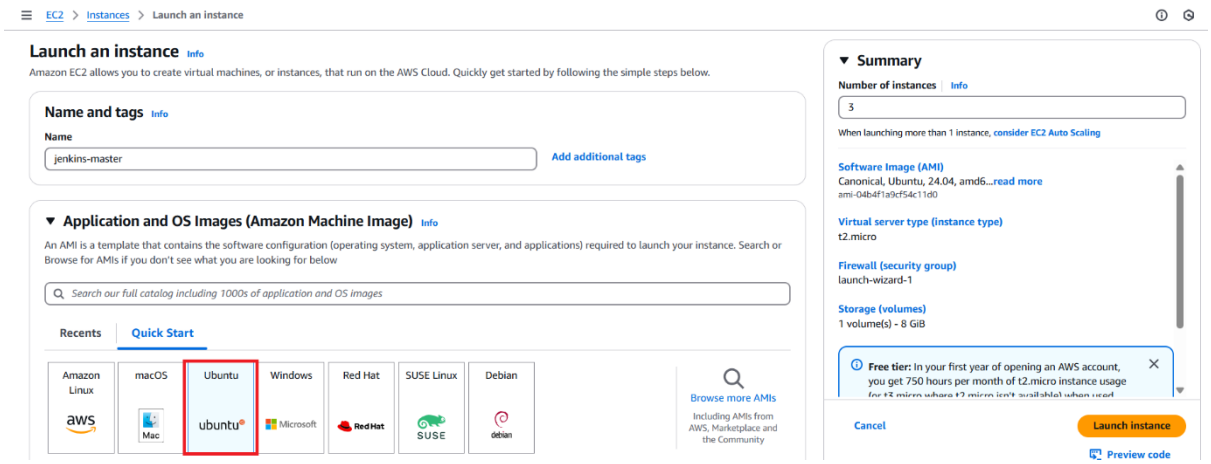
SOLUTION

1. Install the necessary software on the machines using a configuration management tool.

First We need to Infrastructure Setup and Log in to AWS Management Console.



Step 1: Launch an EC2 Instance And Choose Ubuntu And Number Of Instances Will Be 3.

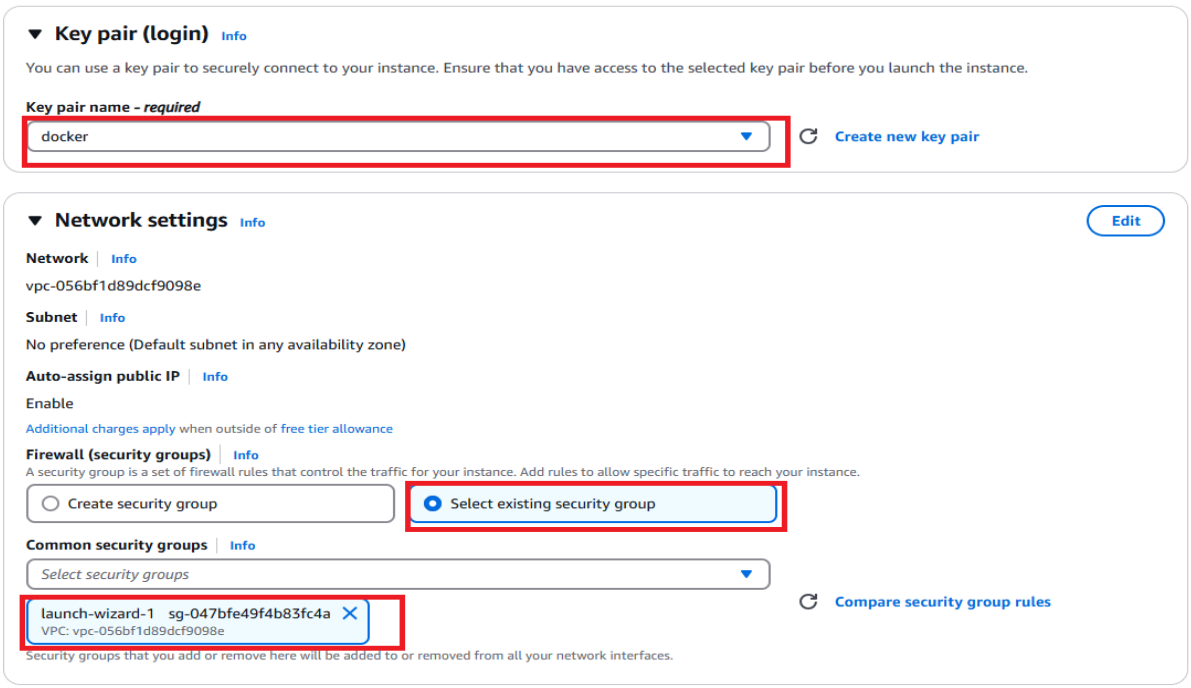


Step 2: Choose Amazon Machine Image.

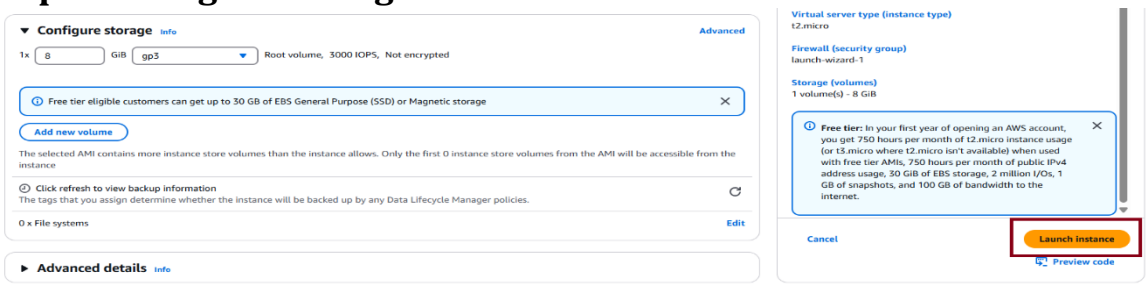
Note :When you install the ansible in ubuntu it is require 22.04 version and above.

In this Case I choose Ubuntu Server 24.04. LTS Version.

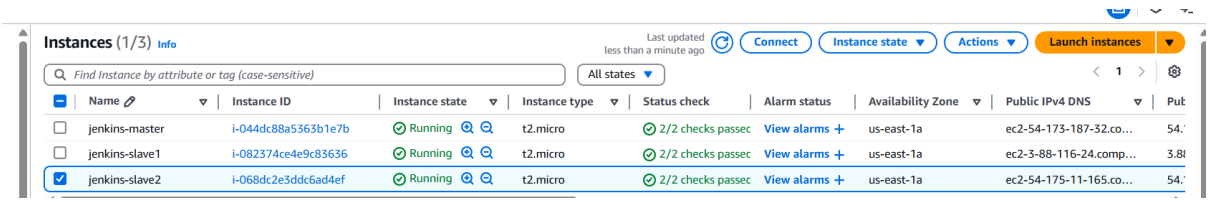
Step 3:Choose Key Pair



Step 4: Configure Storage.

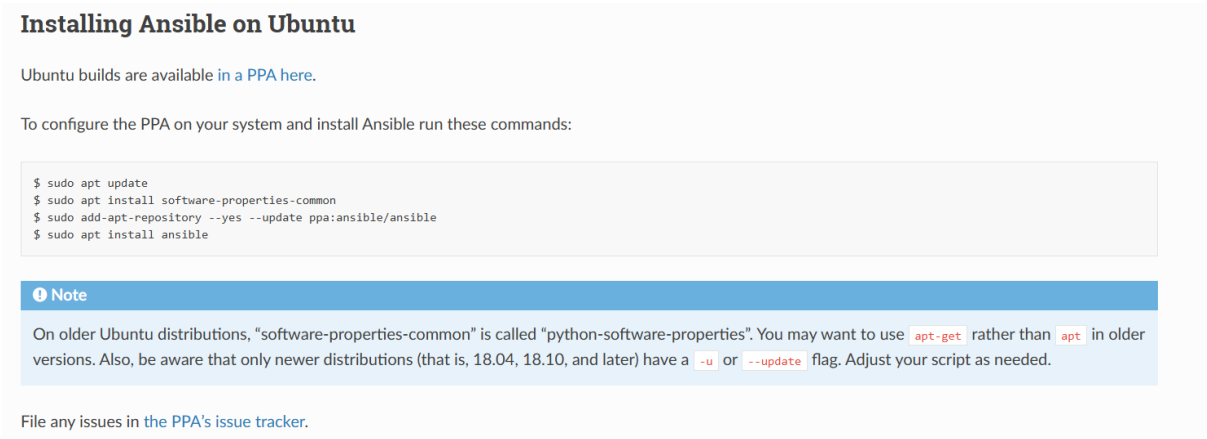


Step 5: Launch Instance



Now Install the Ansible in Ansible Master Server

First we need to go to ansible documentation for install the ansible.
https://docs.ansible.com/ansible/latest/installation_guide/installation_distros.html



Installing Ansible on Ubuntu

Ubuntu builds are available in a PPA here.

To configure the PPA on your system and install Ansible run these commands:

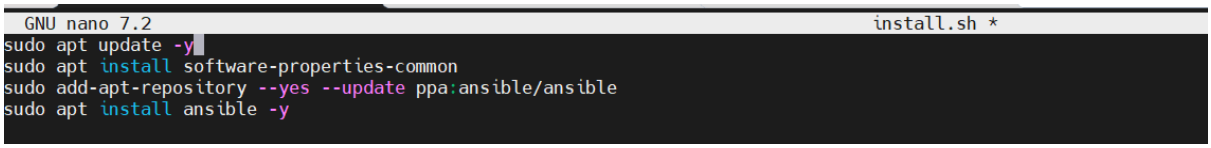
```
$ sudo apt update
$ sudo apt install software-properties-common
$ sudo add-apt-repository --yes --update ppa:ansible/ansible
$ sudo apt install ansible
```

Note

On older Ubuntu distributions, "software-properties-common" is called "python-software-properties". You may want to use `apt-get` rather than `apt` in older versions. Also, be aware that only newer distributions (that is, 18.04, 18.10, and later) have a `-u` or `--update` flag. Adjust your script as needed.

File any issues in the PPA's issue tracker.

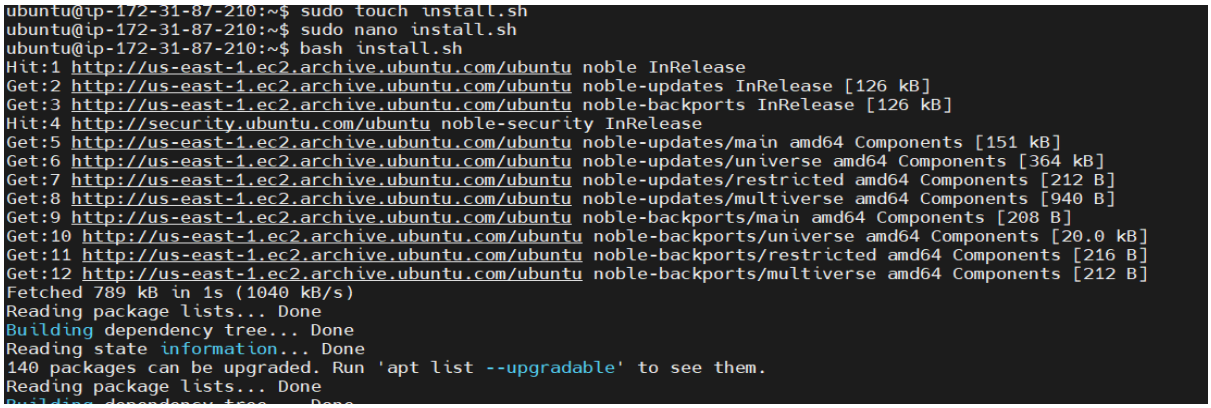
For this installation now we need to create script file.
Created install.sh for ansible installation and this files as a .sh.



```
 GNU nano 7.2                                                    install.sh *
sudo apt update -y
sudo apt install software-properties-common
sudo add-apt-repository --yes --update ppa:ansible/ansible
sudo apt install ansible -y
```

sudo apt update -y
sudo apt install software-properties-common
sudo add-apt-repository --yes --update ppa:ansible/ansible
sudo apt install ansible -y

Now We need to run this script so command is
bash install.sh



```
ubuntu@ip-172-31-87-210:~$ sudo touch install.sh
ubuntu@ip-172-31-87-210:~$ sudo nano install.sh
ubuntu@ip-172-31-87-210:~$ bash install.sh
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble InRelease
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports InRelease [126 kB]
Hit:4 http://security.ubuntu.com/ubuntu noble-security InRelease
Get:5 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd64 Components [151 kB]
Get:6 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/universe amd64 Components [364 kB]
Get:7 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/restricted amd64 Components [212 B]
Get:8 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/multiverse amd64 Components [940 B]
Get:9 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports/main amd64 Components [208 B]
Get:10 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports/universe amd64 Components [20.0 kB]
Get:11 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports/restricted amd64 Components [216 B]
Get:12 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports/multiverse amd64 Components [212 B]
Fetched 789 kB in 1s (1040 kB/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
140 packages can be upgraded. Run 'apt list --upgradable' to see them.
Reading package lists... Done
```

```
Unpacking python3-ntlm-auth (1.5.0-1) ...
Selecting previously unselected package python3-paramiko.
Preparing to unpack .../06-python3-paramiko_2.12.0-2ubuntu4.1_all.deb ...
Unpacking python3-paramiko (2.12.0-2ubuntu4.1) ...
Selecting previously unselected package python3-requests-ntlm.
Preparing to unpack .../07-python3-requests-ntlm_1.1.0-3_all.deb ...
Unpacking python3-requests-ntlm (1.1.0-3) ...
Selecting previously unselected package python3-xmltodict.
Preparing to unpack .../08-python3-xmltodict_0.13.0-1_all.deb ...
Unpacking python3-xmltodict (0.13.0-1) ...
Selecting previously unselected package python3-winrm.
Preparing to unpack .../09-python3-winrm_0.4.3-2_all.deb ...
Unpacking python3-winrm (0.4.3-2) ...
Selecting previously unselected package sshpass.
Preparing to unpack .../10-sshpass_1.09-1_amd64.deb ...
Unpacking sshpass (1.09-1) ...
Setting up python3-ntlm-auth (1.5.0-1) ...
Setting up python3-resolvelib (1.0.1-1) ...
Setting up python3-kerberos (1.1.14-3.1build9) ...
Setting up ansible-core (2.17.9-1ppa~noble) ...
Setting up sshpass (1.09-1) ...
Setting up python3-xmltodict (0.13.0-1) ...
Setting up ansible (10.7.0-1ppa~noble) ...
Setting up python3-nacl (1.5.0-4build1) ...
Setting up python3-requests-ntlm (1.1.0-3) ...
Setting up python3-winrm (0.4.3-2) ...
Setting up python3-paramiko (2.12.0-2ubuntu4.1) ...
Processing triggers for man-db (2.12.0-4build2) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
ubuntu@ip-172-31-87-210:~$
```

After Ansible Successfully install.we need to check the ansible version
The command is

ansible –version

```
ubuntu@ip-172-31-87-210:~$ ansible --version
ansible [core 2.17.9]
  config file = /etc/ansible/ansible.cfg
  configured module search path = ['/home/ubuntu/.ansible/plugins/modules', '/usr/share/ansible/plugins/modules']
  ansible python module location = /usr/lib/python3/dist-packages/ansible
  ansible collection location = /home/ubuntu/.ansible/collections:/usr/share/ansible/collections
  executable location = /usr/bin/ansible
  python version = 3.12.3 (main, Nov  6 2024, 18:32:19) [GCC 13.2.0] (/usr/bin/python3)
  jinja version = 3.1.2
  libyaml = True
ubuntu@ip-172-31-87-210:~$
```

Now We need to install in the ansible master
1.JAVA 2.ANSIBLE 3.JENKINS

ANSIBLE MASTER	**ANSIBLE SLAVE 1**	**ANSIBLE SLAVE 2**
JAVA	JAVA	JAVA
ANSIBLE	DOCKER	DOCKER
JENKIN		

Now we need to create a connection b/w master and slaves1,slave2
for the connection, we need to generate a keypair in master and pasting the keypair will help us to connect with slave1,slave2
ssh-keygen -t rsa in ansible master.
key will be saved in :
/home/ubuntu/.ssh/id_rsa.pub

Reference Ansible Assignment 01(Page No 10)

```
ubuntu@ip-172-31-87-210:~/.ssh$ ssh-keygen -t rsa
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:kK0u8OCK6q/kDtg7lD0sOpjgFBjKnG0AnGWZeZiGFx8 ubuntu@ip-172-31-87-210
The key's randomart image is:
+---[RSA 3072]----+
|+ ++BE           |
|.=.O...o         |
|=.* ..o .        |
|o= o   o         |
|  =+  . S        |
|o++++.           |
|B=o.o..          |
|Xo.. .           |
|B*+o             |
+----[SHA256]-----+
ubuntu@ip-172-31-87-210:~/.ssh$
```

Go to this path **/home/ubuntu/.ssh**
Here key has been generated

```
ubuntu@ip-172-31-87-210:~/.ssh$ ll
total 20
drwx------ 2 ubuntu ubuntu 4096 Mar 16 18:33 ./
drwxr-x--- 5 ubuntu ubuntu 4096 Mar 16 18:21 ../
-rw------- 1 ubuntu ubuntu  388 Mar 16 17:14 authorized_keys
-rw------- 1 ubuntu ubuntu 2610 Mar 16 18:33 id_rsa
-rw-r--r-- 1 ubuntu ubuntu  577 Mar 16 18:33 id_rsa.pub
ubuntu@ip-172-31-87-210:~/.ssh$
```

This key require **id_rsa.pub** for password less authentication.
Now we need to run this command
cat id_rsa.pub

```
ubuntu@ip-172-31-87-210:~/.ssh$ cat id_rsa.pub
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAABgQC4mxCtD+DVGz3LYX5b+DEmZbw+2mo+Co6r0zCCUDi11W/o0EtgsbIzg8ozSwuK1QDlXxaVMlx1nNhvwHxfsNwnMCWIb5MyLveP/p4LYBfrzoBIIyYpoF9uPPqtJvWi6fR5O
LmGfuhYZSvwRwB0inMeZAjprC07fByL8IISLf9ujnhICJ8C53v1Eq7IQlOPW9PjrmmVtiDNc1Bw6pgt37PYKWnrxyrJrGnCKOmY7poPspxnjlUtLLObjX5IFIJsfshkJPtwsWEhiQfnpEnChtlDRDsbEu12n5dEJ+uYEL0CpR
EmJv5KeXQ//mCc0xf5vML2Z9Mcr/6BUipsT9FcWQnk6JEH3fEREQOINzkvB329AkyufynIYcHaRvTdiHwObmW/8P4DRJnXXNbuDnCc8QmjbOXL95TuwYoY5noOUIiUaaLmsa/gCY0UuNH5HfFP+YYiOJFNGpEShENwEJa7SZ1
2GRMEjW0rvO9zoYLGwjyFIx9ZHJGlBwdzOC9rEQOFoP0= ubuntu@ip-172-31-87-210
```

Copy this key and go to both slave server and paste the same path
But we need to paste in authorized_key under .ssh folder.

```
ubuntu@ip-172-31-81-95:~$ cd .ssh/
ubuntu@ip-172-31-81-95:~/.ssh$ ll
total 12
drwx------ 2 ubuntu ubuntu 4096 Mar 16 17:14 ./
drwxr-x--- 4 ubuntu ubuntu 4096 Mar 16 17:42 ../
-rw------- 1 ubuntu ubuntu  388 Mar 16 17:14 authorized_keys
ubuntu@ip-172-31-81-95:~/.ssh$
```

Now check through ansible master server.
My Slave 2 has been successfully connected through passoerdless.
Same process with slave 2

```
ubuntu@ip-172-31-87-210:~/.ssh$ ssh 172.31.81.95
The authenticity of host '172.31.81.95 (172.31.81.95)' can't be established.
ED25519 key fingerprint is SHA256:mjaQjmgwwVUlfQzp96TVJM4taH4sL2rSgmfCipYaFRk.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])?
```

```
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '172.31.81.95' (ED25519) to the list of known hosts.
Welcome to Ubuntu 24.04.1 LTS (GNU/Linux 6.8.0-1021-aws x86_64)

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

 System information as of Sun Mar 16 18:42:26 UTC 2025

  System load:  0.0               Processes:             110
  Usage of /:   28.5% of 6.71GB   Users logged in:       1
  Memory usage: 21%               IPv4 address for enX0: 172.31.81.95
  Swap usage:   0%


Expanded Security Maintenance for Applications is not enabled.

146 updates can be applied immediately.
47 of these updates are standard security updates.
To see these additional updates run: apt list --upgradable

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status


Last login: Sun Mar 16 17:15:56 2025 from 106.222.209.100
ubuntu@ip-172-31-81-95:~$
```

```
ubuntu@ip-172-31-87-210:~/.ssh$ ssh 172.31.87.60
The authenticity of host '172.31.87.60 (172.31.87.60)' can't be established.
ED25519 key fingerprint is SHA256:ehdQs4o/IIEoGZQJRbWQHMIZOZ0lSzJ8spZpU6GUhP8.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])?
```

This Is ansible slave-2.this server also connected through passwordless authentication

```
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '172.31.87.60' (ED25519) to the list of known hosts.
Welcome to Ubuntu 24.04.1 LTS (GNU/Linux 6.8.0-1021-aws x86_64)

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

 System information as of Sun Mar 16 18:44:15 UTC 2025

  System load:  0.0               Processes:             110
  Usage of /:   28.5% of 6.71GB   Users logged in:       1
  Memory usage: 22%               IPv4 address for enX0: 172.31.87.60
  Swap usage:   0%


Expanded Security Maintenance for Applications is not enabled.

146 updates can be applied immediately.
47 of these updates are standard security updates.
To see these additional updates run: apt list --upgradable

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status


Last login: Sun Mar 16 17:16:33 2025 from 106.222.209.100
ubuntu@ip-172-31-87-60:~$
```

we need to add the slave Private-IP int the ansible host file

path of the ansible host file: cd /etc/ansible/

```
ubuntu@ip-172-31-87-210:/etc/ansible$ ll
total 20
drwxr-xr-x   3 root root 4096 Mar 16 18:19 ./
drwxr-xr-x 109 root root 4096 Mar 16 18:19 ../
-rw-r--r--   1 root root  614 Feb 25 16:59 ansible.cfg
-rw-r--r--   1 root root 1175 Feb 25 16:59 hosts
drwxr-xr-x   2 root root 4096 Feb 25 16:59 roles/
ubuntu@ip-172-31-87-210:/etc/ansible$
```

sudo nano hosts.We need to grouping the server.

[prod]

172.31.23.185

[test]

172.31.25.172

NOTE:-If you want to add more any of server in this prod and test section just add the ip address.

```
  GNU nano 7.2                                                    hosts
## alpha.example.org
## beta.example.org
## 192.168.1.100
## 192.168.1.110

# If you have multiple hosts following a pattern, you can specify
# them like this:

## www[001:006].example.com

# You can also use ranges for multiple hosts:

## db-[99:101]-node.example.com

# Ex 3: A collection of database servers in the 'dbservers' group:

## [dbservers]
##
## db01.intranet.mydomain.net
## db02.intranet.mydomain.net
## 10.25.1.56
## 10.25.1.57


# Ex4: Multiple hosts arranged into groups such as 'Debian' and 'openSUSE':

## [Debian]
## alpha.example.org
## beta.example.org

## [openSUSE]
## green.example.com
## blue.example.com

172.31.81.95
172.31.87.60
```

to check whether the connection is
successful or not

```
ubuntu@ip-172-31-87-210:/etc/ansible$ ansible -m ping all
[WARNING]: Platform linux on host 172.31.87.60 is using the discovered Python interpreter at /usr/bin/python3.12, but future installation of another Python interpreter
could change the meaning of that path. See https://docs.ansible.com/ansible-core/2.17/reference_appendices/interpreter_discovery.html for more information.
172.31.87.60 | SUCCESS => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python3.12"
    },
    "changed": false,
    "ping": "pong"
}
[WARNING]: Platform linux on host 172.31.81.95 is using the discovered Python interpreter at /usr/bin/python3.12, but future installation of another Python interpreter
could change the meaning of that path. See https://docs.ansible.com/ansible-core/2.17/reference_appendices/interpreter_discovery.html for more information.
172.31.81.95 | SUCCESS => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python3.12"
    },
    "changed": false,
    "ping": "pong"
}
ubuntu@ip-172-31-87-210:/etc/ansible$
```

After Done we need to create the one yaml file so this yaml file helps to install java and rest server install the docker and java. we need to mention what need to be give task.

```
 GNU nano 7.2                                                    install.yaml
---
- name: installing java and jenkin
  host: localhost
  tasks:
   -name: installing java and Jenkins
    script: localhost.sh

- name: installing java and docker by ansible slave 1 and slave 2 machine
  host: all
  tasks:
    -name: installing java and docker
   script: slave.sh
```

```
 GNU nano 7.2                                                    localhost.sh *
sudo apt update -y
sudo apt install openjdk-17-jdk -y

sudo wget -O /usr/share/keyrings/jenkins-keyring.asc \
  https://pkg.jenkins.io/debian-stable/jenkins.io-2023.key
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 -y
sudo apt-get install jenkins -y
```

```
 GNU nano 7.2                                                    slave.sh
sudo apt update -y
sudo apt install openjdk-17-jdk -y
sudo apt install docker.io -y
```

Now Run this playbook.

```
ubuntu@ip-172-31-87-210:/etc/ansible$ ansible-playbook install.yaml

PLAY [Installing Java and Jenkins on Master] ***********************************************************************************************************************************************

TASK [Gathering Facts] *********************************************************************************************************************************************************************
ok: [localhost]

TASK [Running local setup script] **********************************************************************************************************************************************************
changed: [localhost]

PLAY [Installing Java and Docker on Slave Machines] ****************************************************************************************************************************************

TASK [Gathering Facts] *********************************************************************************************************************************************************************
[WARNING]: Platform linux on host 172.31.87.60 is using the discovered Python interpreter at /usr/bin/python3.12, but future installation of another Python interpreter
could change the meaning of that path. See https://docs.ansible.com/ansible-core/2.17/reference_appendices/interpreter_discovery.html for more information.
ok: [172.31.87.60]
[WARNING]: Platform linux on host 172.31.81.95 is using the discovered Python interpreter at /usr/bin/python3.12, but future installation of another Python interpreter
could change the meaning of that path. See https://docs.ansible.com/ansible-core/2.17/reference_appendices/interpreter_discovery.html for more information.
ok: [172.31.81.95]

TASK [Running slave setup script] **********************************************************************************************************************************************************
changed: [172.31.81.95]
changed: [172.31.87.60]

PLAY RECAP *********************************************************************************************************************************************************************************
172.31.81.95               : ok=2    changed=1    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
172.31.87.60               : ok=2    changed=1    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
localhost                  : ok=2    changed=1    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0

ubuntu@ip-172-31-87-210:/etc/ansible$
```

Now Check the Version in both slaves

```
ubuntu@ip-172-31-81-95:/etc$ java --version
openjdk 17.0.14 2025-01-21
OpenJDK Runtime Environment (build 17.0.14+7-Ubuntu-124.04)
OpenJDK 64-Bit Server VM (build 17.0.14+7-Ubuntu-124.04, mixed mode, sharing)
ubuntu@ip-172-31-81-95:/etc$ docker --version
Docker version 26.1.3, build 26.1.3-0ubuntu1~24.04.1
```

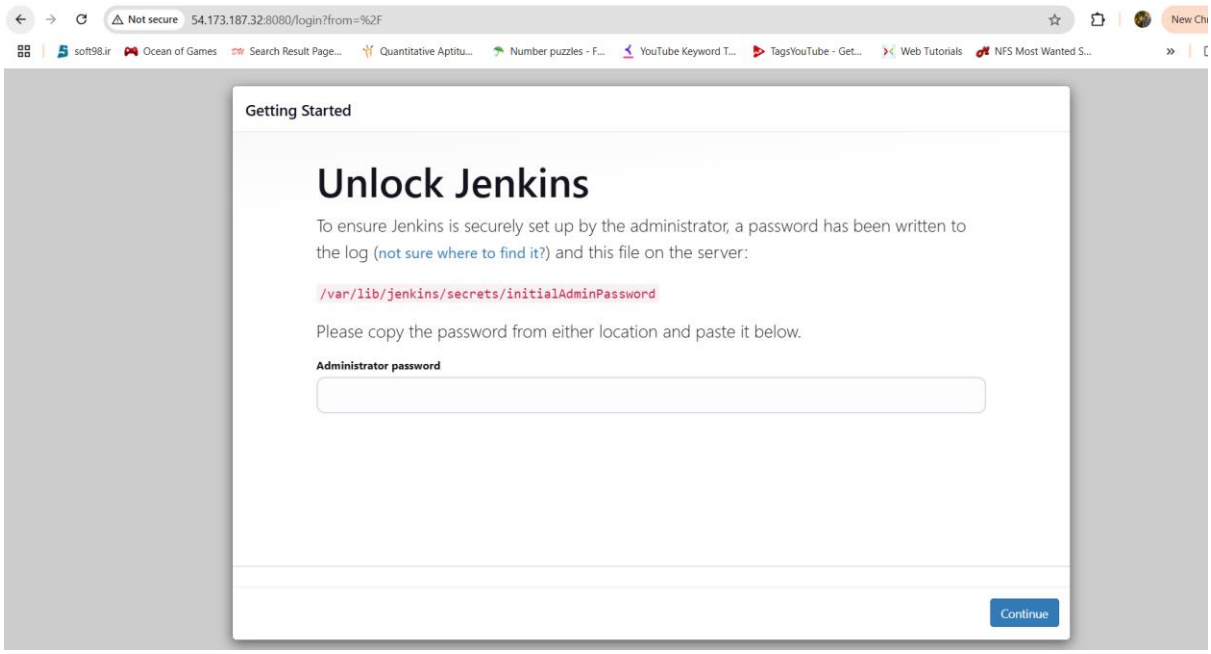
```
ubuntu@ip-172-31-87-60:~/.ssh$ java --version
openjdk 17.0.14 2025-01-21
OpenJDK Runtime Environment (build 17.0.14+7-Ubuntu-124.04)
OpenJDK 64-Bit Server VM (build 17.0.14+7-Ubuntu-124.04, mixed mode, sharing)
ubuntu@ip-172-31-87-60:~/.ssh$ docker --version
Docker version 26.1.3, build 26.1.3-0ubuntu1~24.04.1
ubuntu@ip-172-31-87-60:~/.ssh$
```

Jenkin version Check in ansible master server

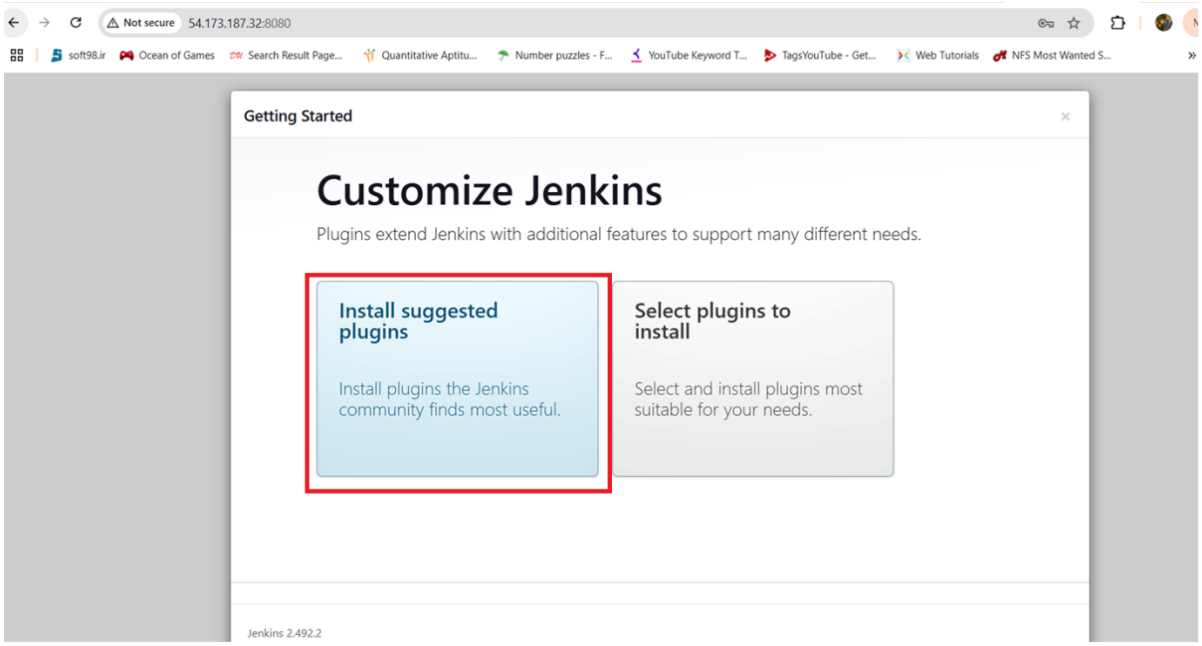
```
ubuntu@ip-172-31-87-210:/etc/ansible$ jenkins --version
2.492.2
```

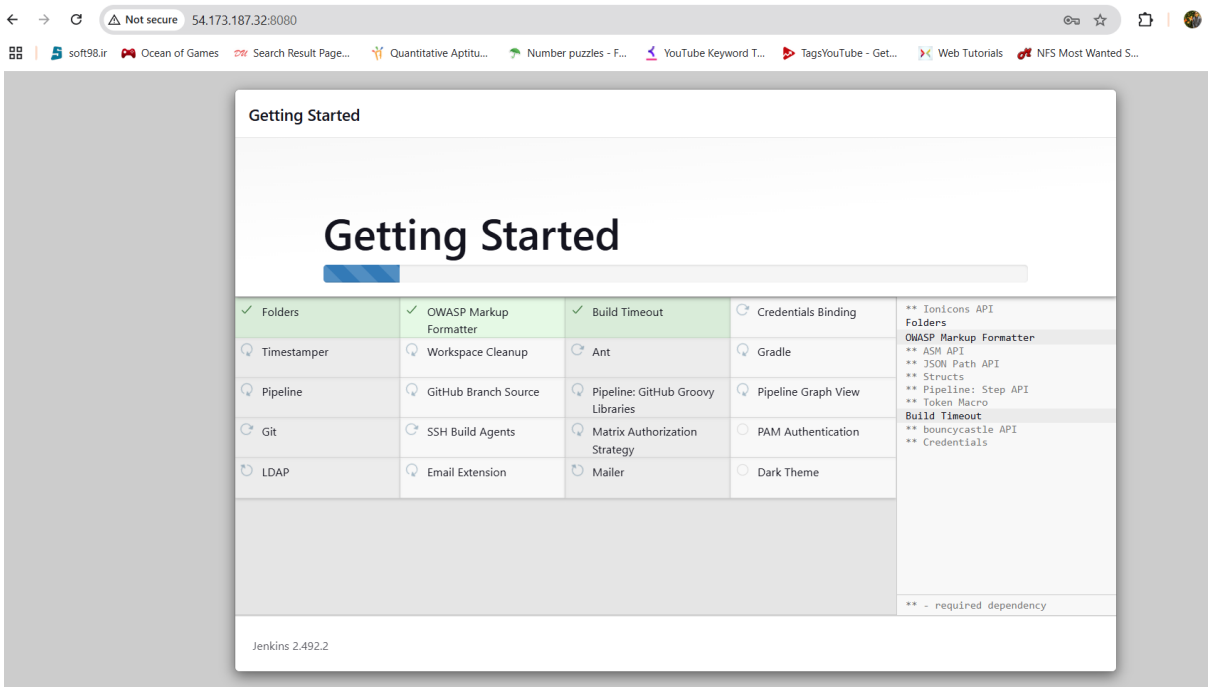
Now We need to configure the Jenkins dashboard

Go to **sudo cat /var/lib/jenkins/secrets/initialAdminPassword**



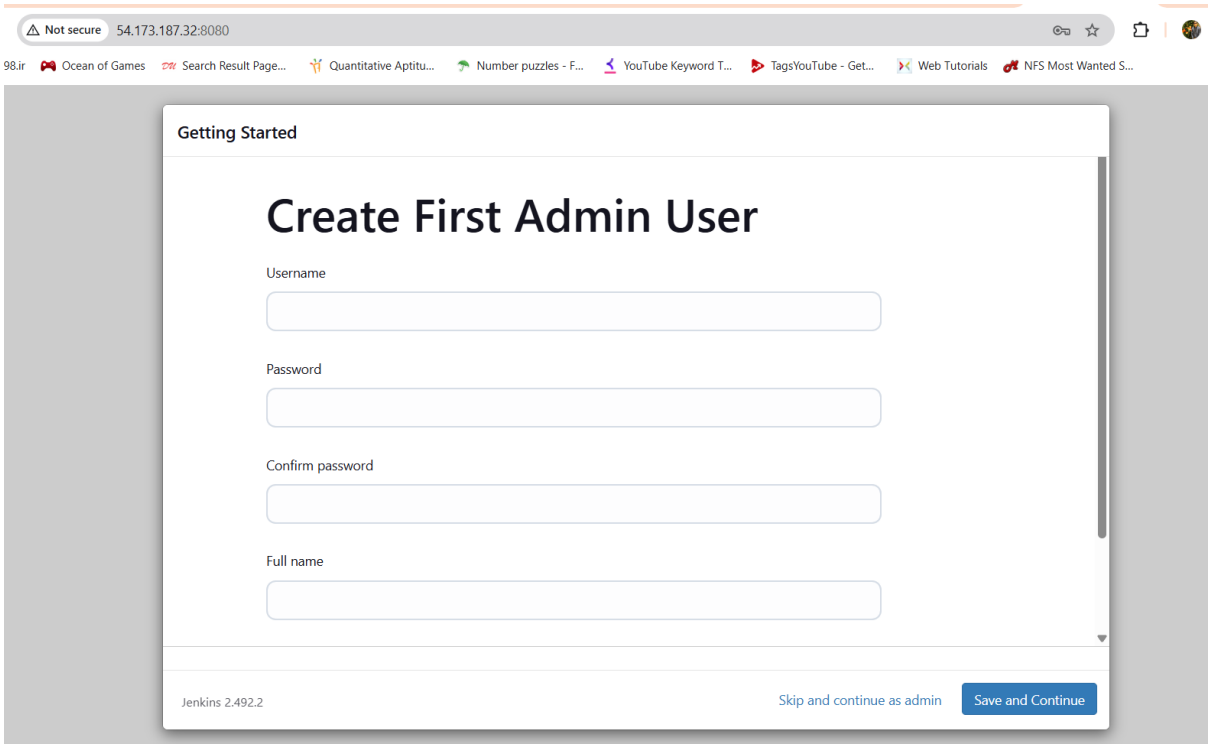

```
ubuntu@ip-172-31-87-210:/etc/ansible$ sudo cat /var/lib/jenkins/secrets/initialAdminPassword
34ef7814079c424ba28f5d713fce259b
```

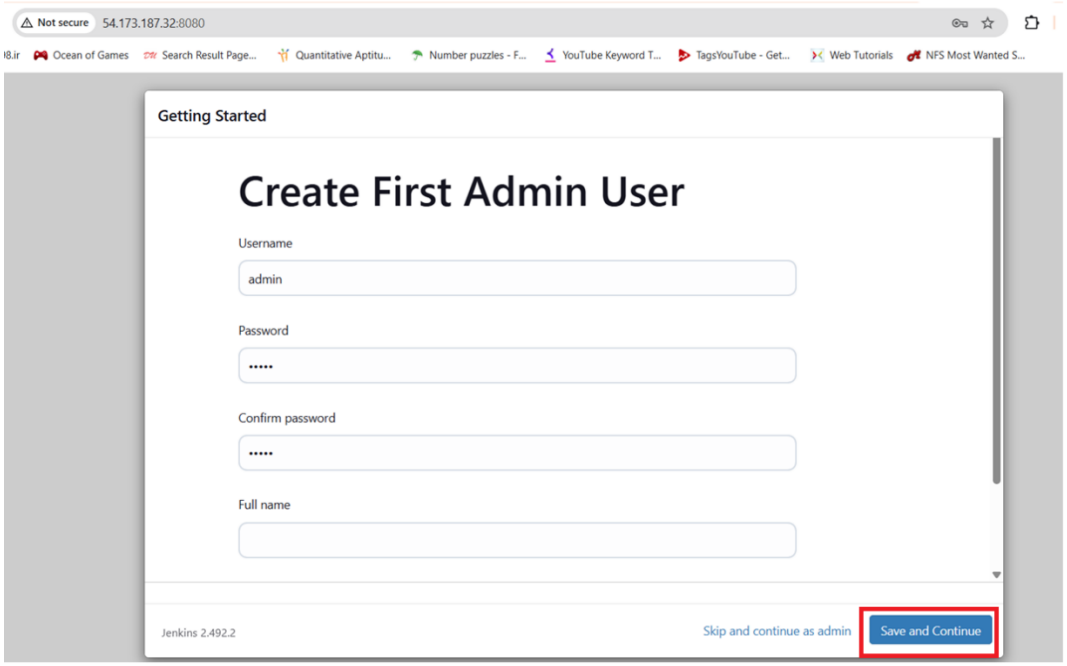




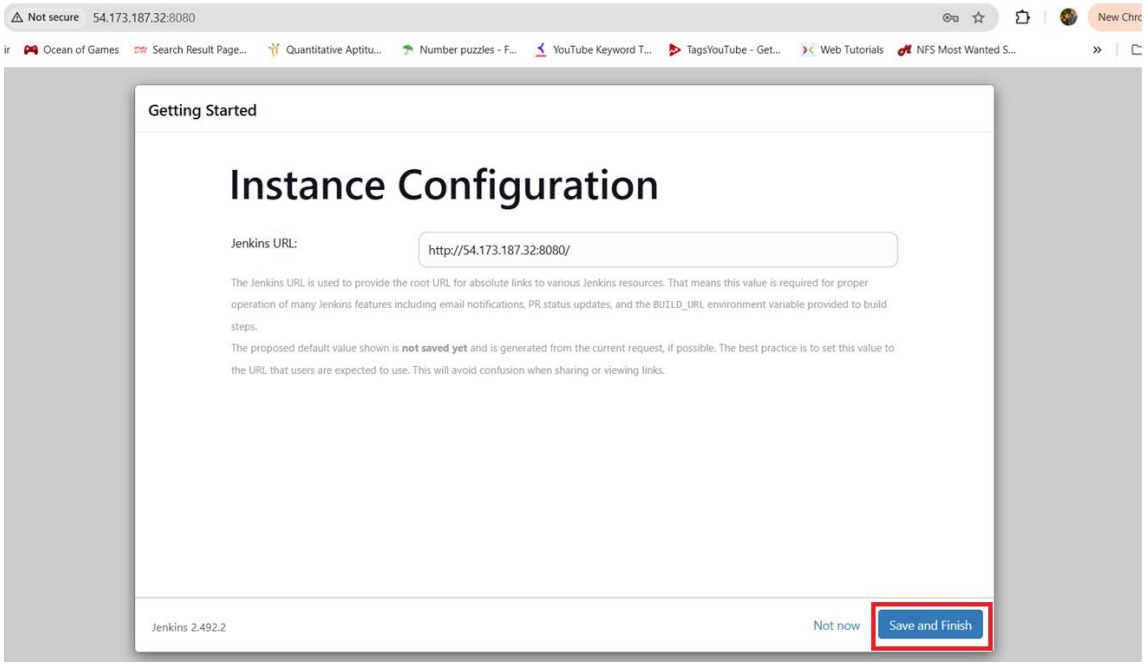
Now After Installed The Plugins.

You need to fill your user name,password and email id in this form as per your choice.

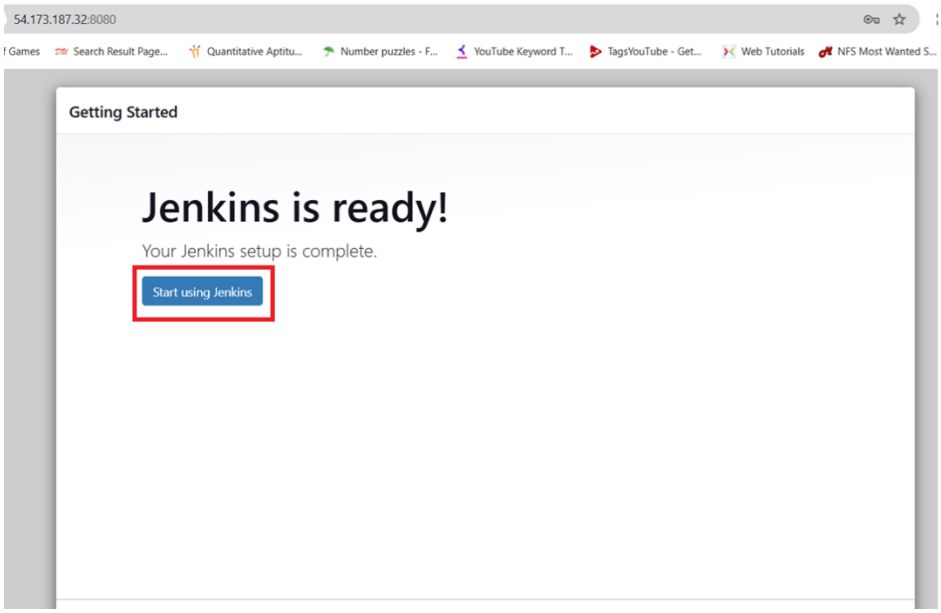




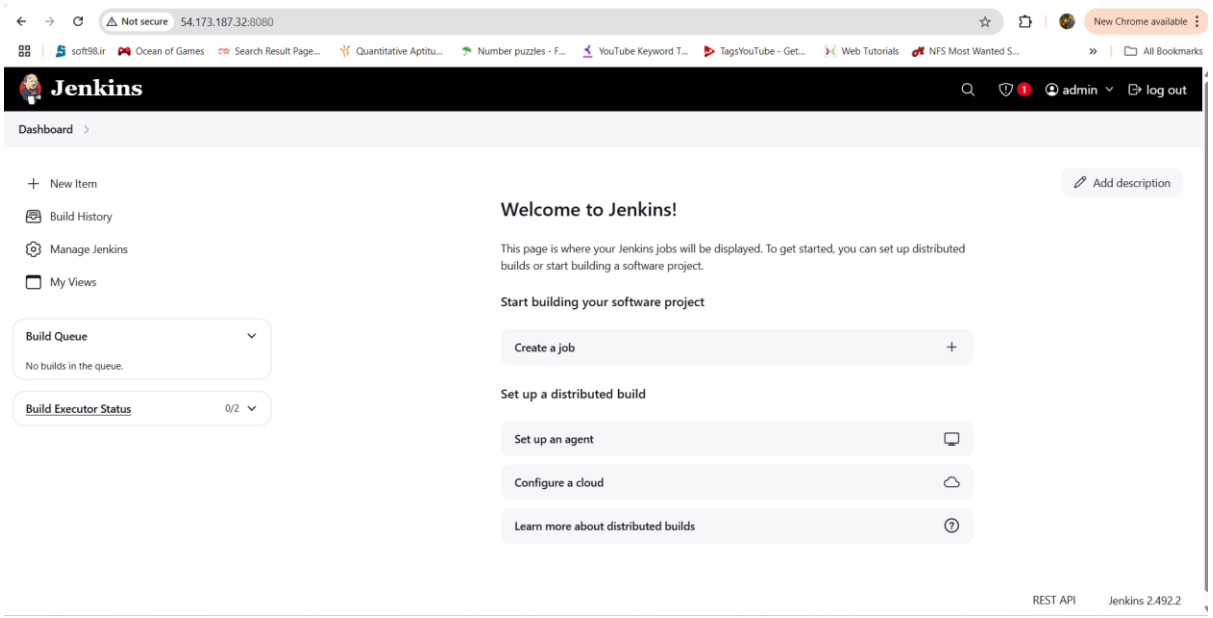
After Setup Your username and password.you need to configure your instance with jenkin urls.



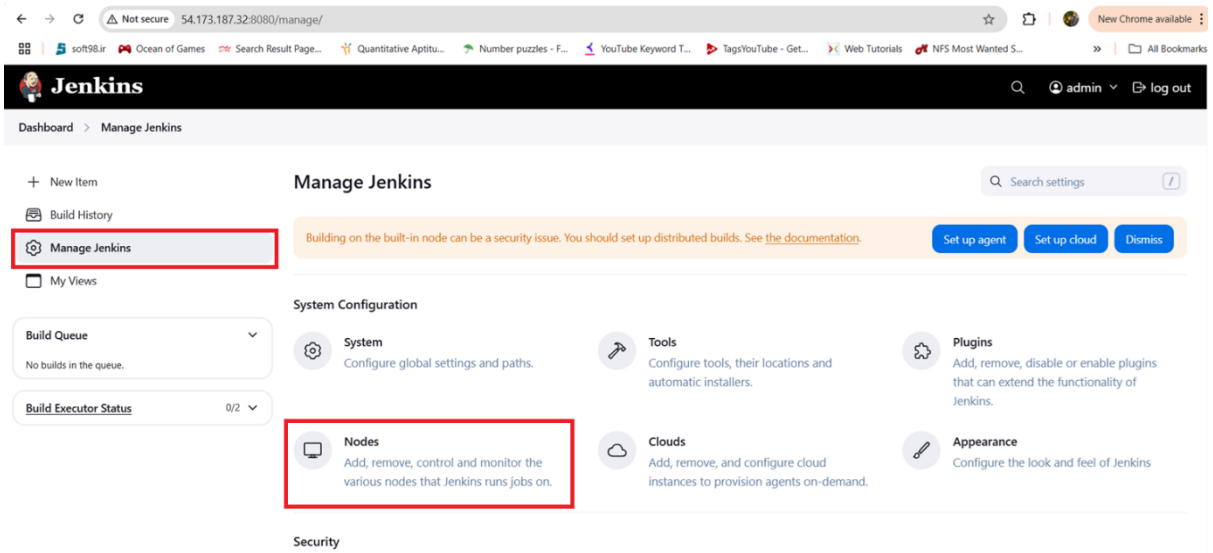
Then Click Start using Jenkin



After click the Start using Jenkin you will see jenkins dashboard.

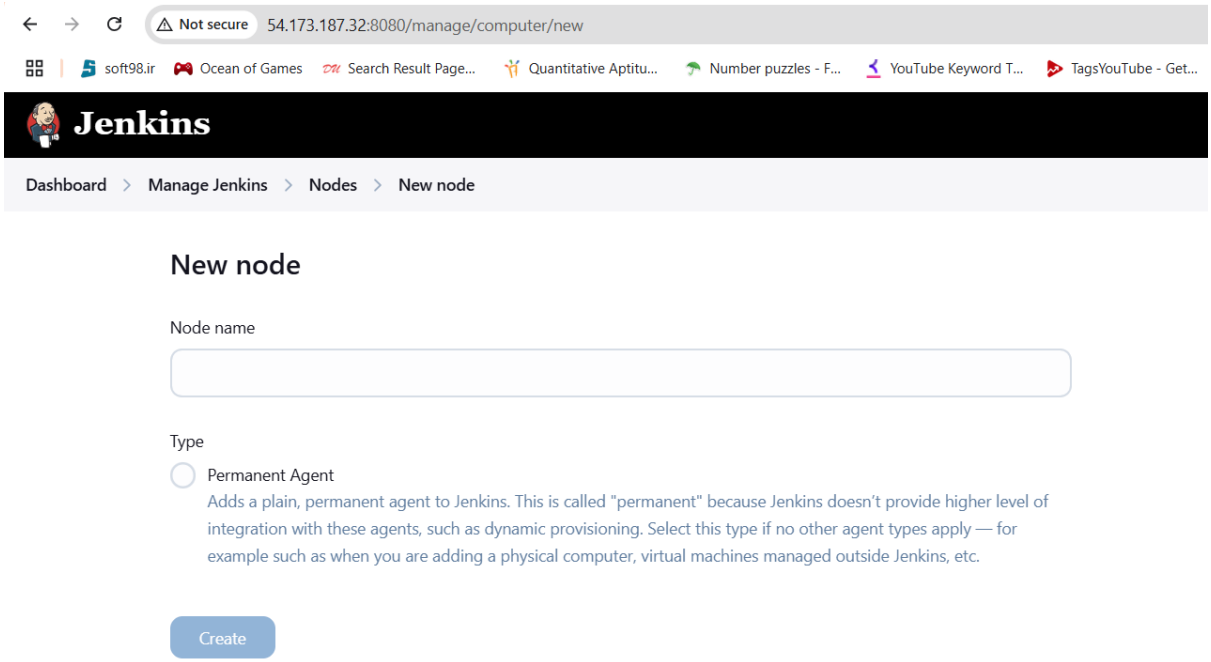


Now Need to configure nodes in Jenkins.
Jenkins > Mange Jenkins > Click Nodes.

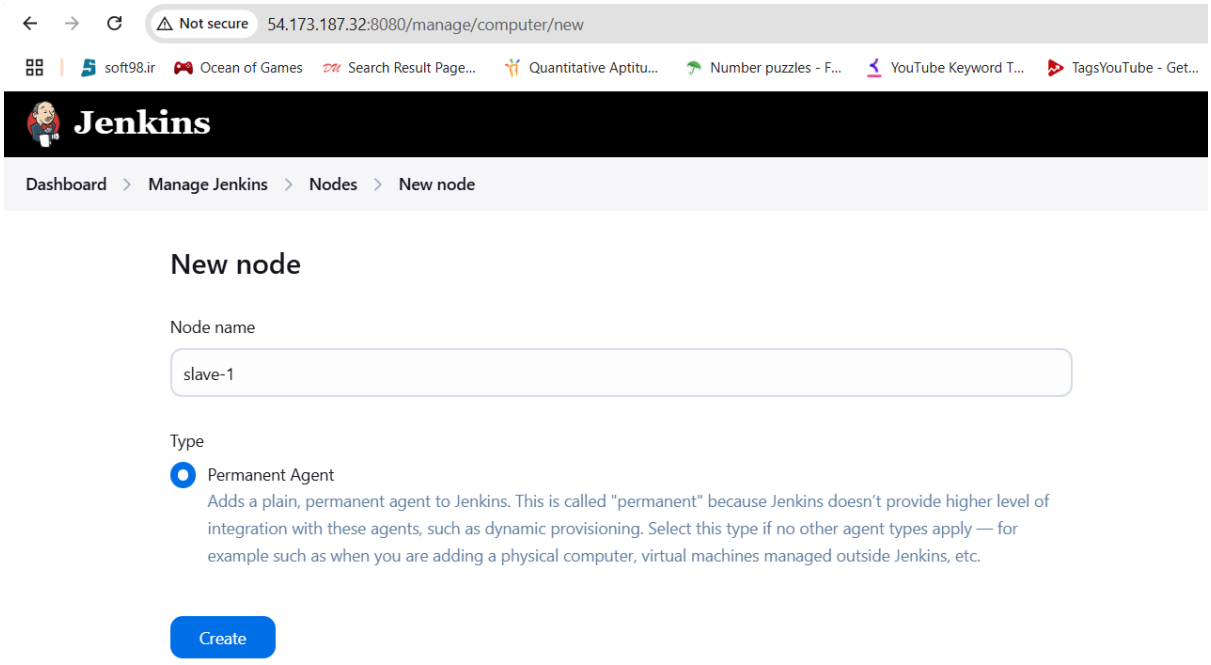


After Click Nodes.

You will need to fill the all information regarding the nodes.

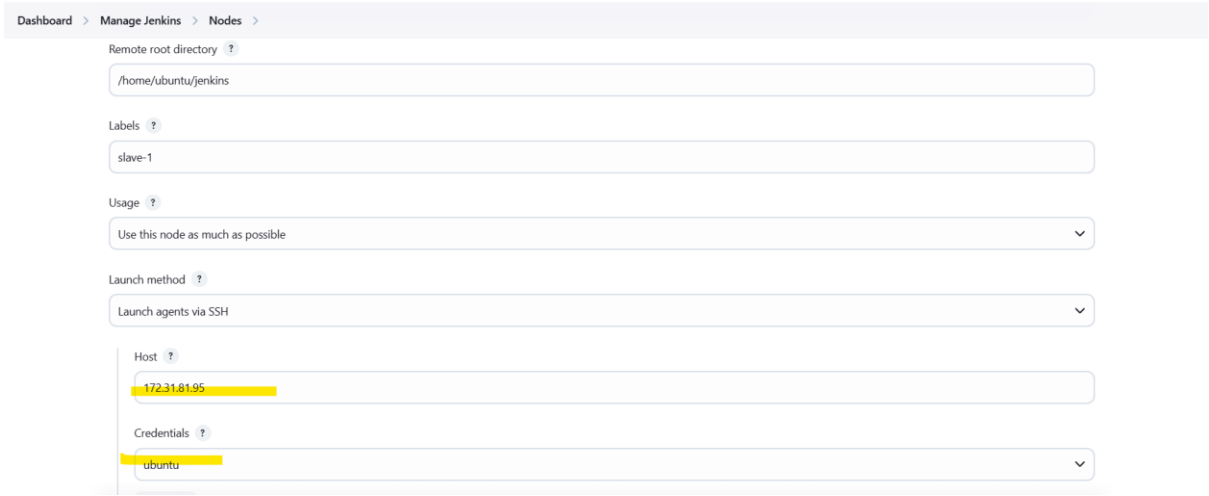


Node Name:-slave-1 then click Create.

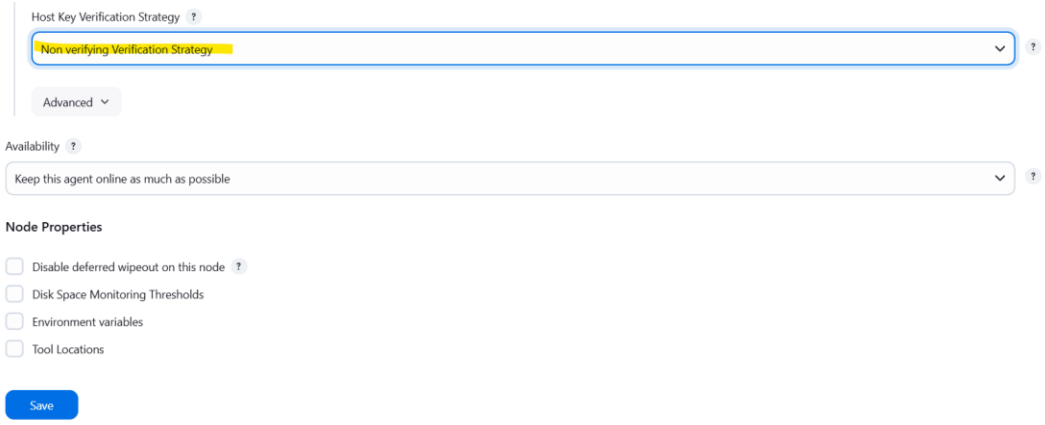


After Click Create You need to put the remote root directory.
In My Case.this is my jenkins workspace path.
/home/ubuntu/jenkins

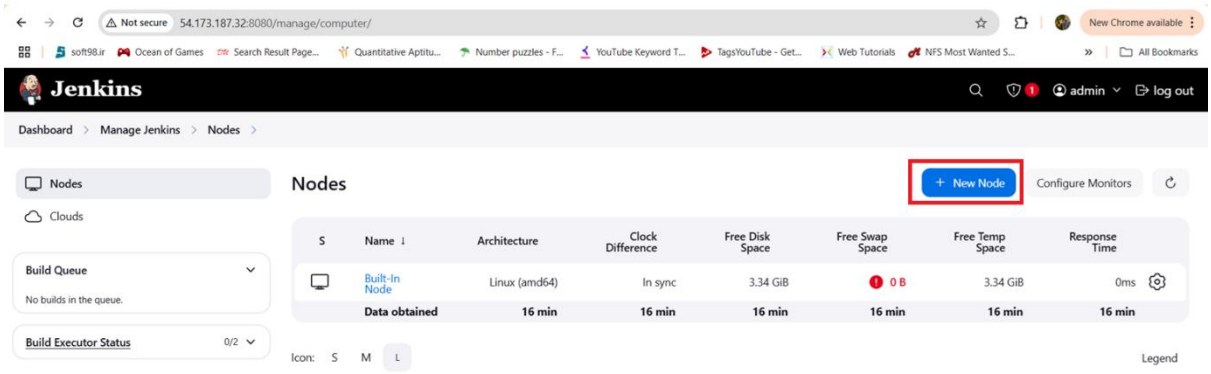
Host:172.31.81.95
Username:ubuntu
Launch Method:Launch agents via SSH.



Here we need to put the .pem key.
Host Key Verification Strategy: **Non Verifying Verification Strategy**

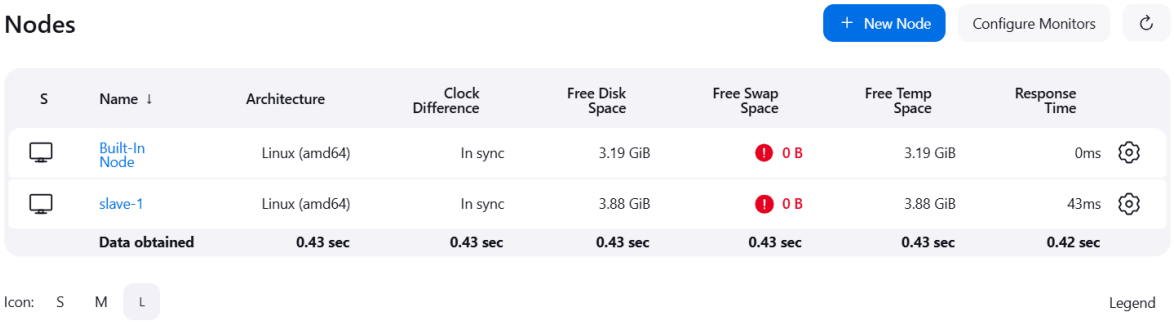


After Click Save

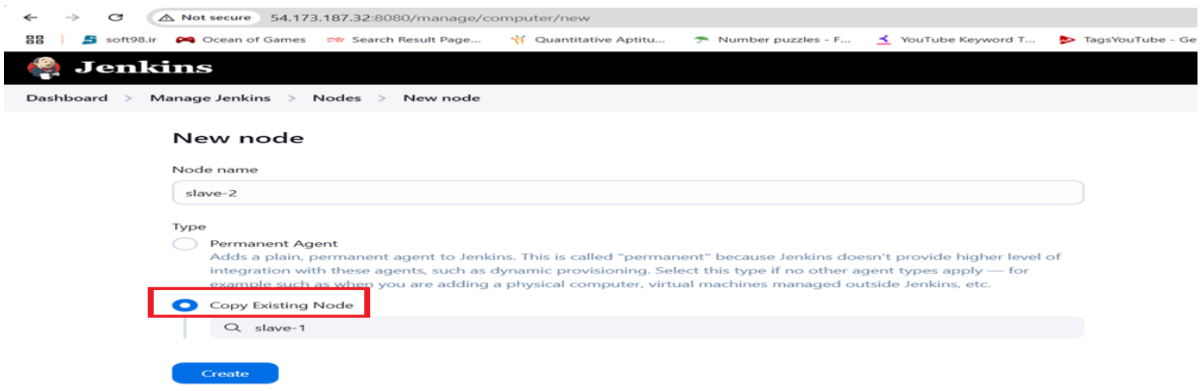


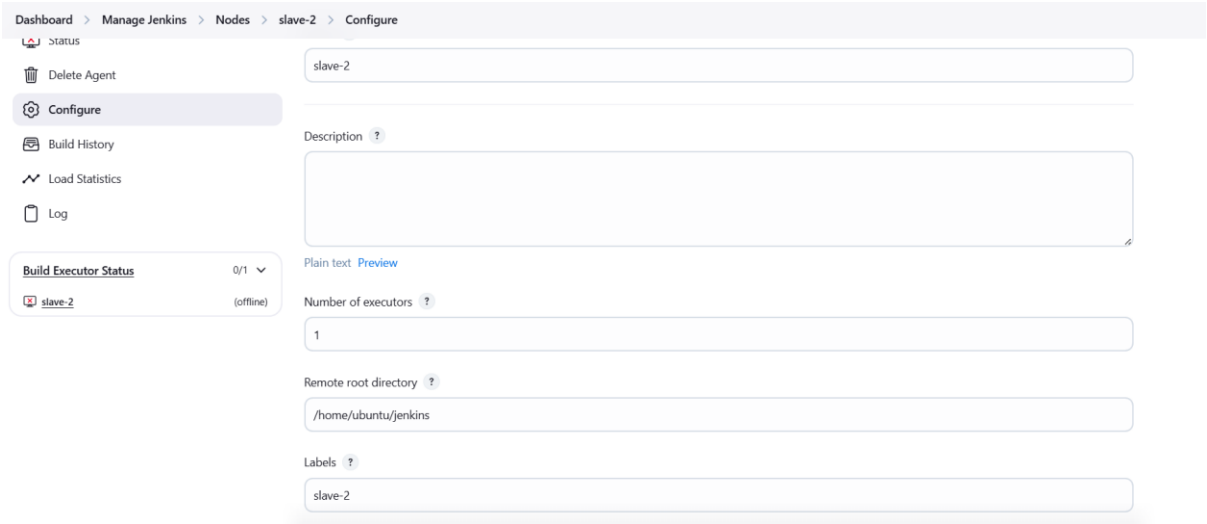
You will See the node which is create showing here.

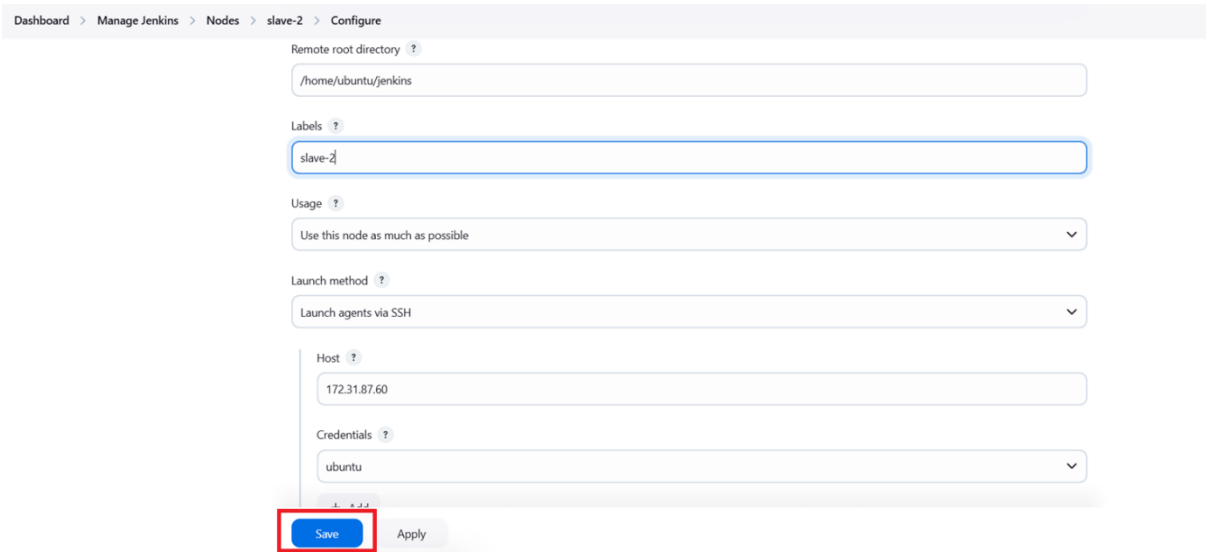
Node has been sync successfully.



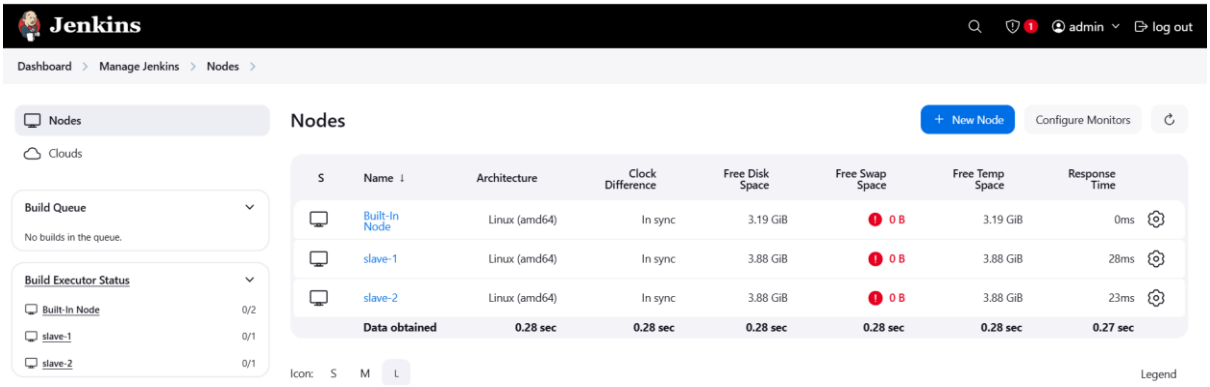
Same Process We need to as it is slave-1





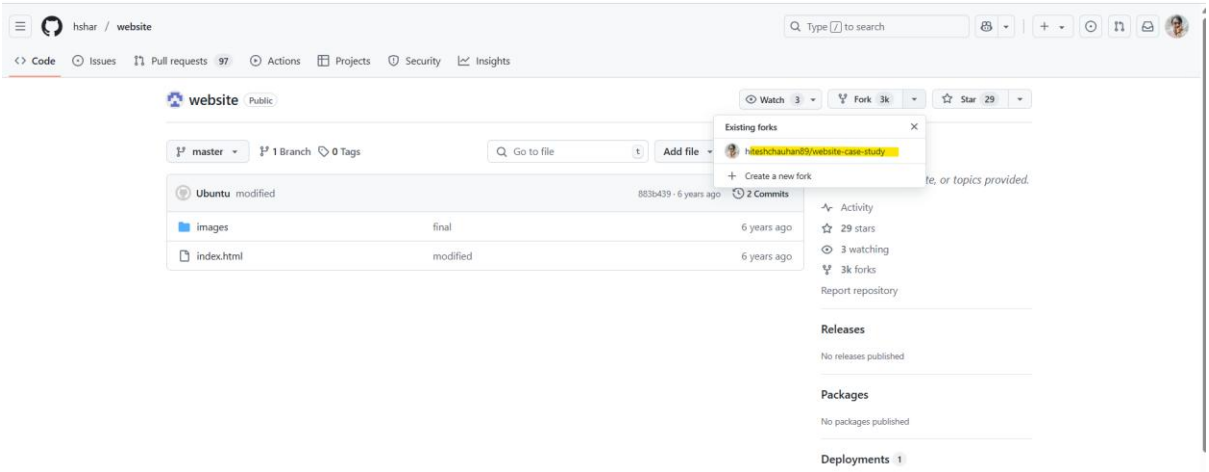


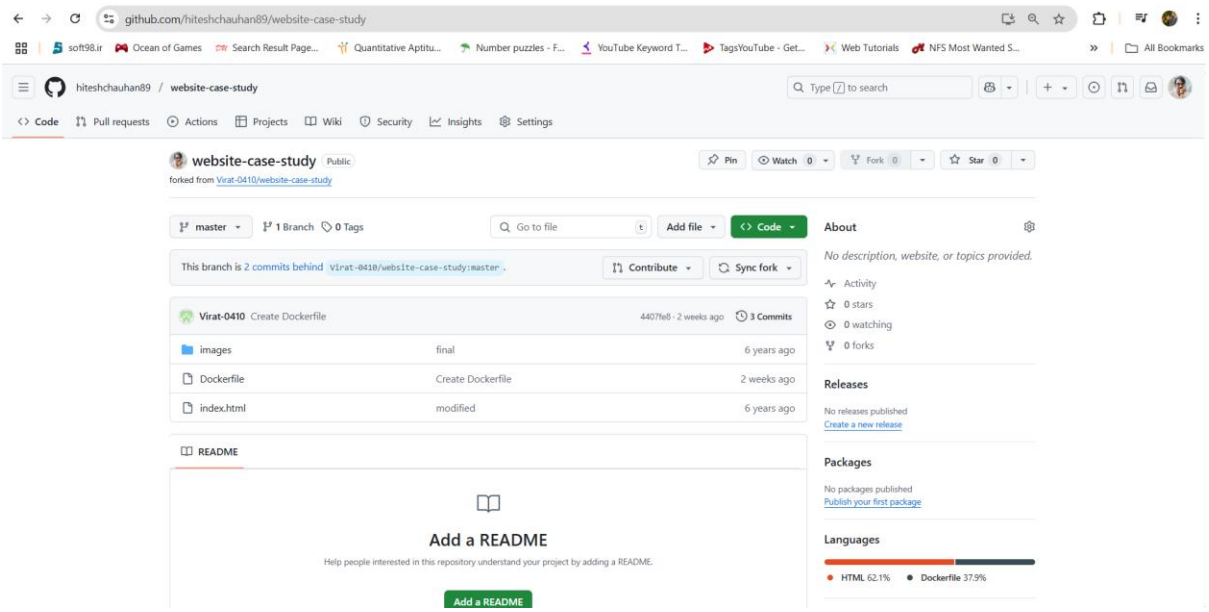
After Node Has been sync.



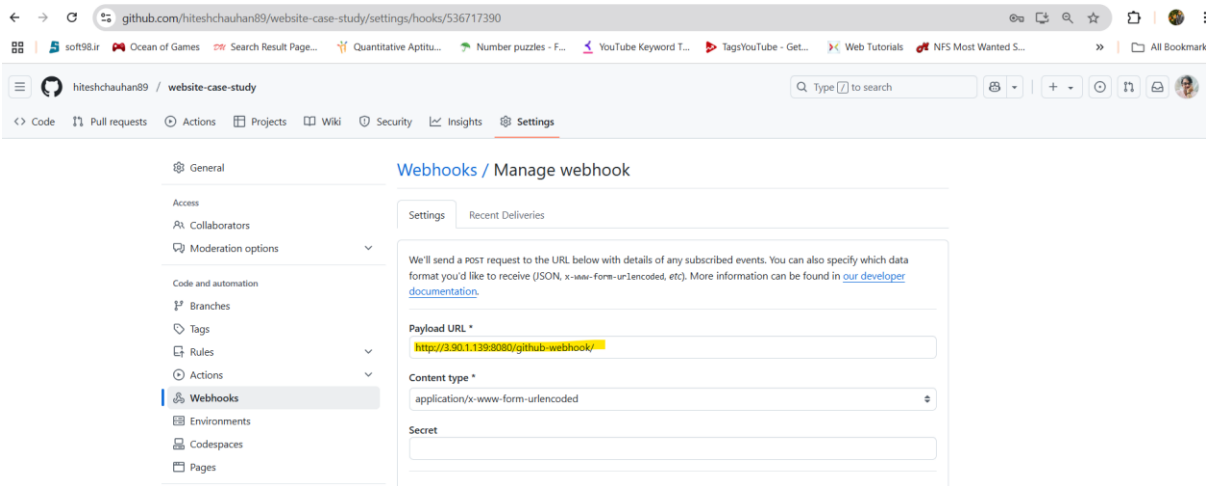
Go To This Url and Fork this repositories in our github account
https://github.com/hshar/website

Fork This Url with your github.

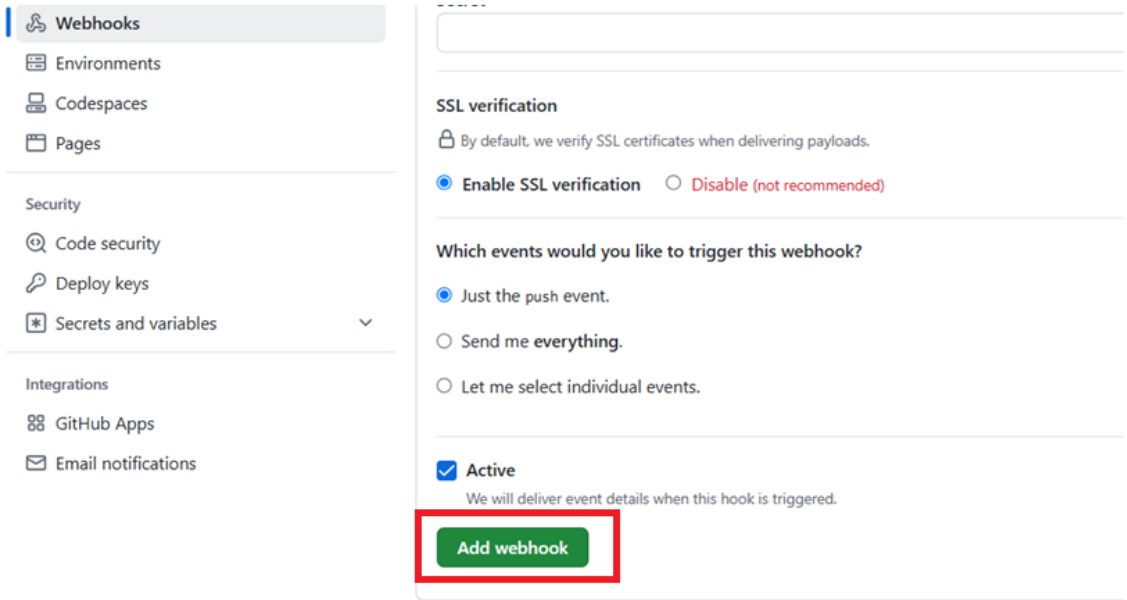




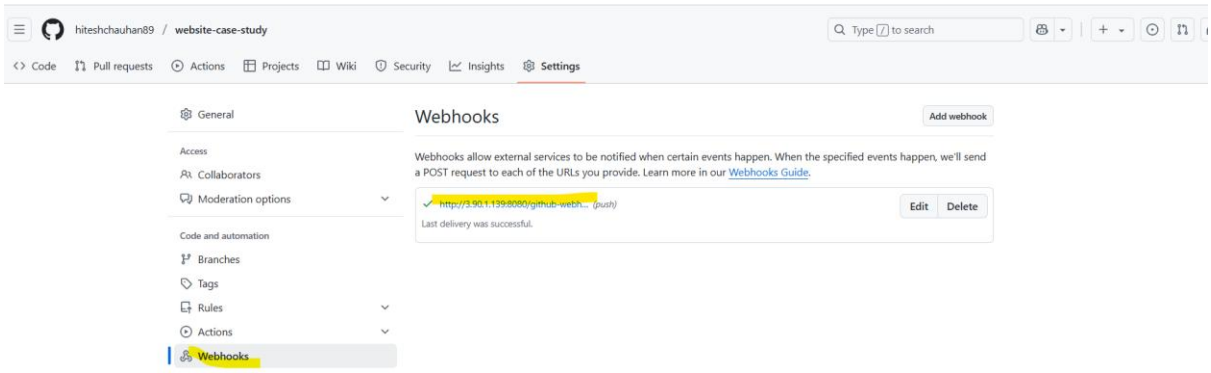
After Folk Your Url Then go to same repository and click settings then click webhook.



Then Click Add Webhook



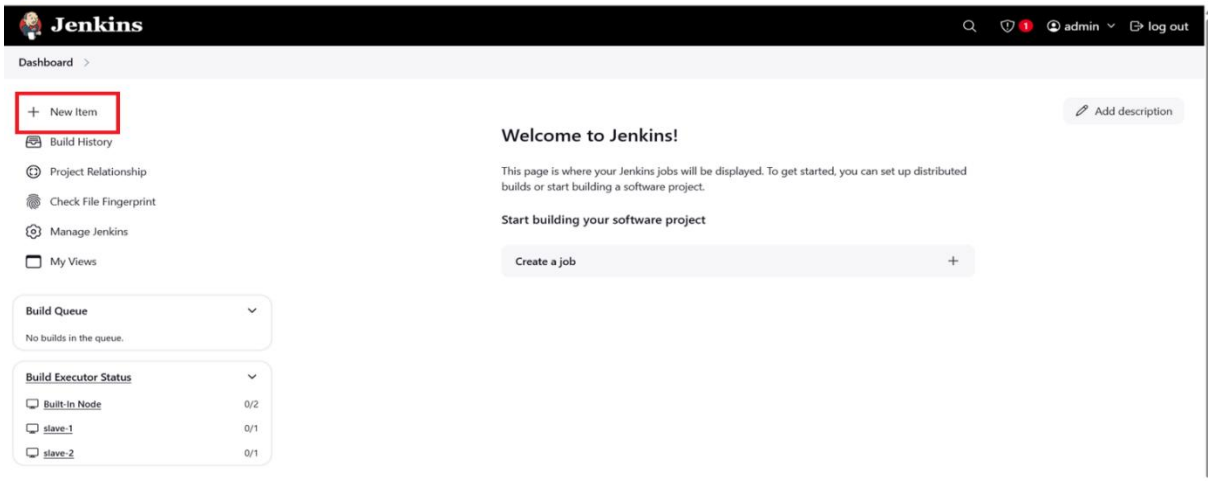
You will see like this.



Job1 : build

Go To Jenkins Url.We need to Create Jobs.

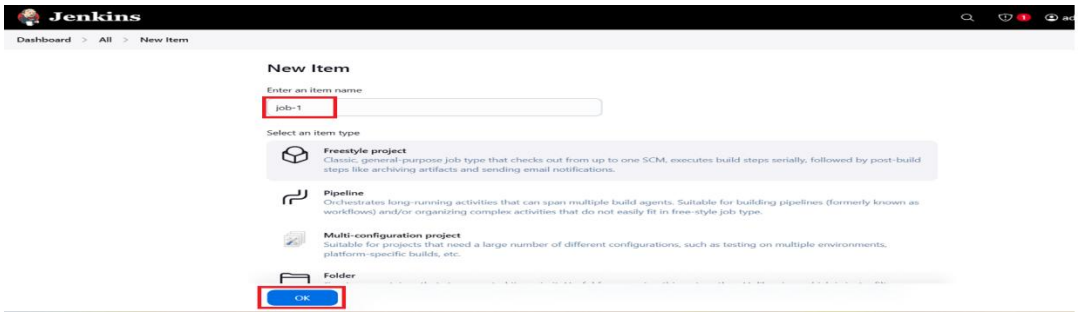
JOB-1



Now To Create job-1

Click **Dashboard >All>New Item** Then

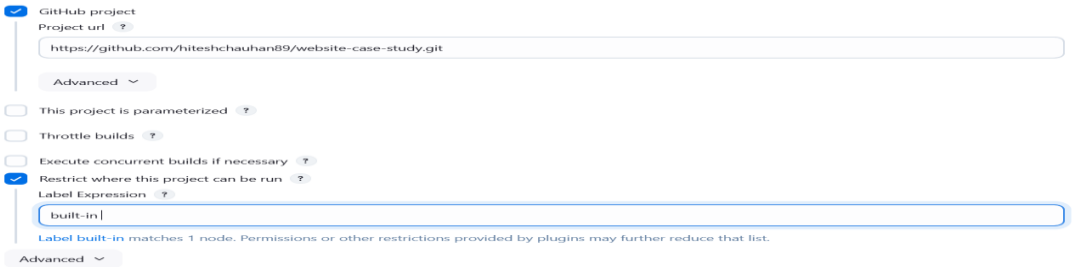
Click OK

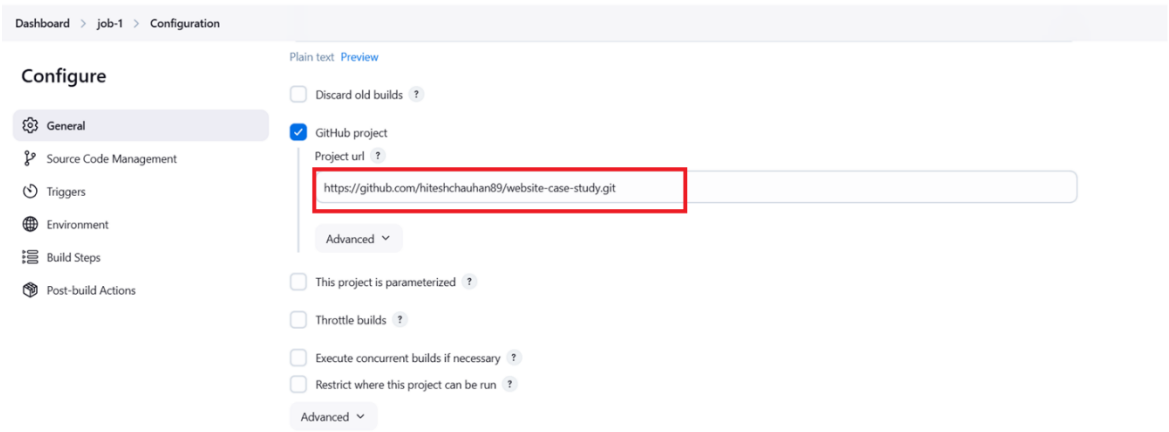


After You Need to choose GitHub Projects Url.Copy the Url we have added in forks.

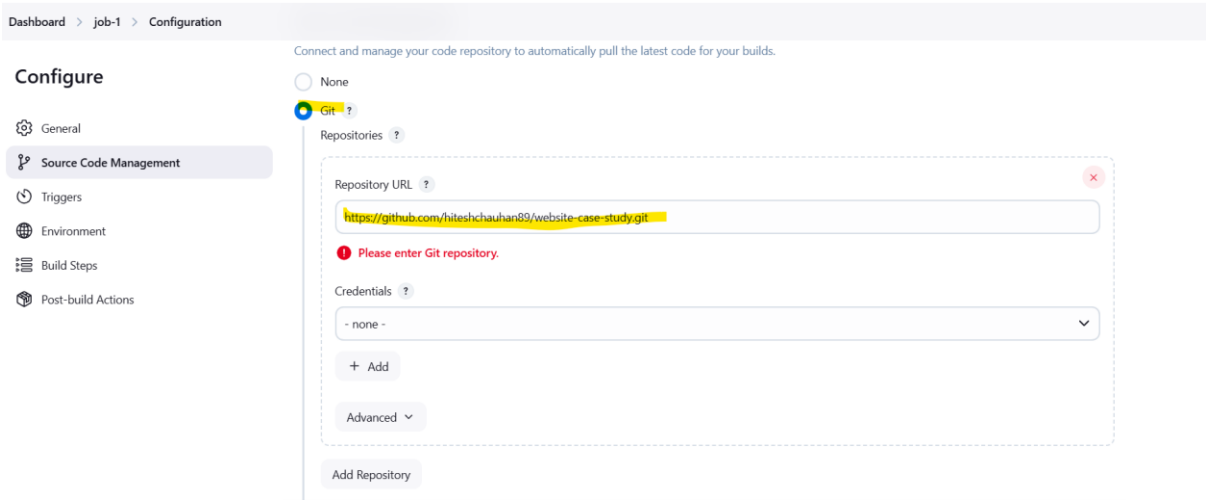
Project Url:- https://github.com/hiteshchauhan89/website-case-study.git

Check Box Restrict Where This Project can be run so mentioned **built-in**

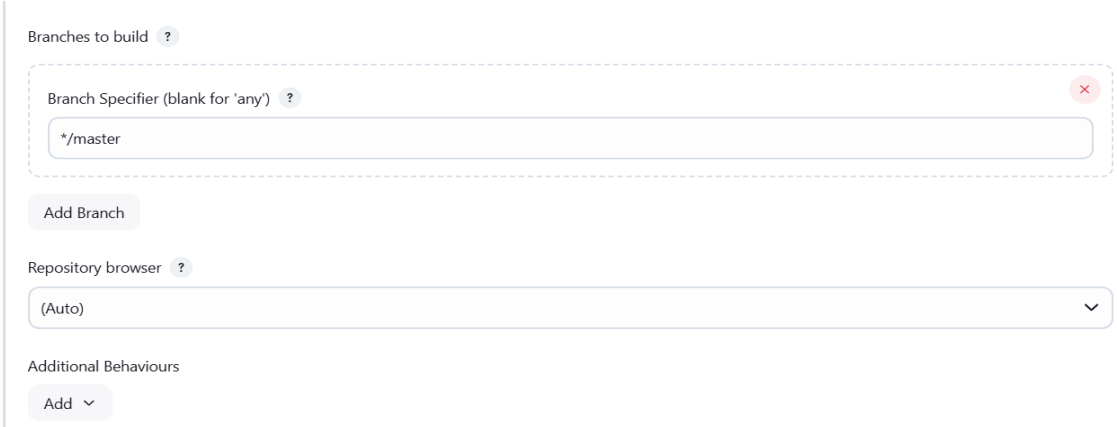




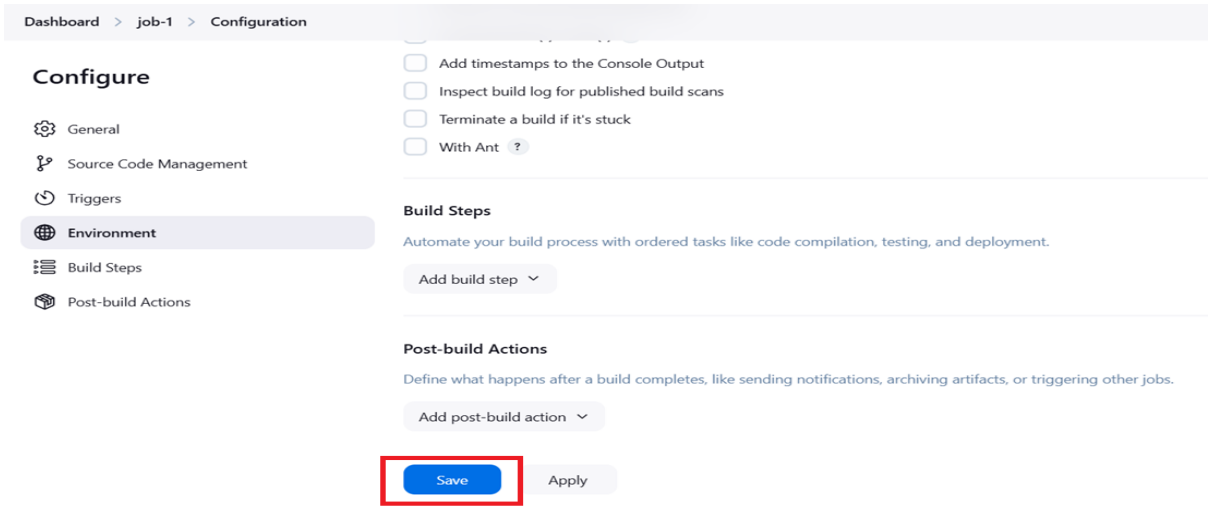
Then Source Code Management Choose Git same url need to mentioned here https://github.com/hiteshchauhan89/website-case-study.git



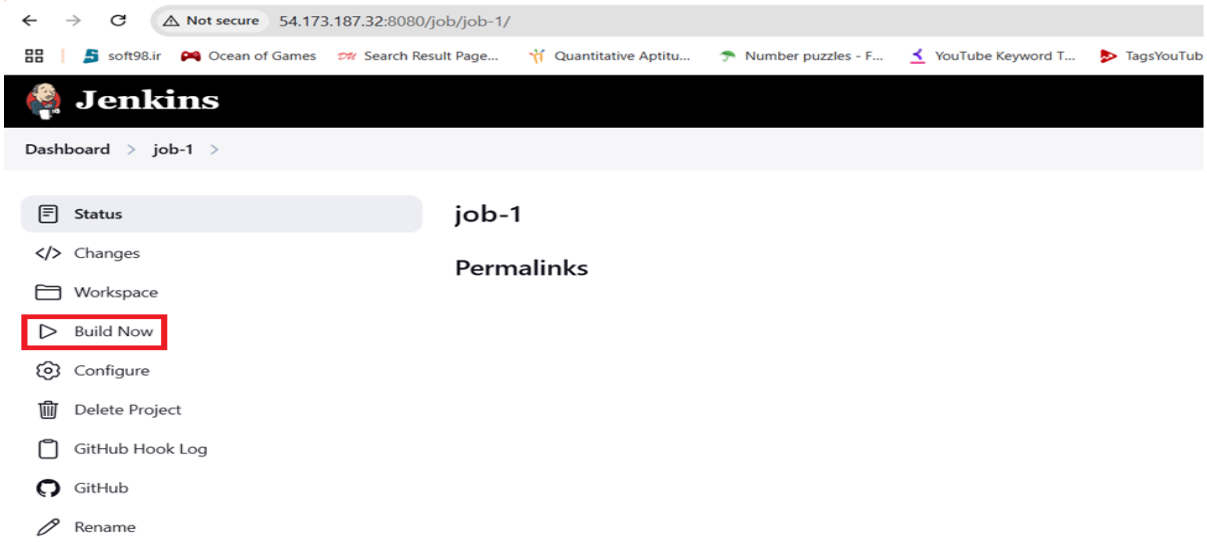
Then Next,We need to code which Branch To Build
Here Branch Specifier mentioned ***/master**



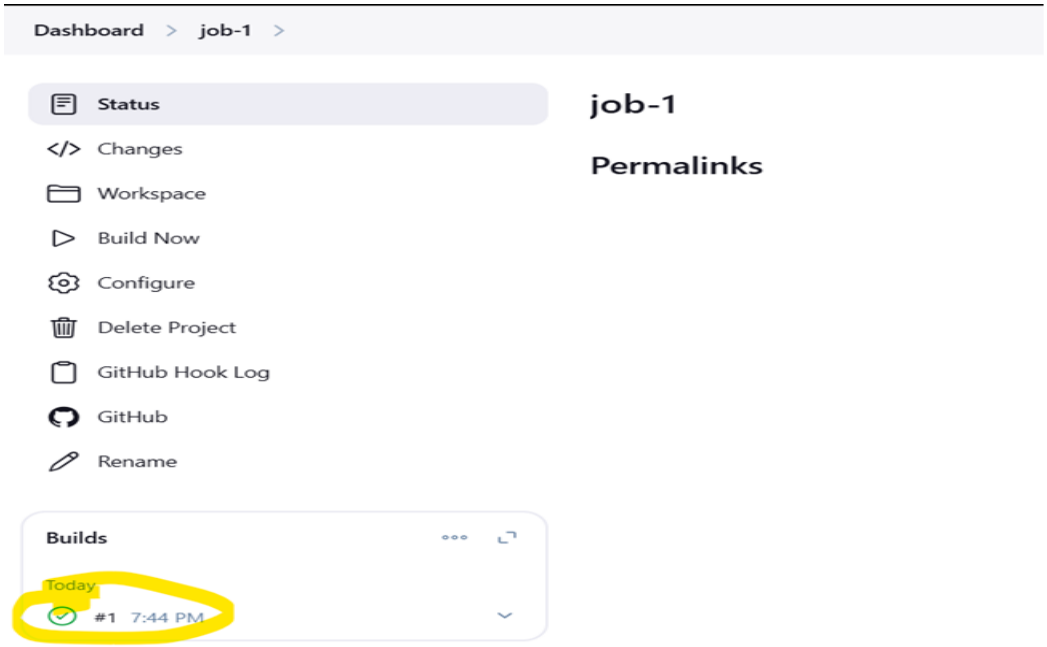
Now Save This Settings



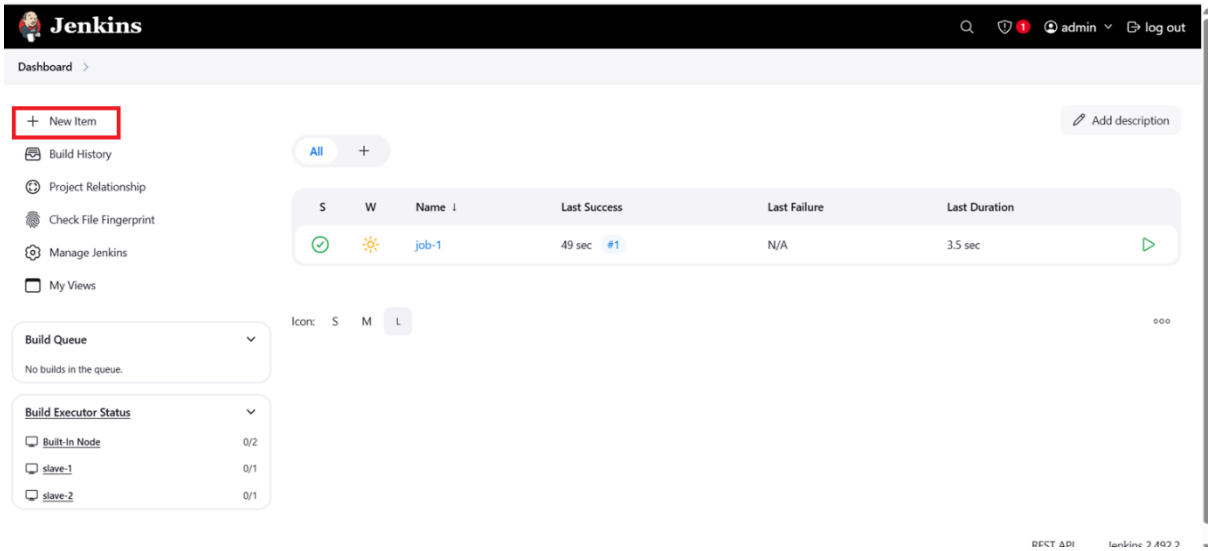
Then Click Build Now



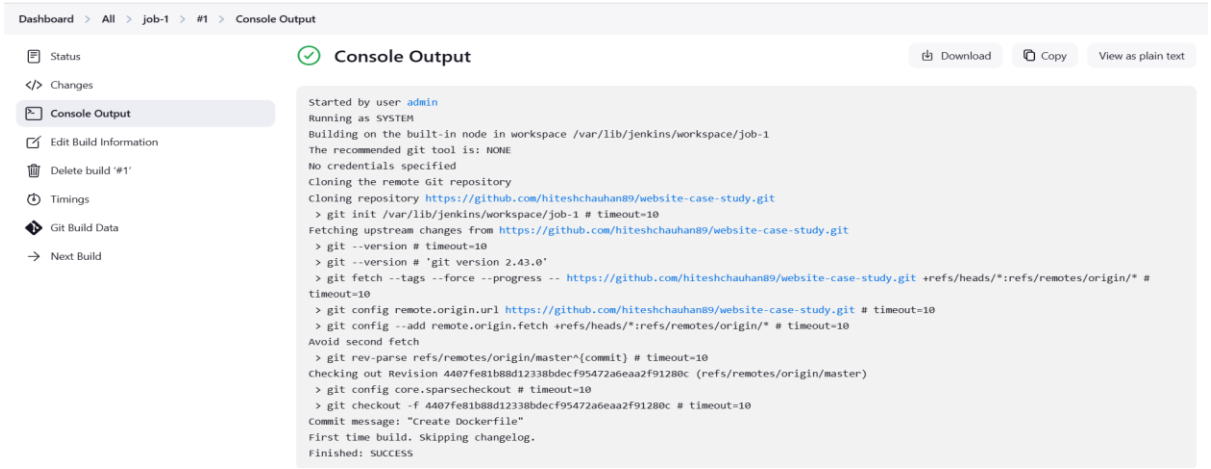
You will see the below Job-1 has been successfully Created.



Now We need to check the outputs.



This is the Job-1 Output.



Now We can also Cross-very through server.

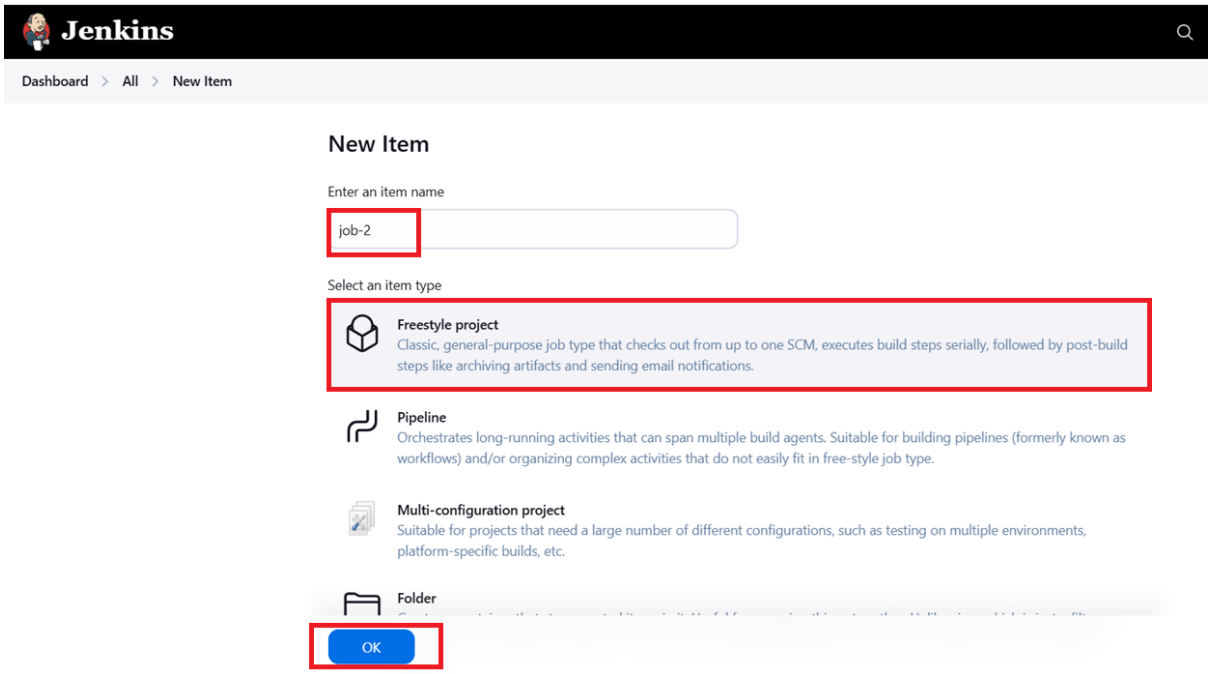
Go to cd /var/lib/Jenkins/workspaces/job-1.
You will see the Job-1 has been created the jobs.

```
ubuntu@ip-172-31-95-109:~$ cd /var/lib/jenkins/workspace/job-1
ubuntu@ip-172-31-95-109:/var/lib/jenkins/workspace/job-1$ ll
total 24
drwxr-xr-x 4 jenkins jenkins 4096 Mar 22 10:37 ./
drwxr-xr-x 3 jenkins jenkins 4096 Mar 22 10:37 ../
drwxr-xr-x 8 jenkins jenkins 4096 Mar 22 11:13 .git/
-rw-r--r-- 1 jenkins jenkins  118 Mar 22 10:37 Dockerfile
drwxr-xr-x 2 jenkins jenkins 4096 Mar 22 10:37 images/
-rw-r--r-- 1 jenkins jenkins  193 Mar 22 10:37 index.html
ubuntu@ip-172-31-95-109:/var/lib/jenkins/workspace/job-1$
```

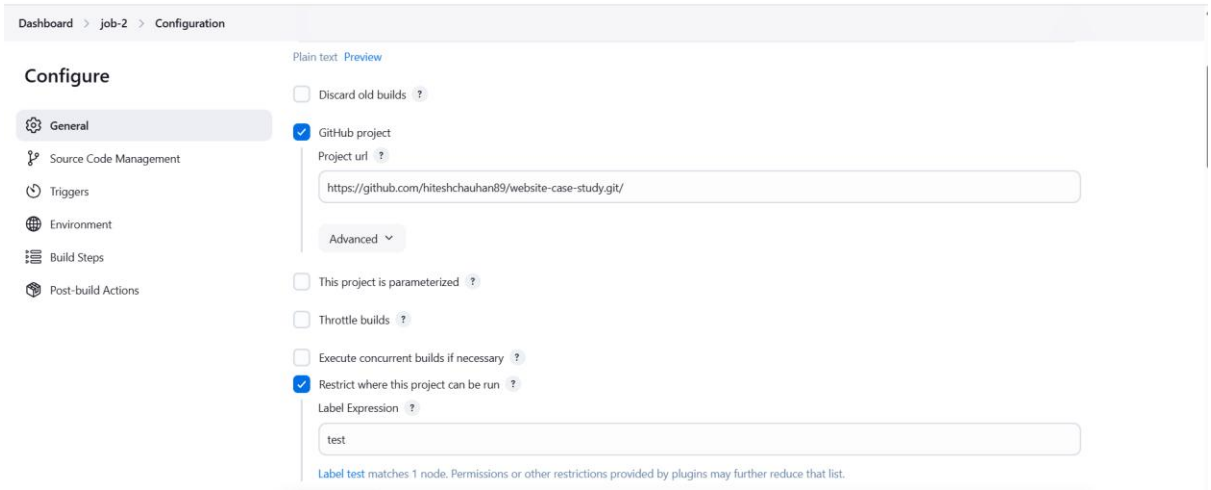
Go To Jenkins Url.We need to Create Jobs

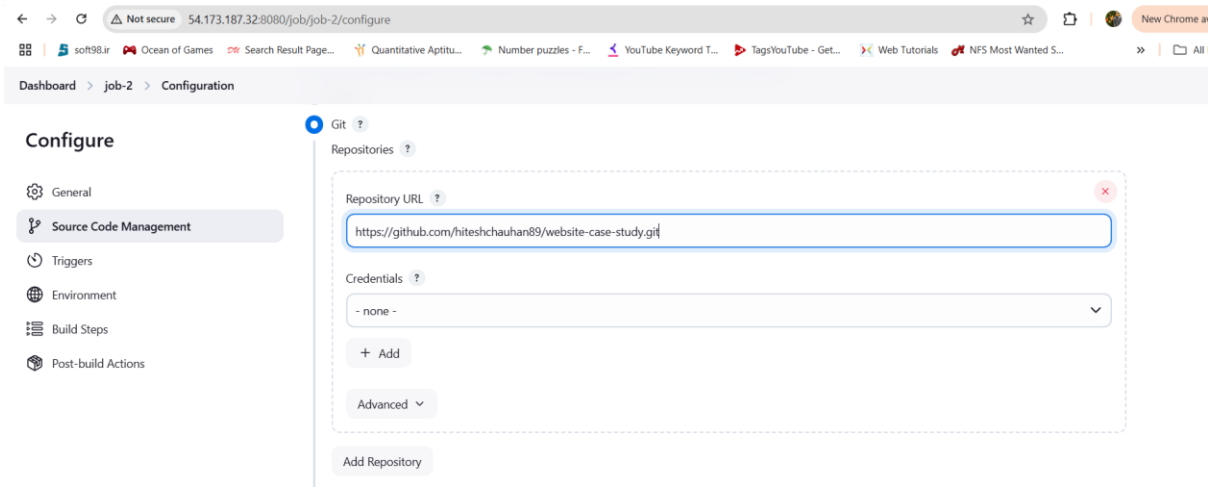
Job2: test

Click **Dashboard >All>New Item** Then
Click OK

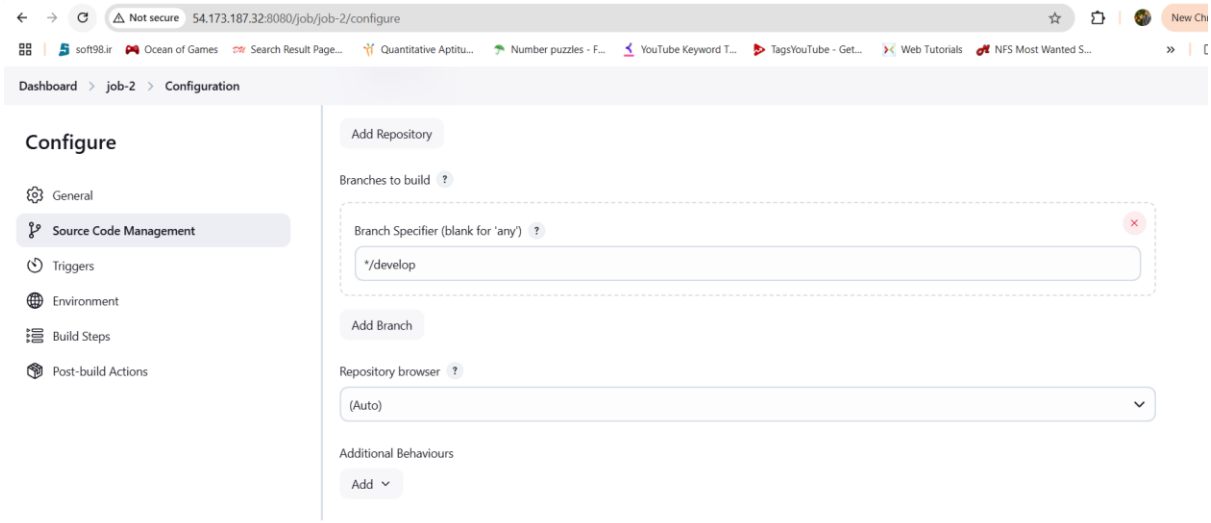


After You Need to choose GitHub Projects Url.Copy the Url we have added in forks.
Project Url:- https://github.com/hiteshchauhan89/website-case-study.git
Check Box Restrict Where This Project can be run so mentioned **test**



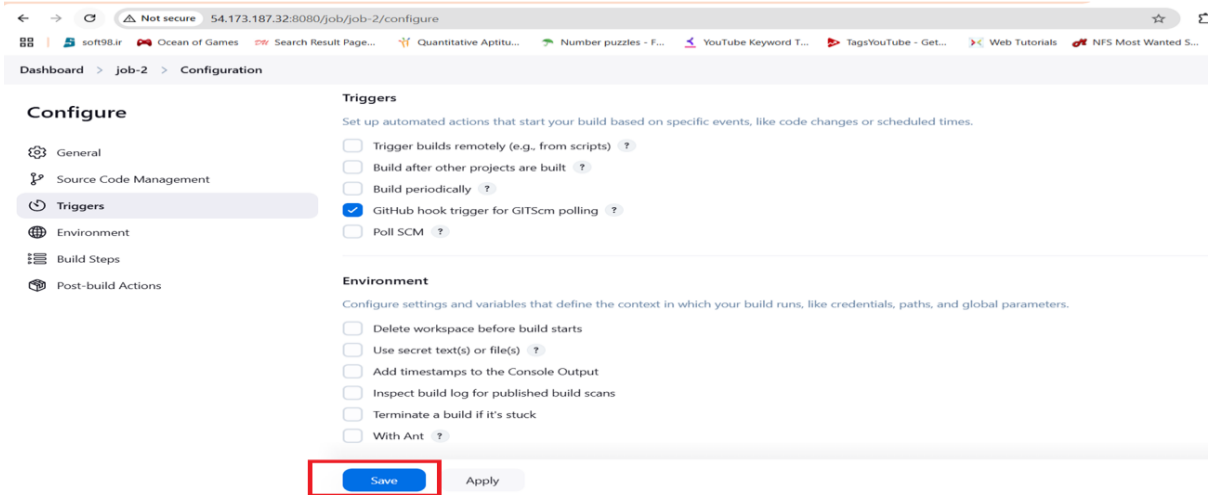


Now We need to change the Branch here mentioned ***/develop**

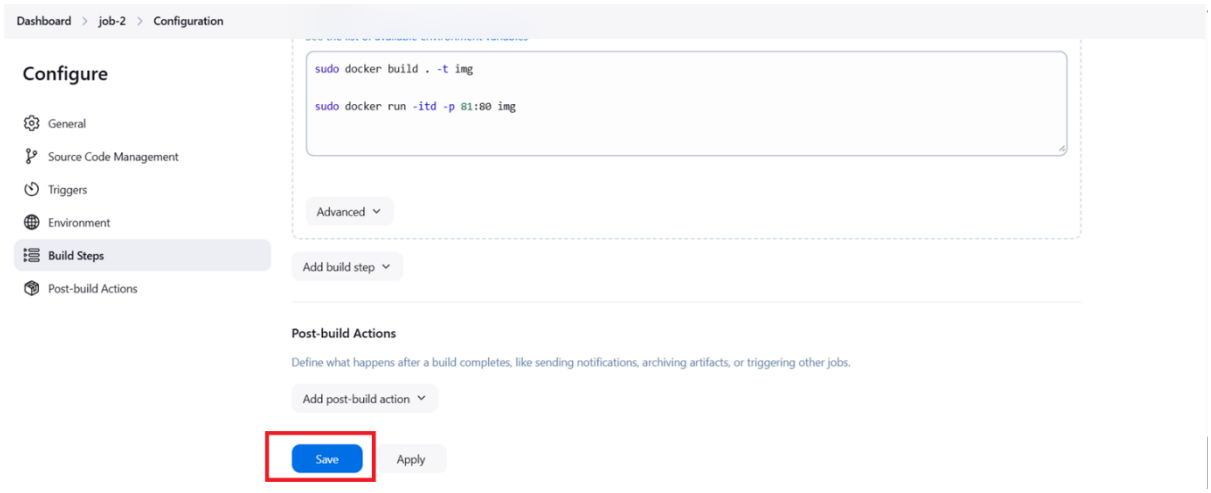


Triggers

We need trigger this url through webhook.we have already added this webhook url in Job-1.

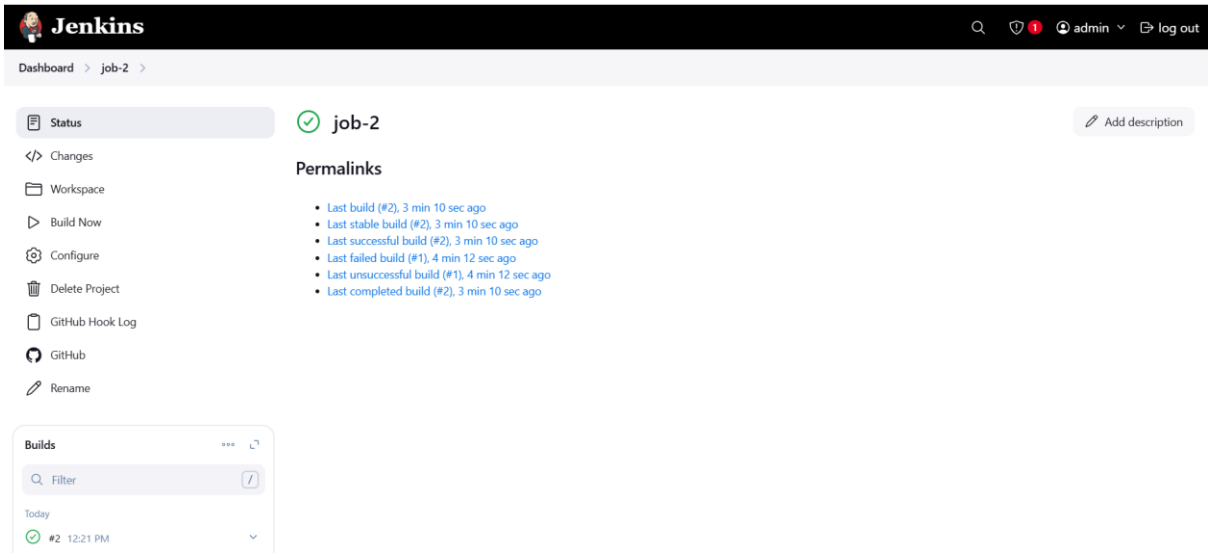


After there is Build Steps
Click **Build Steps>Execute Shell.**
Here we need to execute command.
sudo docker build . -t img
sudo docker run -itd -p 81:80 img

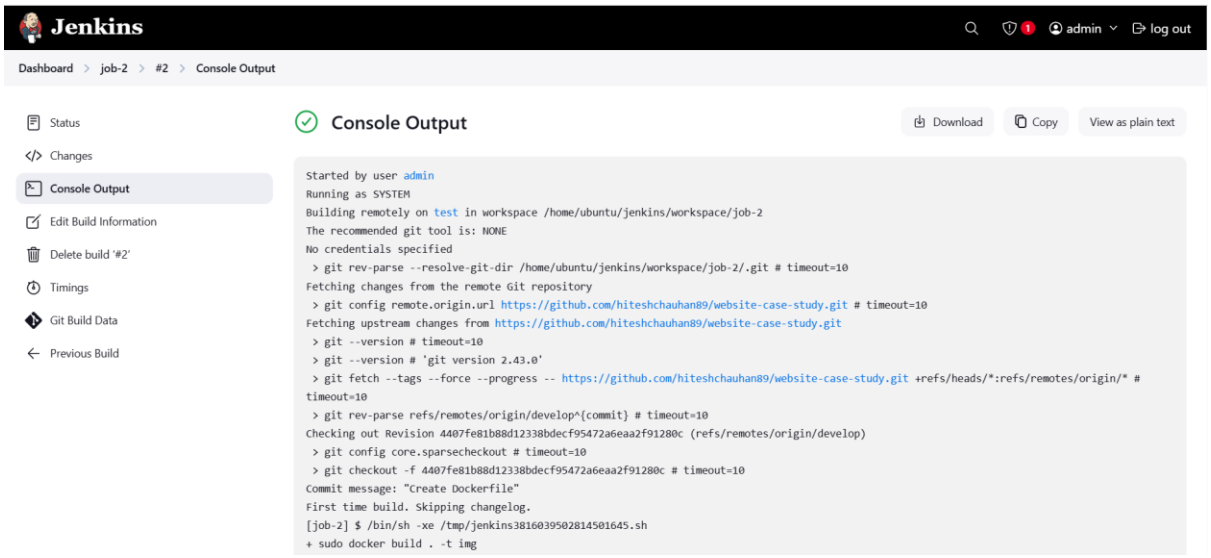


Then Click Build Now.

Now Job-2 Has been successfully Created.



This is the output of job-2.




```
DEPRECATED: The legacy builder is deprecated and will be removed in a future release.
            Install the buildx component to build images with BuildKit:
            https://docs.docker.com/go/buildx/

Sending build context to Docker daemon  268.8kB

Step 1/5 : FROM ubuntu
latest: Pulling from library/ubuntu
5a7813e071bf: Pulling fs layer
5a7813e071bf: Verifying Checksum
5a7813e071bf: Download complete
5a7813e071bf: Pull complete
Digest: sha256:72297848456d5d37d1262630108ab308d3e9ec7ed1c3286a32fe09856619a782
Status: Downloaded newer image for ubuntu:latest
 ---> a04dc4851cbc
Step 2/5 : RUN apt-get update
 ---> Running in 06231845284a
Get:1 http://security.ubuntu.com/ubuntu noble-security InRelease [126 kB]
Get:2 http://archive.ubuntu.com/ubuntu noble InRelease [256 kB]
Get:3 http://archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]
Get:4 http://archive.ubuntu.com/ubuntu noble-backports InRelease [126 kB]
Get:5 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 Packages [34.0 kB]
Get:6 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Packages [1060 kB]
Get:7 http://security.ubuntu.com/ubuntu noble-security/main amd64 Packages [845 kB]
Get:8 http://archive.ubuntu.com/ubuntu noble/restricted amd64 Packages [117 kB]
Get:9 http://security.ubuntu.com/ubuntu noble-security/restricted amd64 Packages [916 kB]
```

```
Get:10 http://archive.ubuntu.com/ubuntu noble/main amd64 Packages [1808 kB]
Get:11 http://archive.ubuntu.com/ubuntu noble/universe amd64 Packages [19.3 MB]
Get:12 http://archive.ubuntu.com/ubuntu noble/multiverse amd64 Packages [331 kB]
Get:13 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 Packages [1171 kB]
Get:14 http://archive.ubuntu.com/ubuntu noble-updates/universe amd64 Packages [1351 kB]
Get:15 http://archive.ubuntu.com/ubuntu noble-updates/multiverse amd64 Packages [38.7 kB]
Get:16 http://archive.ubuntu.com/ubuntu noble-updates/restricted amd64 Packages [962 kB]
Get:17 http://archive.ubuntu.com/ubuntu noble-backports/main amd64 Packages [48.0 kB]
Get:18 http://archive.ubuntu.com/ubuntu noble-backports/universe amd64 Packages [30.9 kB]
Fetched 28.7 MB in 2s (13.4 MB/s)
Reading package lists...
 ---> Removed intermediate container 06231845284a
 ---> 8ae5dd4d6c21
Step 3/5 : RUN apt-get install apache2 -y
 ---> Running in 08a65b6169e2
Reading package lists...
Building dependency tree...
Reading state information...
The following additional packages will be installed:
  adduser apache2-bin apache2-data apache2-utils ca-certificates krb5-locales
  libapr1t64 libaprutil1-dbd-sqlite3 libaprutil1-ldap libaprutil1t64
  libbrotli1 libcurl4t64 libexpat1 libgdbm-compat4t64 libgdbm6t64
  libgssapi-krb5-2 libicu74 libjansson4 libk5crypto3 libkeyutils1 libkrb5-3
  libkrb5support0 libldap-common libldap2 liblua5.4-0 libnghttp2-14
  libperl5.38t64 libpsl5t64 librtmp1 libsasl2-2 libsasl2-modules
  libsasl2-modules-db libsqlite3-0 libssh-4 libssl3t64 libxml2 media-types
```

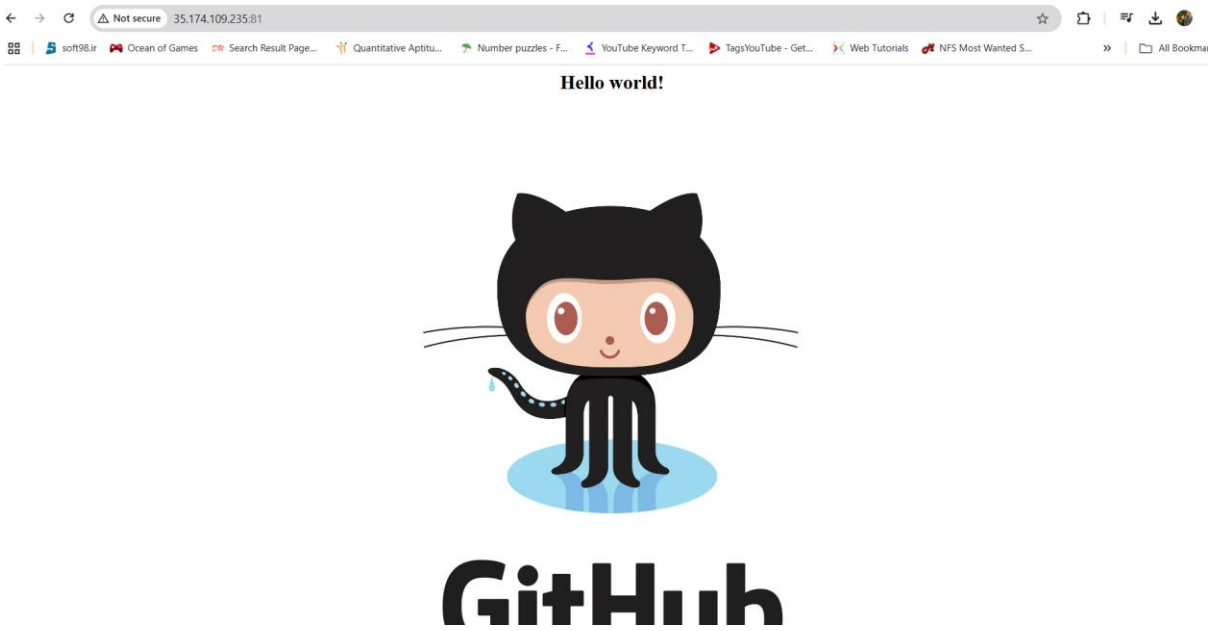
Dashboard > job-2 > #2 > Console Output

```
  liblocale-gettext-perl cron quota ecryptfs-utils apache2-doc
  apache2-suexec-pristine | apache2-suexec-custom www-browser ufw gdbm-l10n
  krb5-doc krb5-user libsasl2-modules-gssapi-mit
  | libsasl2-modules-gssapi-heimdal libsasl2-modules-ldap libsasl2-modules-otp
  libsasl2-modules-sql perl-doc libterm-readline-gnu-perl
  | libterm-readline-perl-perl make libtap-harness-archive-perl
The following NEW packages will be installed:
  adduser apache2 apache2-bin apache2-data apache2-utils ca-certificates
  krb5-locales libapr1t64 libaprutil1-dbd-sqlite3 libaprutil1-ldap
  libaprutil1t64 libbrotli1 libcurl4t64 libexpat1 libgdbm-compat4t64
  libgdbm6t64 libgssapi-krb5-2 libicu74 libjansson4 libk5crypto3 libkeyutils1
  libkrb5-3 libkrb5support0 libldap-common libldap2 liblua5.4-0 libnghttp2-14
  libperl5.38t64 libpsl5t64 librtmp1 libsasl2-2 libsasl2-modules
  libsasl2-modules-db libsqlite3-0 libssh-4 libxml2 media-types netbase
  openssl perl perl-modules-5.38 publicsuffix ssl-cert
The following packages will be upgraded:
  libssl3t64 perl-base
2 upgraded, 43 newly installed, 0 to remove and 16 not upgraded.
Need to get 30.0 MB of archives.
After this operation, 109 MB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 perl-base amd64 5.38.2-3.2build2.1 [1823 kB]
Get:2 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 perl-modules-5.38 all 5.38.2-3.2build2.1 [3110 kB]
Get:3 http://archive.ubuntu.com/ubuntu noble/main amd64 libgdbm6t64 amd64 1.23-5.1build1 [34.4 kB]
Get:4 http://archive.ubuntu.com/ubuntu noble/main amd64 libgdbm-compat4t64 amd64 1.23-5.1build1 [6710 B]
Get:5 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 libperl5.38t64 amd64 5.38.2-3.2build2.1 [4867 kB]
Get:6 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 perl amd64 5.38.2-3.2build2.1 [231 kB]
Get:7 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 libapr1t64 amd64 1.7.2-3.1ubuntu0.1 [108 kB]
Get:8 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 libexpat1 amd64 2.6.1-2ubuntu0.2 [87.4 kB]
```

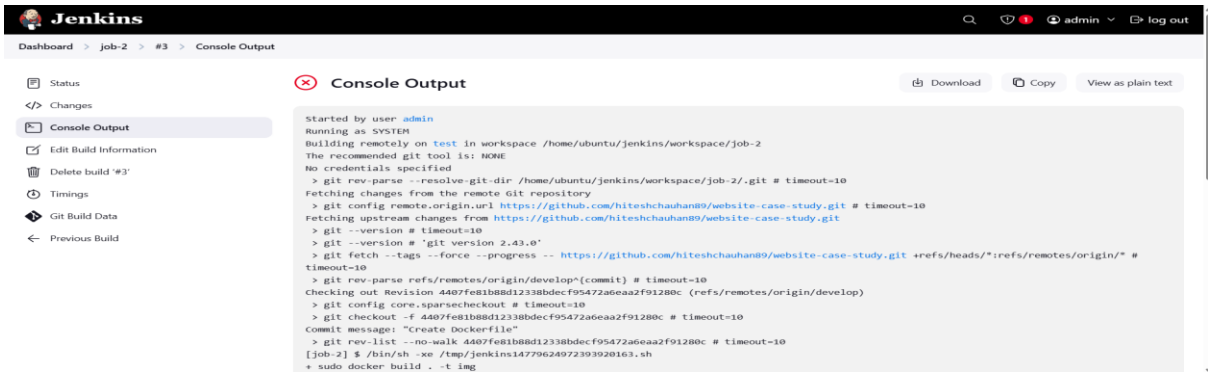
Dashboard > job-2 > #2 > Console Output

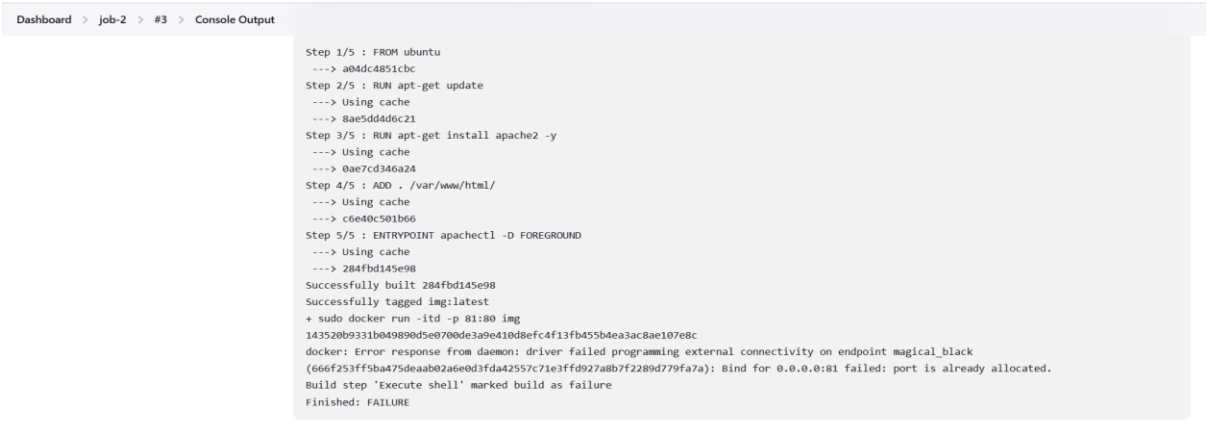
```
Enabling site 000-default.
invoke-rc.d: could not determine current runlevel
invoke-rc.d: policy-rc.d denied execution of start.
Processing triggers for libc-bin (2.39-0ubuntu8.3) ...
Processing triggers for ca-certificates (20240203) ...
Updating certificates in /etc/ssl/certs...
0 added, 0 removed; done.
Running hooks in /etc/ca-certificates/update.d...
done.
 ---> Removed intermediate container 08a65b6169e2
 ---> 0ae7cd346a24
Step 4/5 : ADD . /var/www/html/
 ---> c6e40c501b66
Step 5/5 : ENTRYPOINT apachectl -D FOREGROUND
 ---> Running in 22f891e0b16c
 ---> Removed intermediate container 22f891e0b16c
 ---> 284fbd145e98
Successfully built 284fbd145e98
Successfully tagged img:latest
+ sudo docker run -itd -p 81:80 img
5560223ff05e5a382442ce1456139d8d4025d079b2cad7a5a15e9a961a21f1b7
Finished: SUCCESS
```

After Deployed the Job-2.
Copy the public ip from test machine.you will the output with port no **81**.



Now In this job 2.you will again getting the error when you build the images.

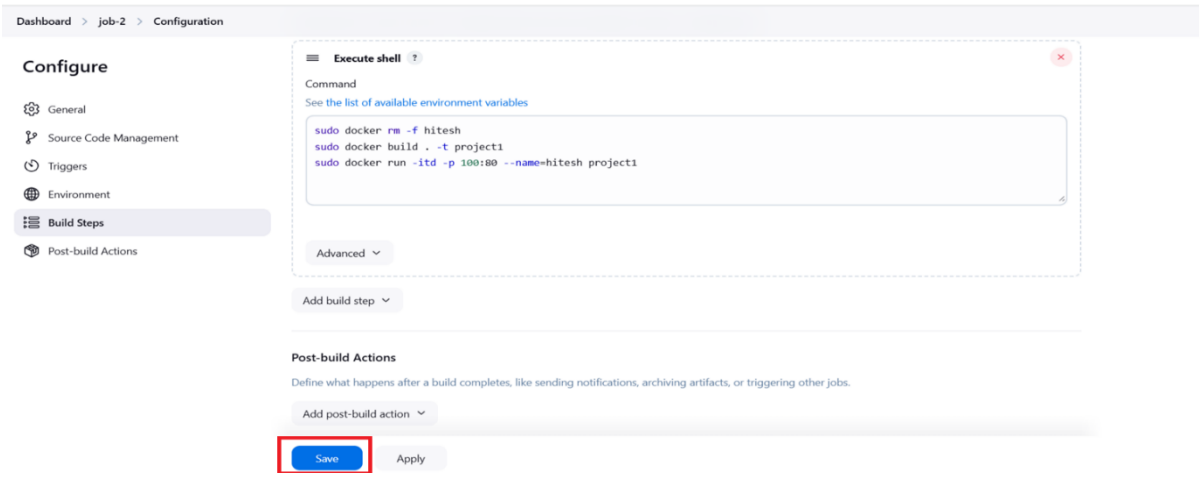




Now We need to some changes in execute shell command.

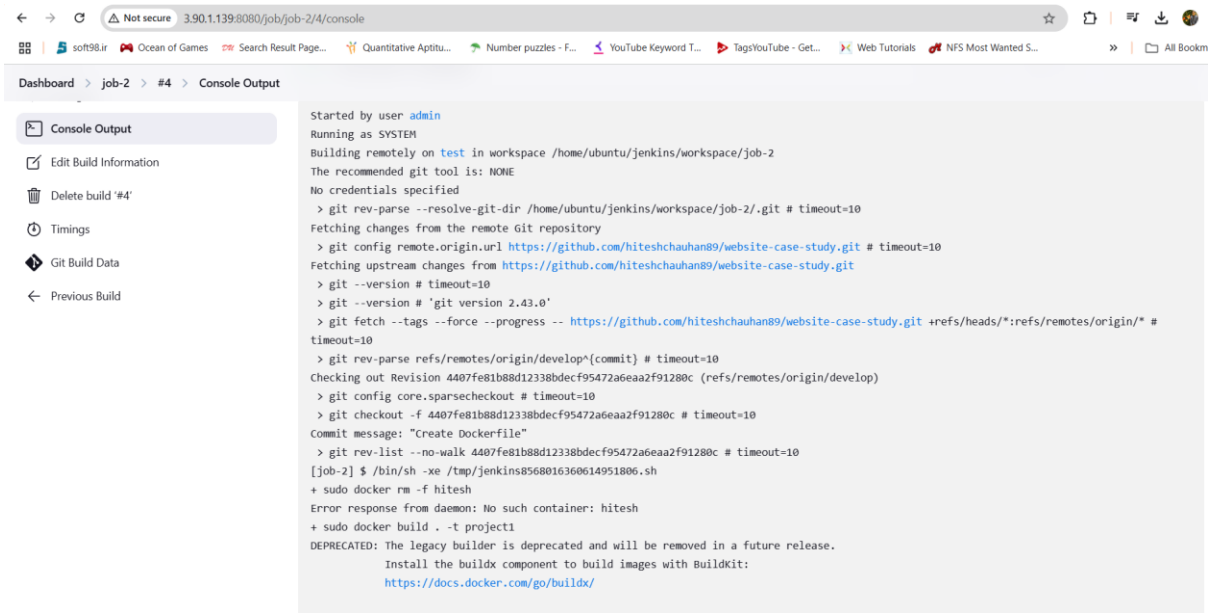
Sudo docker rm -f hitesh
Sudo docker build . -t project1
Sudo docker run -itd -p 100:80 –name=hitesh project1

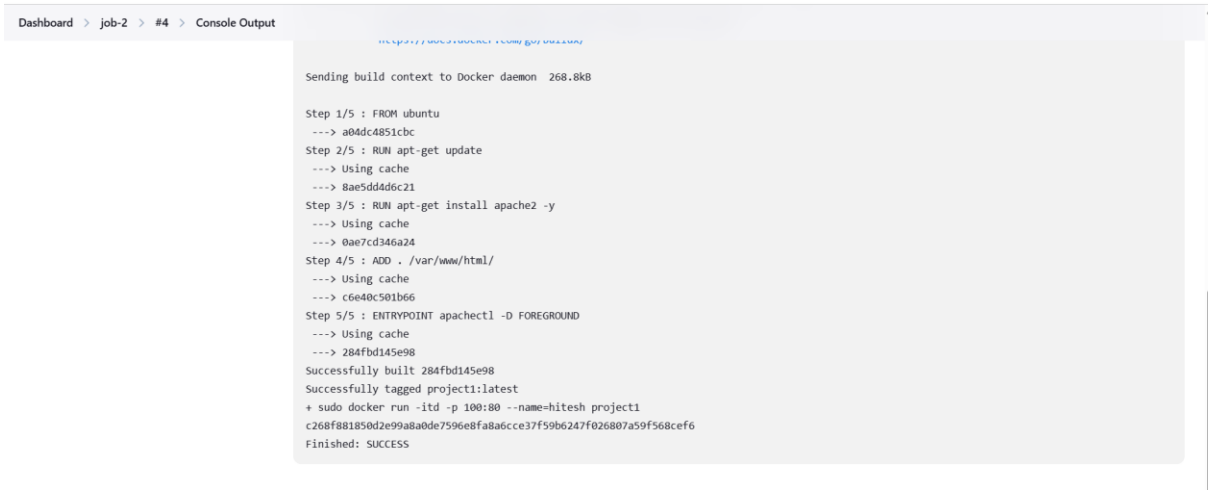
After change the execute shell.you need to save the configuration.



Now you need to create again build job after some chages.

Now You can see the expected output from job-2.





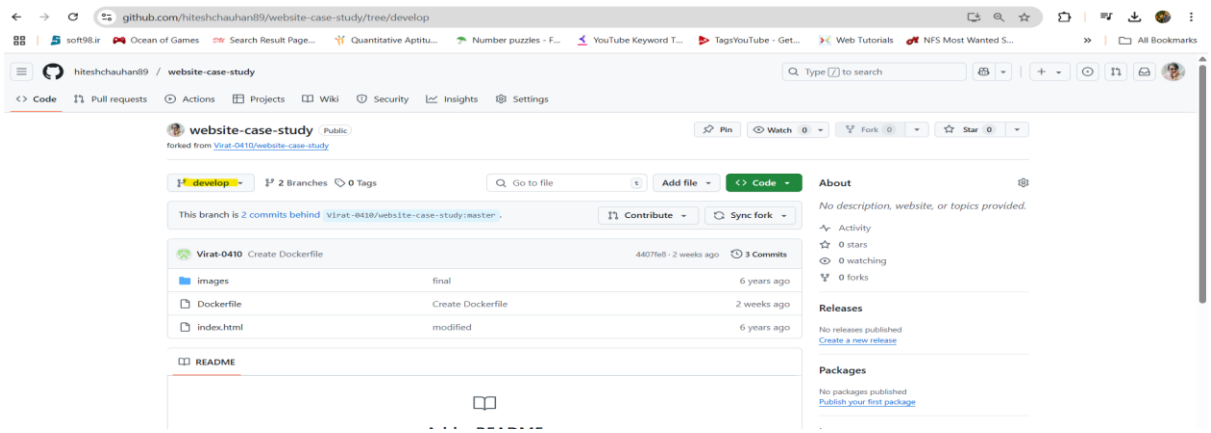
After Image build in this job.you can see through **docker ps** command.

```
root@ip-172-31-85-42:/home/ubuntu/jenkins# docker ps
CONTAINER ID   IMAGE      COMMAND                  CREATED         STATUS         PORTS                                   NAMES
c268f881850d   project1   "/bin/sh -c 'apachec…"   7 minutes ago   Up 7 minutes   0.0.0.0:100->80/tcp, :::100->80/tcp   hitesh
root@ip-172-31-85-42:/home/ubuntu/jenkins#
```

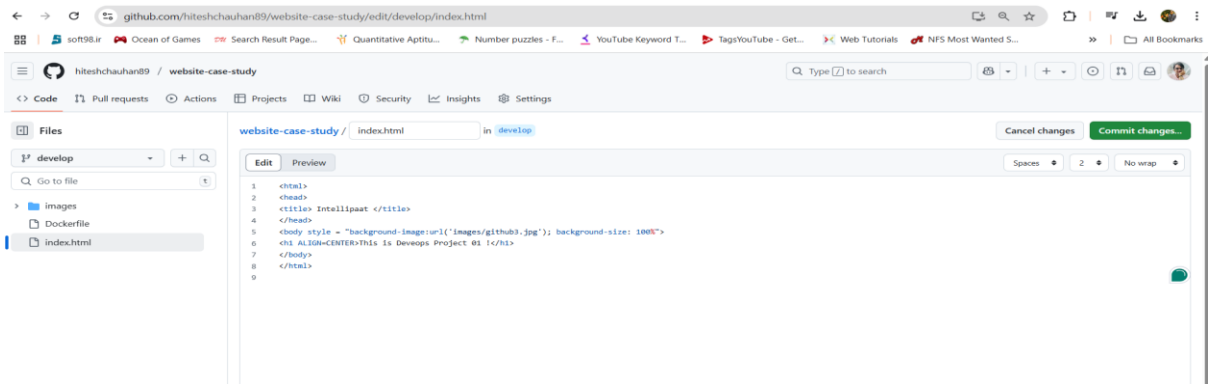
This is the output

Now In this repository you do some changes in same repositories.

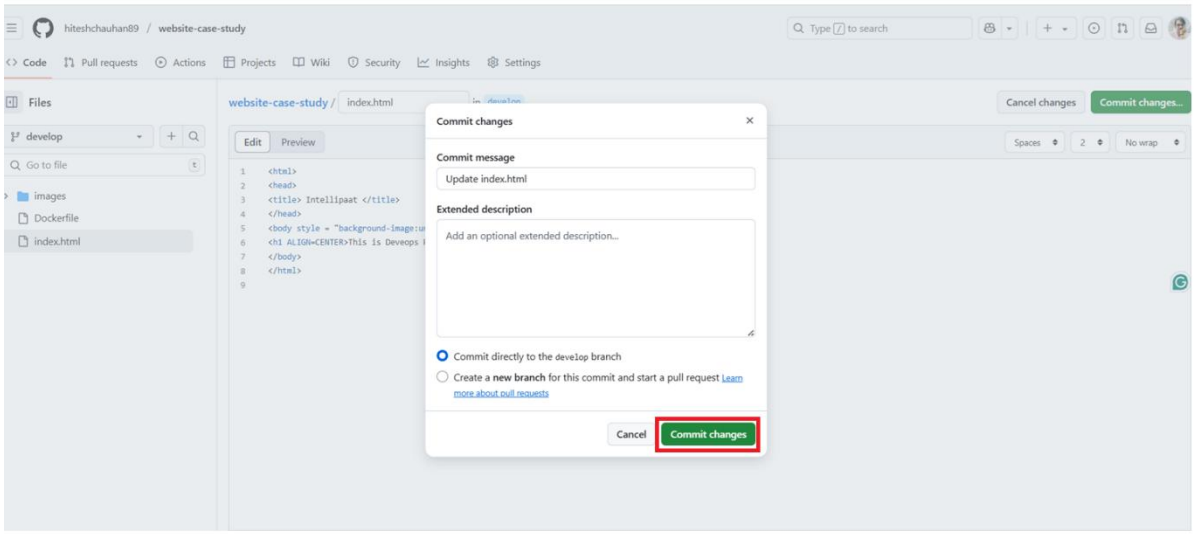
For example I need to change some index.html file.



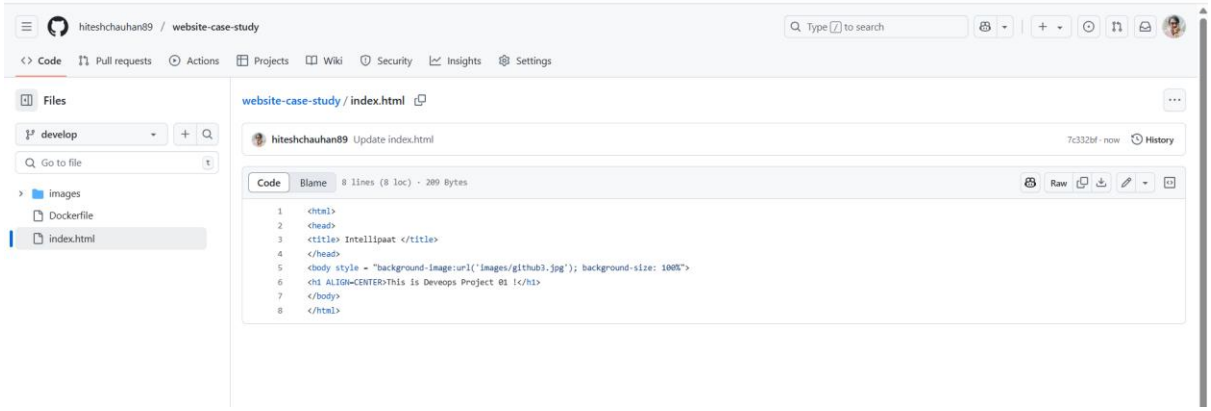
Now we have changed some changed in index.html.



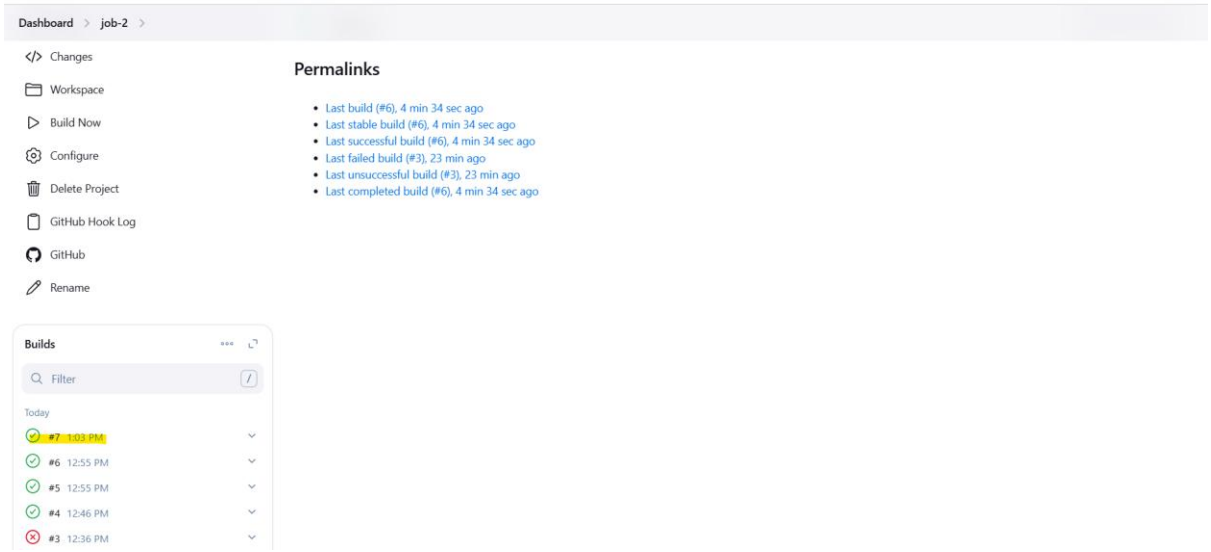
Now Commit this changes through github.



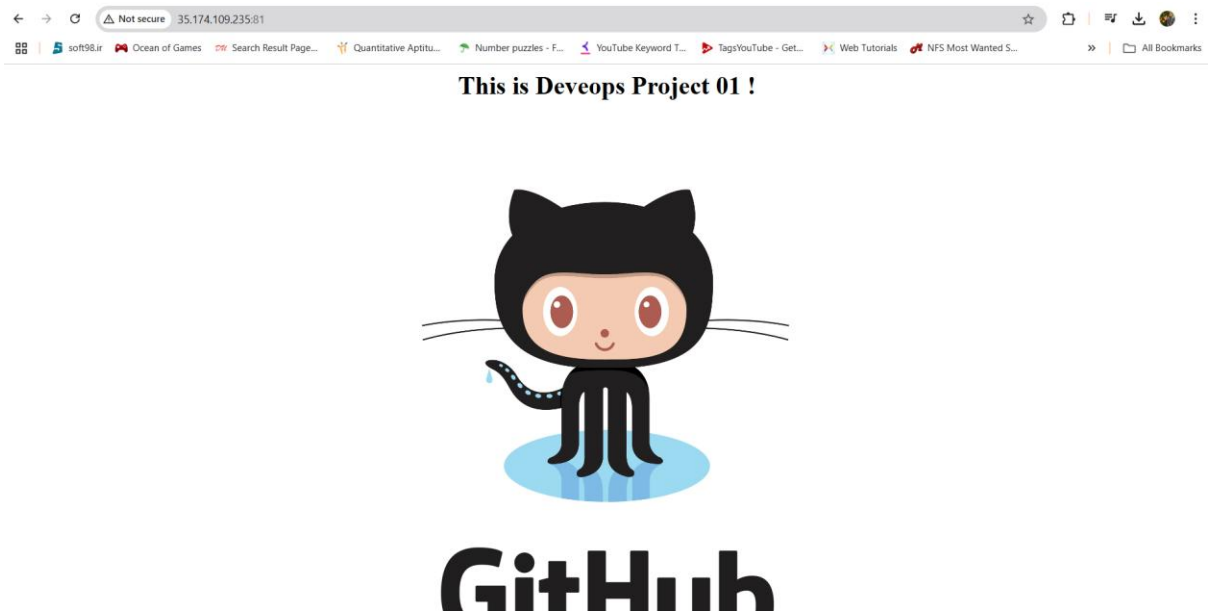
Click Commit Changes.



Now You can see Task no 07 is automatically run in Jenkins.



This is out put with port no 81.


Not secure
35.174.109.235:81
soft98.ir
Ocean of Games
Search Result Page...
Quantitative Aptitu...
Number puzzles - F...
YouTube Keyword T...
TagsYouTube - Get...
Web Tutorials
NFS Most Wanted S...
All Bookmarks
This is Deveops Project 01 !
GitHub

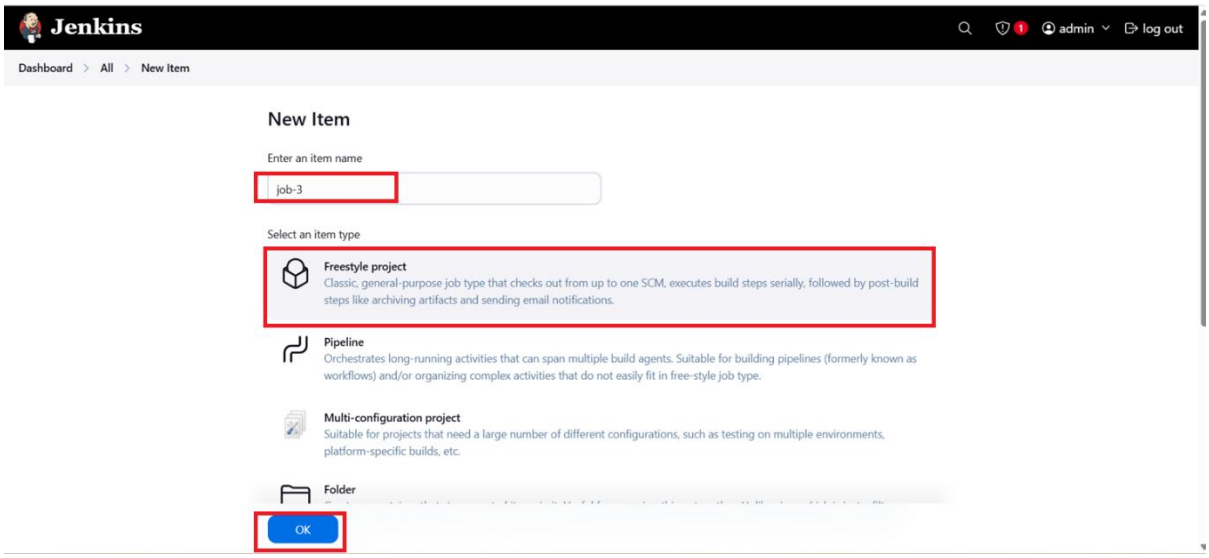
Job3 : prod

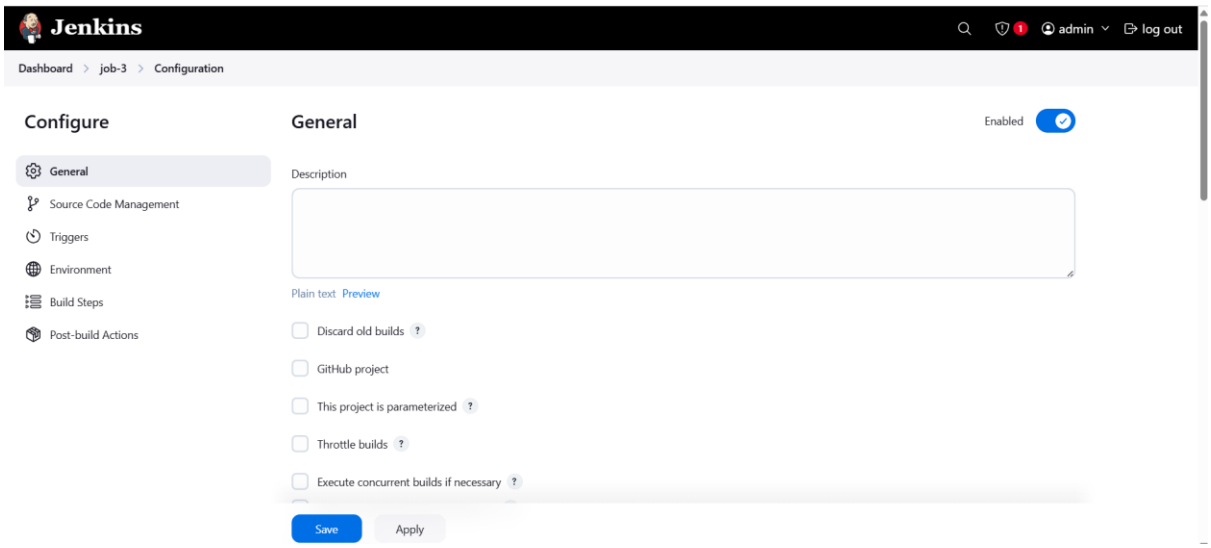
Go To Jenkins Url.We need to Create Jobs

J0B-3

Click **Dashboard >All>New Item** Then

Click OK

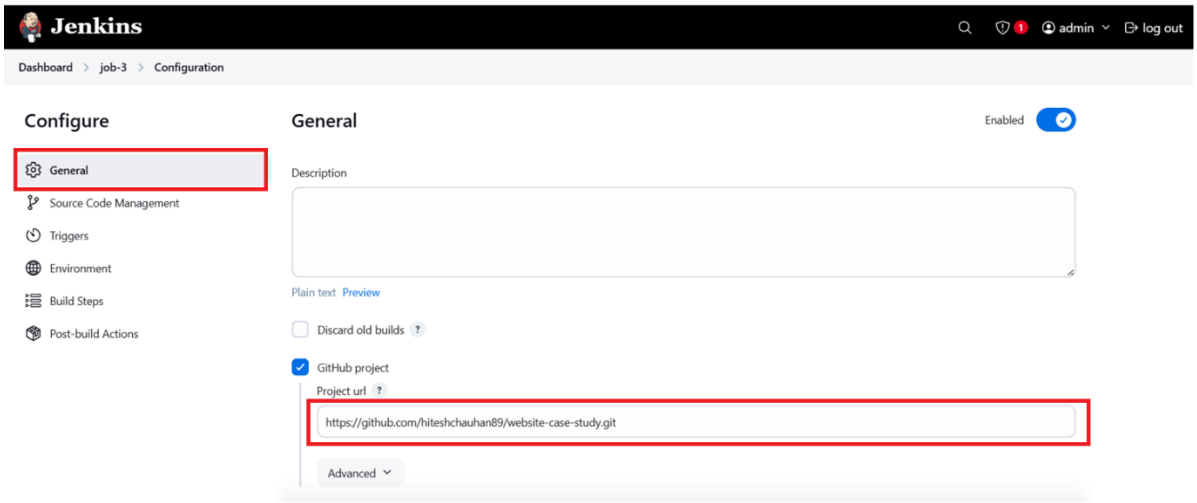




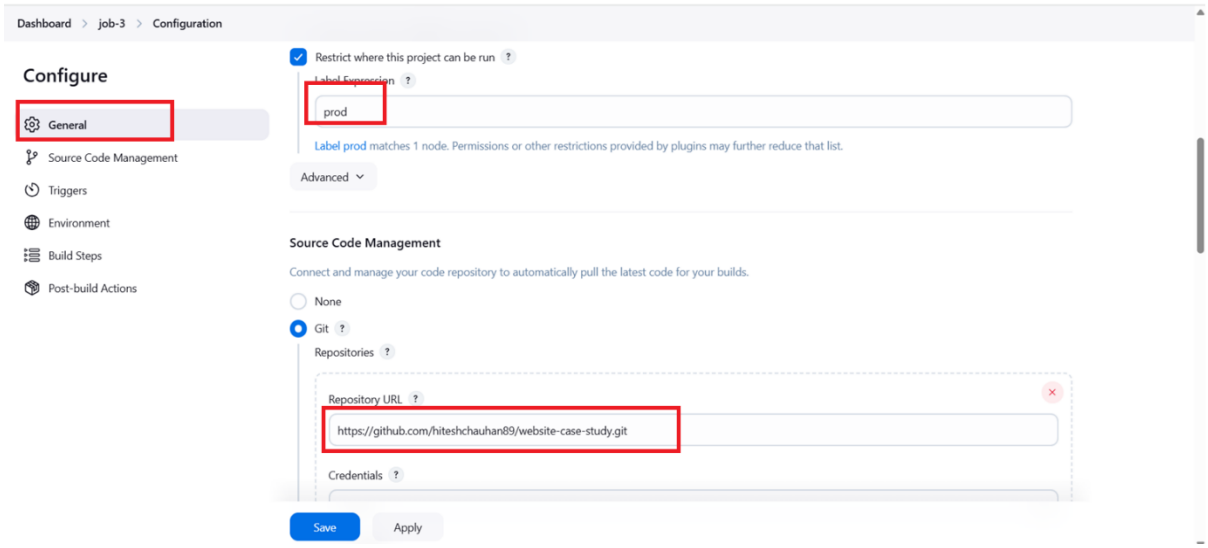
After You Need to choose GitHub Projects Url.Copy the Url we have added in forks.

Project Url:- https://github.com/hiteshchauhan89/website-case-study.git

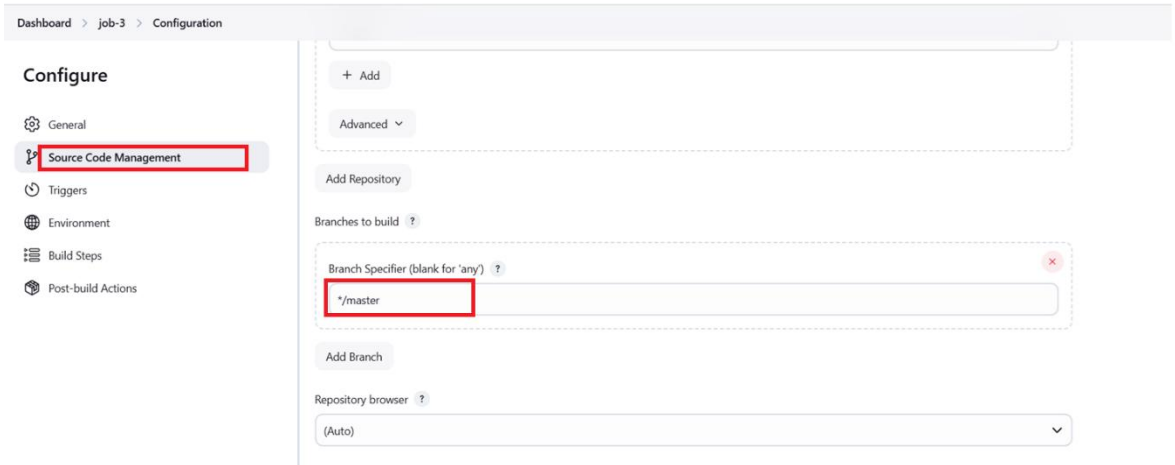
Check Box Restrict Where This Project can be run so mentioned **prod**



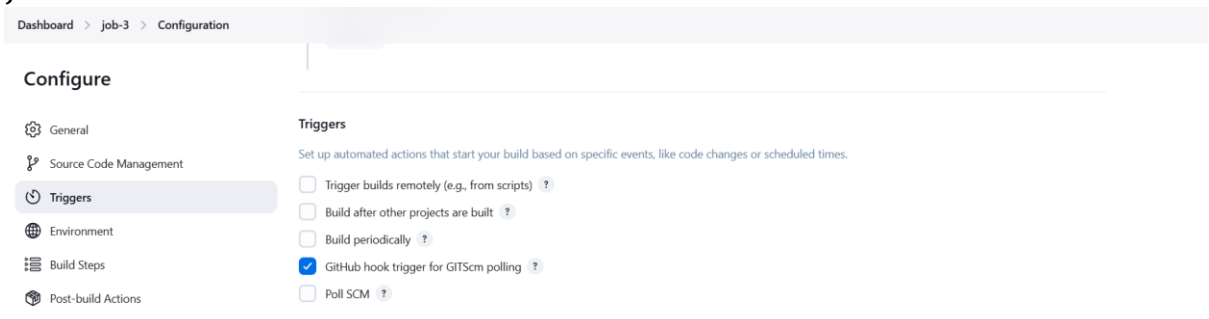
Label Name is prod.

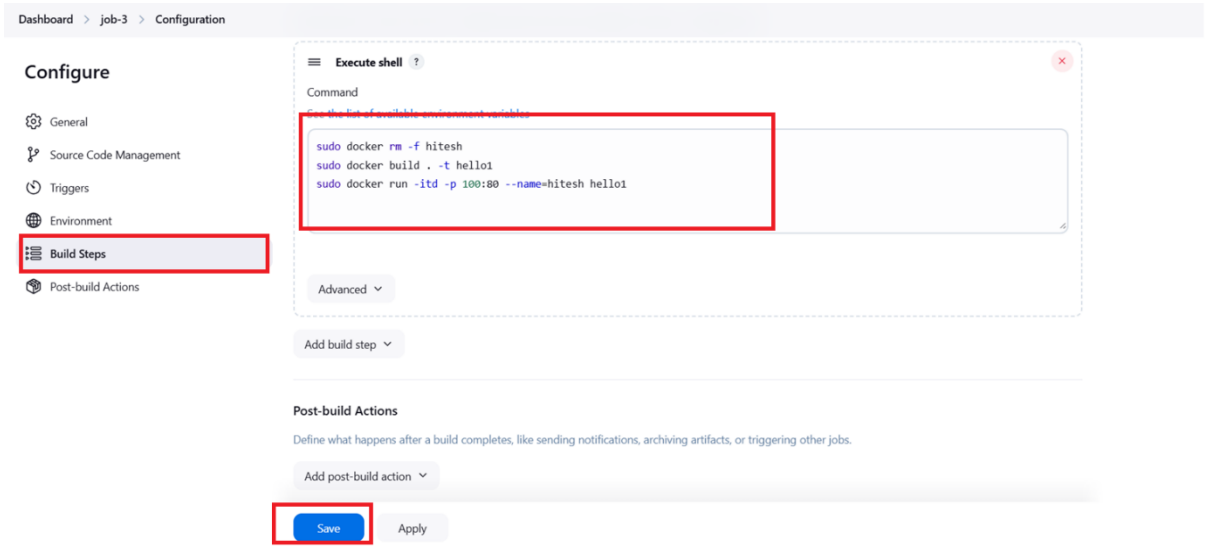


Source Code Management in Branch should master ***/master**

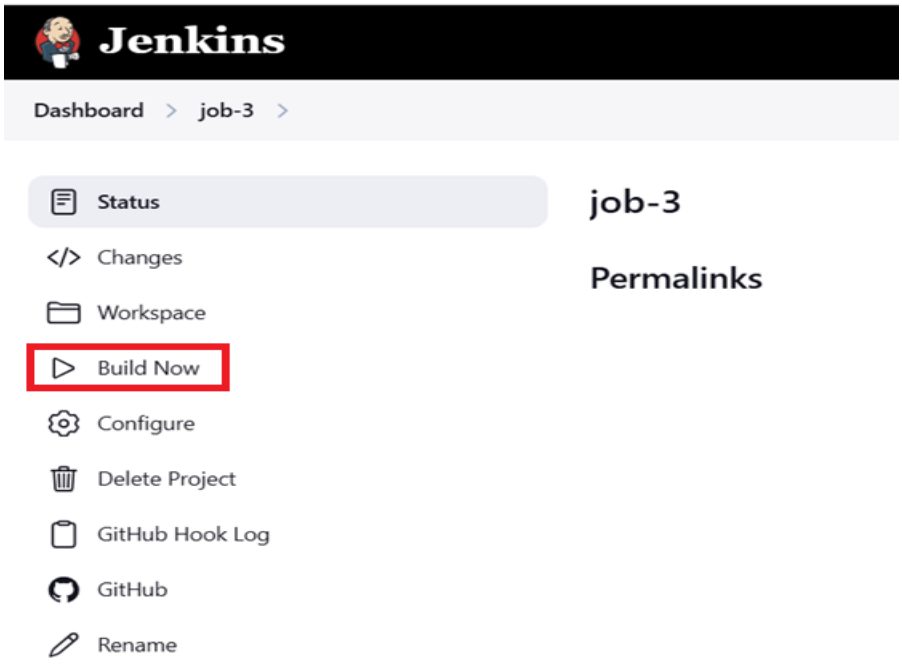


In Execute Shell We need to use same command which is already used in job-2.

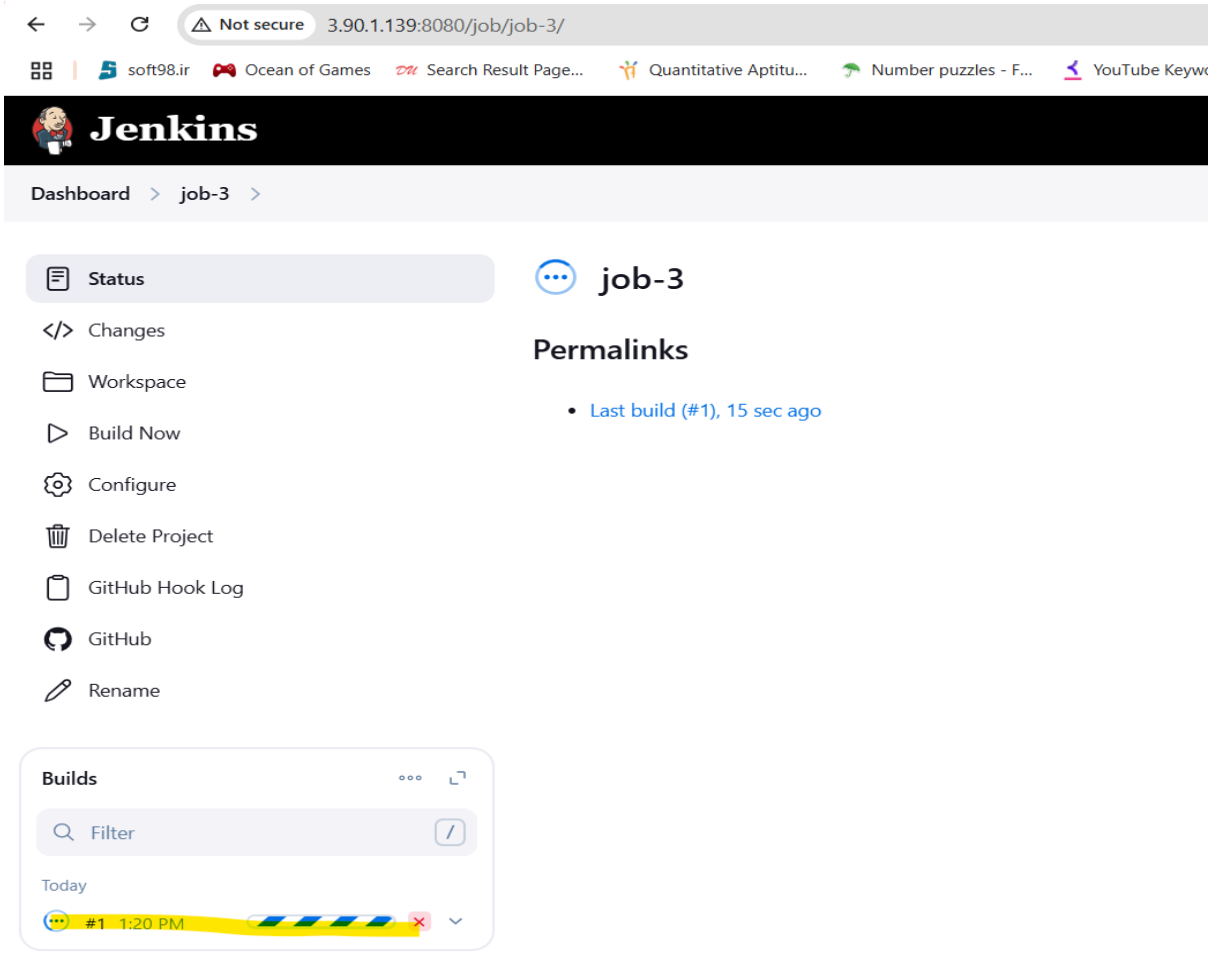




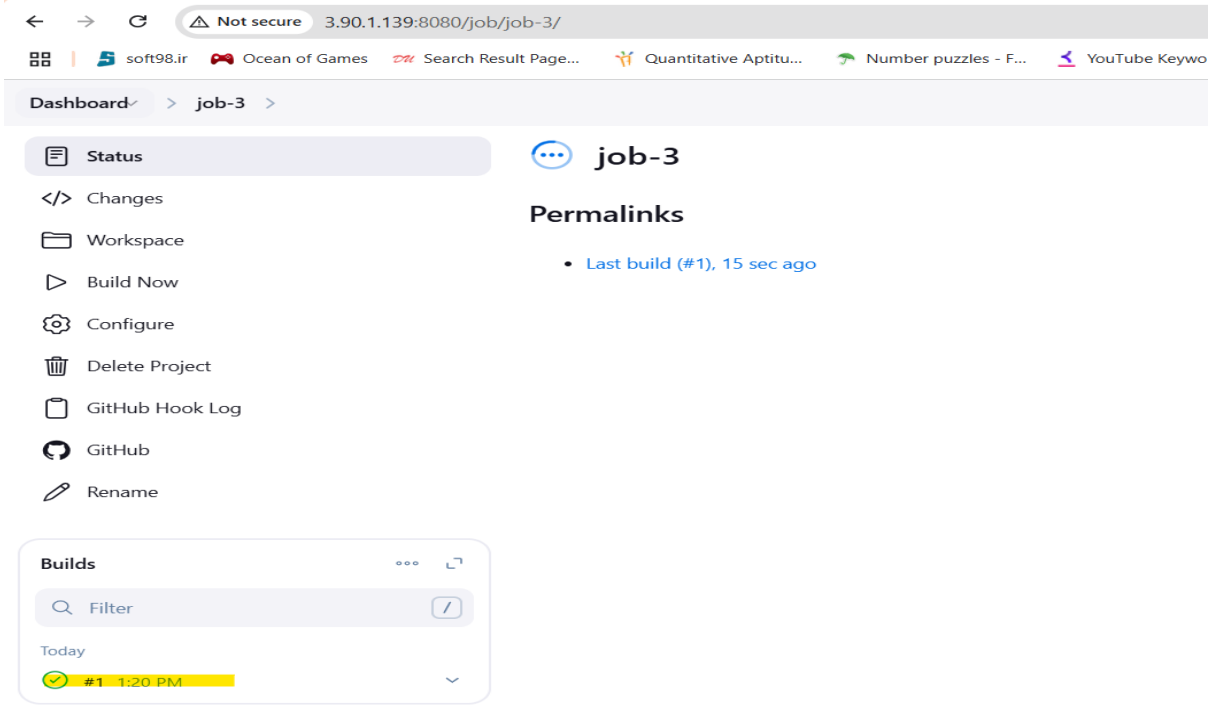
Build Now



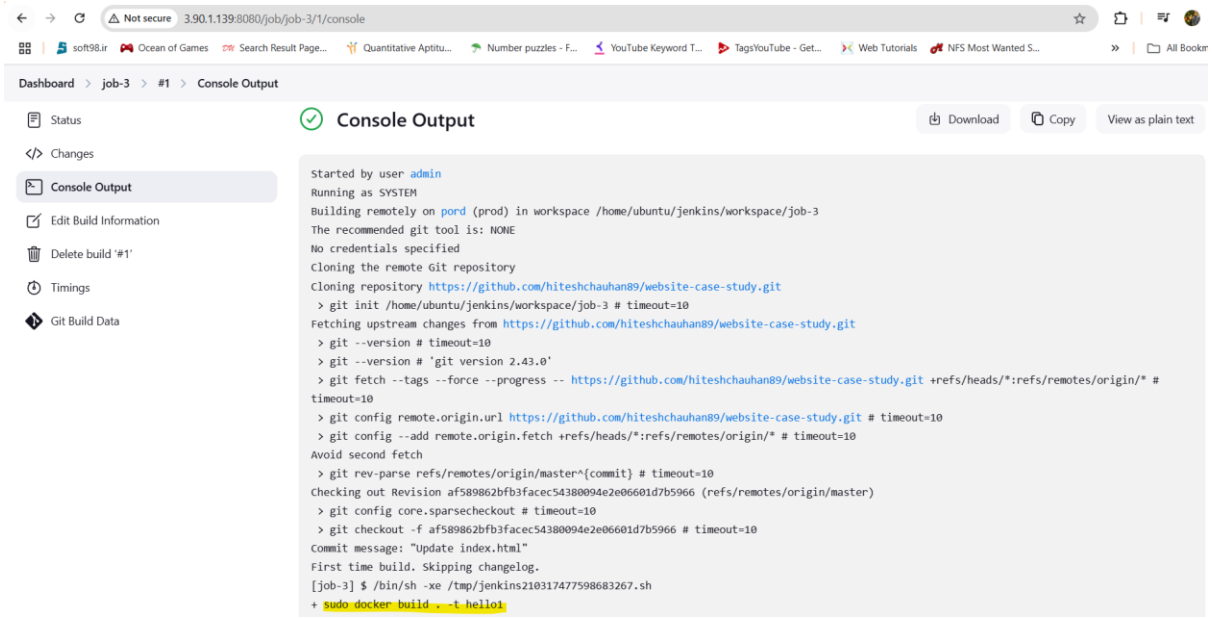
Job-3 creating.

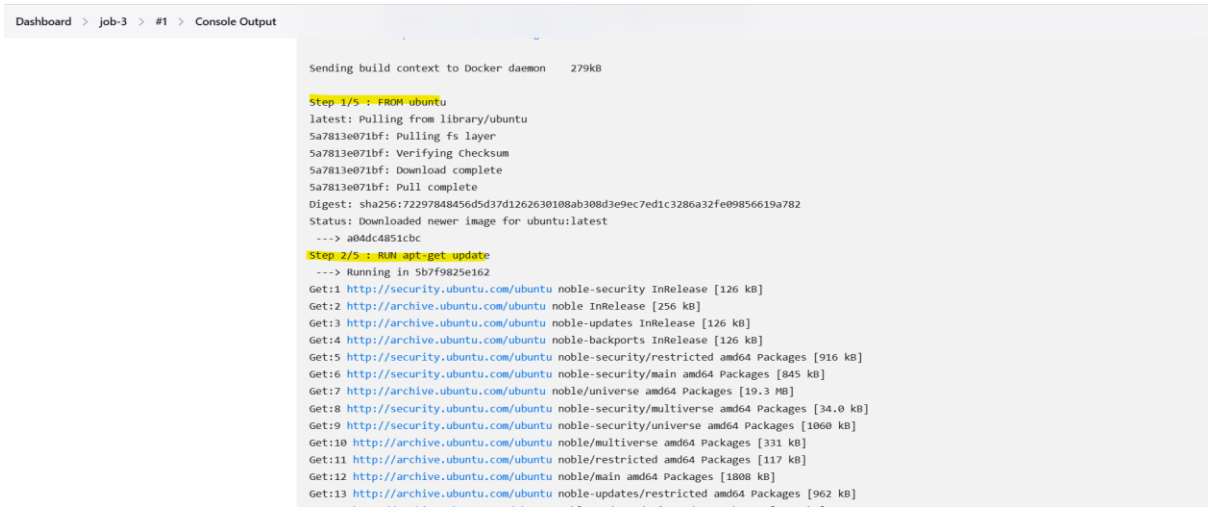


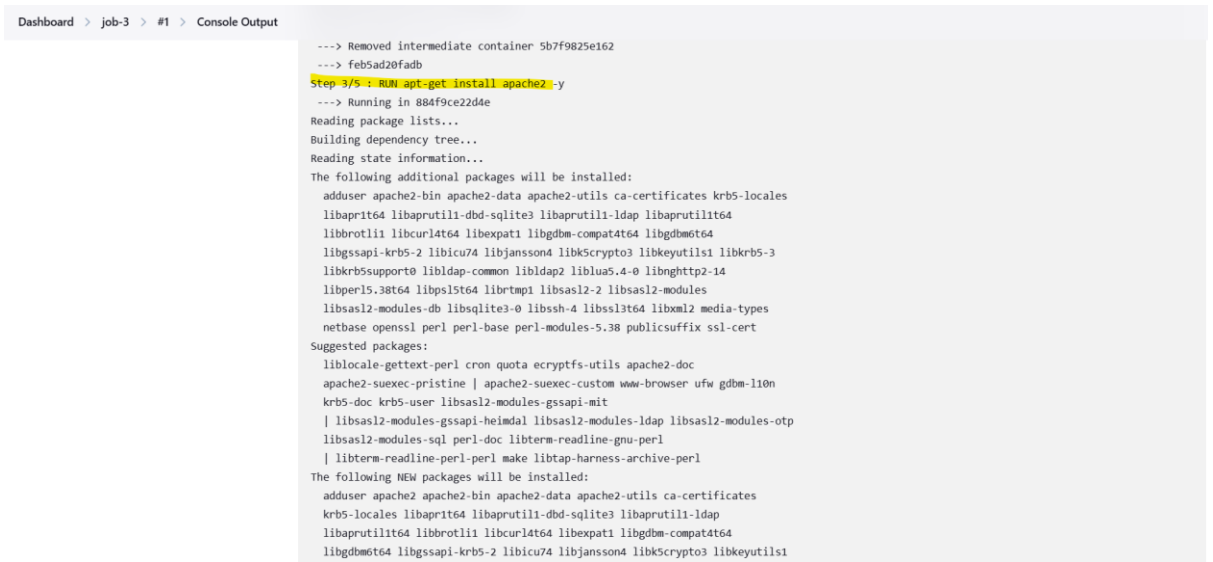
Here Job-3 is created.

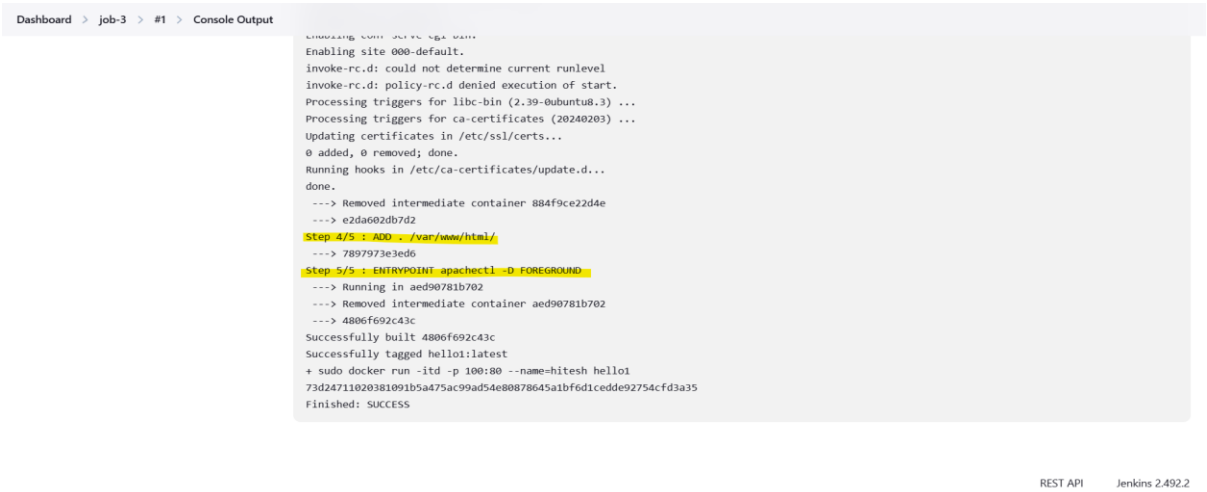


This is the Console Output.

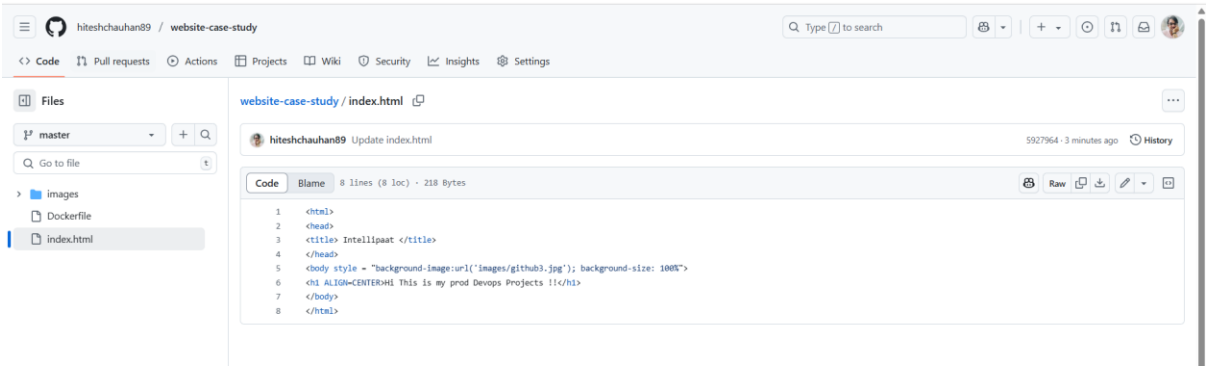




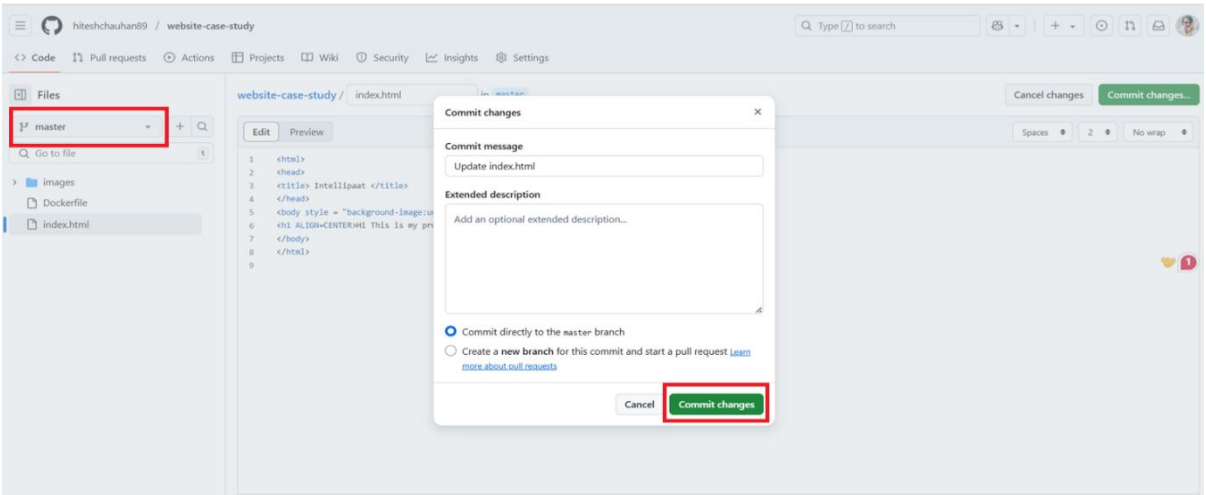




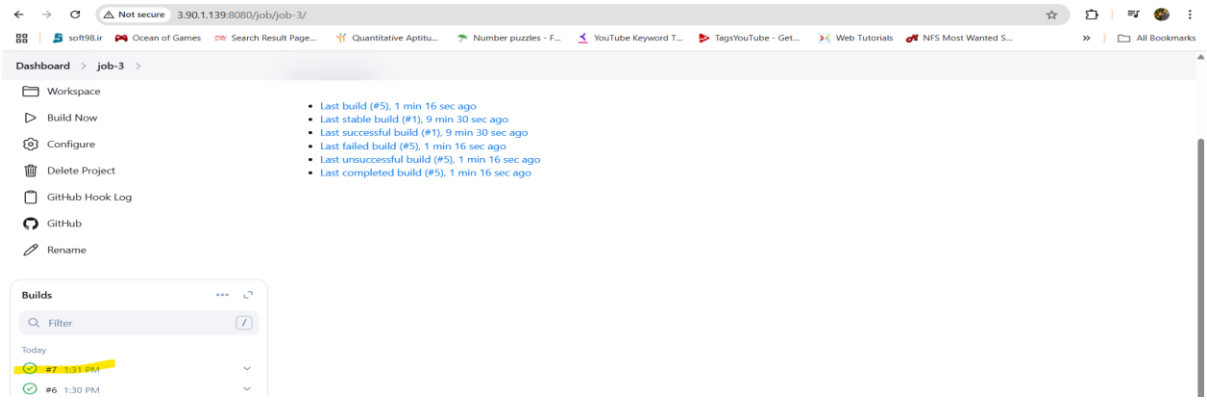
Now Here we need to change the some code



Commit changes the code.



Now Here in master branch code has been deployed automatically.
The Task no 07 has been automatically created after github master branch code changed.



This is output of Master Branch code changes.