

Project 1 : Capstone 1

You have been hired as a 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 and their product is available on this GitHub link.

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

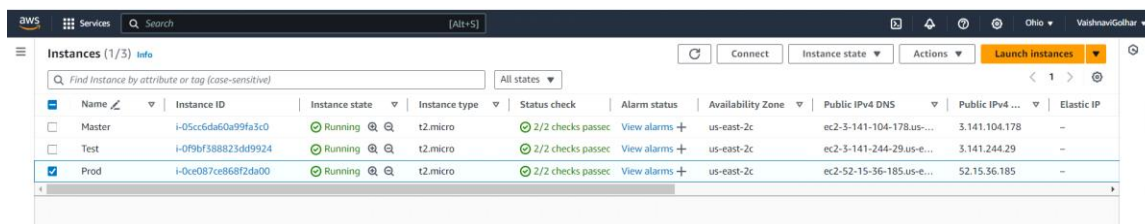
Following are the specifications of the lifecycle:

1. Install the necessary software on the machines using a configuration management tool
2. Git workflow has to be implemented
3. CodeBuild should automatically be triggered once a commit is made to master branch or develop branch.
 - a. If a commit is made to master branch, test and push to prod
 - b. If a 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 GitHub. 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 define i jenkins pipelines with the following jobs

- a. Job1 : build
- b. Job2 : test
- c. Job3 : prod

SOLUTION:

1. Set Up AWS EC2 Instances



The screenshot shows the AWS Management Console 'Instances' page. It displays a table of three EC2 instances: 'Master', 'Test', and 'Prod'. All instances are in the 'Running' state, using 't2.micro' instance type, and have passed their status checks. They are located in the 'us-east-2c' availability zone. The 'Prod' instance has a public IP of 52.15.36.185.

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Public IPv4 ...	Elastic IP
Master	i-05cc6da60a99fa3c0	Running	t2.micro	2/2 checks passed	View alarms	us-east-2c	ec2-3-141-104-178.us-...	3.141.104.178	-
Test	i-0f9bf388823dd9924	Running	t2.micro	2/2 checks passed	View alarms	us-east-2c	ec2-3-141-244-29.us-e...	3.141.244.29	-
Prod	i-0ce087ce868f2da00	Running	t2.micro	2/2 checks passed	View alarms	us-east-2c	ec2-52-15-36-185.us-e...	52.15.36.185	-

2. Install Necessary Software



The screenshot shows the 'Installing Ansible on Ubuntu' page from the Ansible Community Documentation. It provides instructions on how to install Ansible on Ubuntu by adding the PPA and running specific 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.

```

ubuntu@ip-172-31-37-122:~$ history
1  sudo apt update
2  sudo apt install software-properties-common
3  sudo apt install ansible
4  history
ubuntu@ip-172-31-37-122:~$
  
```

i-05cc6da60a99fa3c0 (Master)

PublicIPs: 3.141.104.178 PrivateIPs: 172.31.37.122

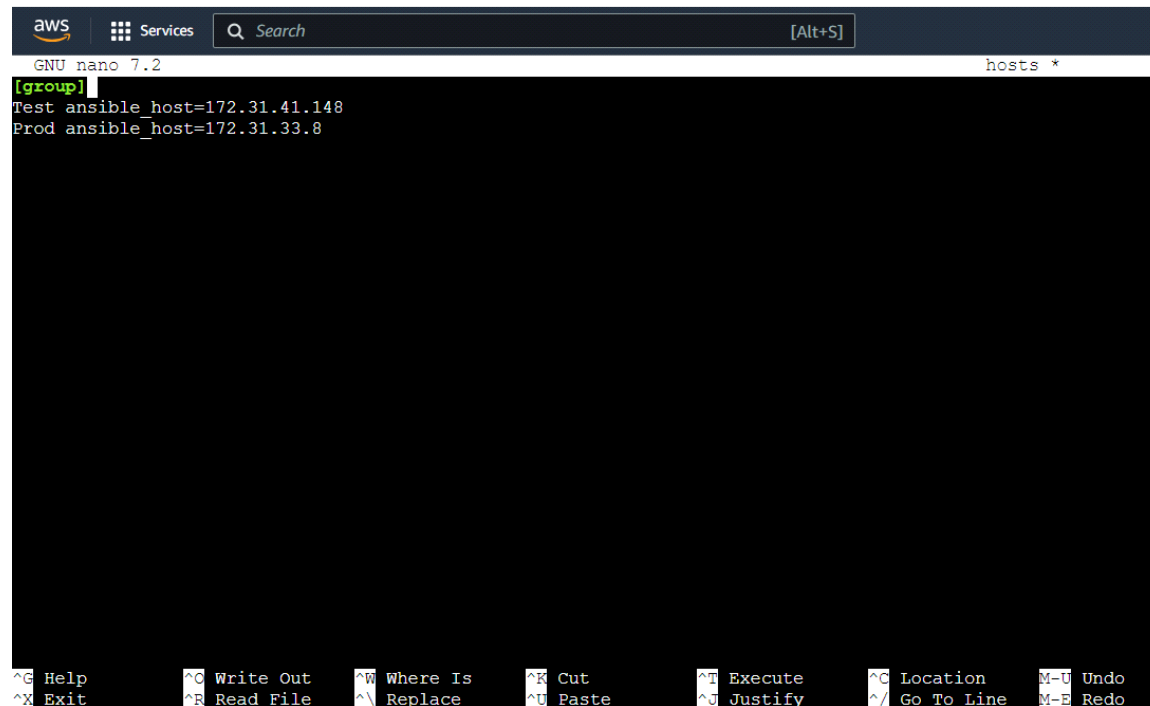
3. Create ssh connection between Master and Slaves

```
5  ssh-keygen
6  cd .ssh
7  ls
8  sudo cat id_ed25519.pub
9  cd
10 ssh 172.31.41.148
11 ssh 172.31.33.8
12 history
ubuntu@ip-172-31-37-122:~$
```

i-05cc6da60a99fa3c0 (Master)

PublicIPs: 3.141.104.178 PrivateIPs: 172.31.37.122

4. Create an Ansible Inventory File:



```
aws Services Search [Alt+S]
GNU nano 7.2 hosts *
[group]
Test ansible_host=172.31.41.148
Prod ansible_host=172.31.33.8

^G Help      ^O Write Out  ^W Where Is   ^K Cut        ^T Execute    ^C Location   M-U Undo
^X Exit      ^R Read File  ^\ Replace    ^U Paste      ^J Justify    ^/ Go To Line  M-E Redo
```

i-05cc6da60a99fa3c0 (Master)

PublicIPs: 3.141.104.178 PrivateIPs: 172.31.37.122

```

ubuntu@ip-172-31-37-122:~$ cd /etc/ansible
ubuntu@ip-172-31-37-122:/etc/ansible$ ls
ansible.cfg  hosts  roles
ubuntu@ip-172-31-37-122:/etc/ansible$ sudo nano hosts
ubuntu@ip-172-31-37-122:/etc/ansible$ sudo cat hosts
[group]
Test ansible_host=172.31.41.148
Prod ansible_host=172.31.33.8
ubuntu@ip-172-31-37-122:/etc/ansible$

```

i-05cc6da60a99fa3c0 (Master)

PublicIPs: 3.141.104.178 PrivateIPs: 172.31.37.122

```

ubuntu@ip-172-31-37-122:/etc/ansible$ ansible -m ping all
Prod | SUCCESS => {
  "ansible_facts": {
    "discovered_interpreter_python": "/usr/bin/python3"
  },
  "changed": false,
  "ping": "pong"
}
Test | SUCCESS => {
  "ansible_facts": {
    "discovered_interpreter_python": "/usr/bin/python3"
  },
  "changed": false,
  "ping": "pong"
}
ubuntu@ip-172-31-37-122:/etc/ansible$

```

i-05cc6da60a99fa3c0 (Master)

PublicIPs: 3.141.104.178 PrivateIPs: 172.31.37.122

5. Create script to run master and slaves

```
aws Services Search [Alt+S]
GNU nano 7.2 master.sh *
sudo apt update
sudo apt install docker.io -y
sudo apt install openjdk-11-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" > /dev/null
sudo apt-get update
sudo apt-get install jenkins -y
```

i-05cc6da60a99fa3c0 (Master)

PublicIPs: 3.141.104.178 PrivateIPs: 172.31.37.122

```
ubuntu@ip-172-31-37-122:/etc/ansible$ sudo nano master.sh
ubuntu@ip-172-31-37-122:/etc/ansible$ sudo cat master.sh
sudo apt update
sudo apt install docker.io -y
sudo apt install openjdk-11-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" > /dev/null
sudo apt-get update
sudo apt-get install jenkins -y
ubuntu@ip-172-31-37-122:/etc/ansible$
```

i-05cc6da60a99fa3c0 (Master)

PublicIPs: 3.141.104.178 PrivateIPs: 172.31.37.122

```
aws Services Search [Alt+S]
GNU nano 7.2 slaves
sudo apt update
sudo apt install docker.io -y
sudo apt install openjdk-11-jdk -y

^G Help      ^O Write Out  ^W Where Is   ^K Cut        ^T Execute    ^C Location
^X Exit      ^R Read File  ^\ Replace    ^U Paste      ^J Justify    ^_ Go To Line
```

i-05cc6da60a99fa3c0 (Master)

PublicIPs: 3.141.104.178 PrivateIPs: 172.31.37.122

```
ubuntu@ip-172-31-37-122:/etc/ansible$ sudo nano slaves.sh
ubuntu@ip-172-31-37-122:/etc/ansible$ sudo cat slaves.sh
sudo apt update
sudo apt install docker.io -y
sudo apt install openjdk-11-jdk -y
ubuntu@ip-172-31-37-122:/etc/ansible$
```

i-05cc6da60a99fa3c0 (Master)

PublicIPs: 3.141.104.178 PrivateIPs: 172.31.37.122

6.

Create an Ansible Playbook:

```
aws | Services | Search [Alt+S]
GNU nano 7.2
---
- name: executing task on master
  become: yes
  hosts: localhost
  tasks:
    - name: executing script on master
      script: master.sh
- Name: executing task on slaves
  become: yes
  hosts: all
  tasks:
    - name: executing script on slaves
      script: slaves.sh

^G Help      ^O Write Out  ^W Where Is   ^K Cut        ^T Execute    ^C Location
^X Exit      ^R Read File  ^\ Replace    ^U Paste      ^J Justify    ^_ Go To L
```

i-05cc6da60a99fa3c0 (Master)

PublicIPs: 3.141.104.178 PrivateIPs: 172.31.37.122

7. Run the Ansible Playbook:

```
ubuntu@ip-172-31-37-122:/etc/ansible$ sudo nano play.yaml
ubuntu@ip-172-31-37-122:/etc/ansible$ ansible-playbook play.yaml --syntax-check
ERROR! 'Name' is not a valid attribute for a Play

The error appears to be in '/etc/ansible/play.yaml': line 8, column 4, but may
be elsewhere in the file depending on the exact syntax problem.

The offending line appears to be:

    script: master.sh
  - Name: executing task on slaves
    ^ here
ubuntu@ip-172-31-37-122:/etc/ansible$ sudo nano play.yaml
ubuntu@ip-172-31-37-122:/etc/ansible$ ansible-playbook play.yaml --syntax-check

playbook: play.yaml
ubuntu@ip-172-31-37-122:/etc/ansible$
```

i-05cc6da60a99fa3c0 (Master)

PublicIPs: 3.141.104.178 PrivateIPs: 172.31.37.122

```
playbook: play.yaml
ubuntu@ip-172-31-37-122:/etc/ansible$ ansible-playbook play.yaml --check

PLAY [executing task on master] *****

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

TASK [executing script on master] *****
skipping: [localhost]

PLAY [executing task on slaves] *****

TASK [Gathering Facts] *****
ok: [Prod]
ok: [Test]

TASK [executing script on slaves] *****
skipping: [Test]
skipping: [Prod]

PLAY RECAP *****
Prod      : ok=1  changed=0    unreachable=0    failed=0    skipped=1    rescued=0    ignored=0
Test      : ok=1  changed=0    unreachable=0    failed=0    skipped=1    rescued=0    ignored=0
localhost : ok=1  changed=0    unreachable=0    failed=0    skipped=1    rescued=0    ignored=0

ubuntu@ip-172-31-37-122:/etc/ansible$
```

i-05cc6da60a99fa3c0 (Master)

PublicIPs: 3.141.104.178 PrivateIPs: 172.31.37.122

```
ubuntu@ip-172-31-37-122:/etc/ansible$ ansible-playbook play.yaml

PLAY [executing task on master] *****

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

TASK [executing script on master] *****
changed: [localhost]

PLAY [executing task on slaves] *****

TASK [Gathering Facts] *****
ok: [Prod]
ok: [Test]

TASK [executing script on slaves] *****
changed: [Prod]
changed: [Test]

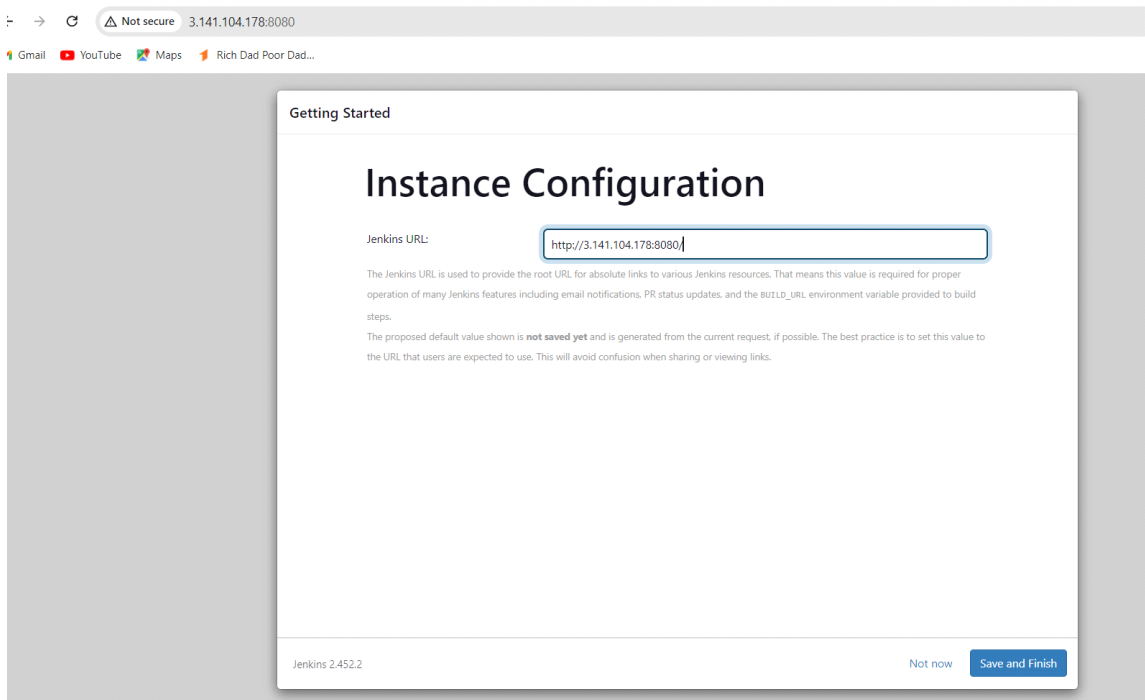
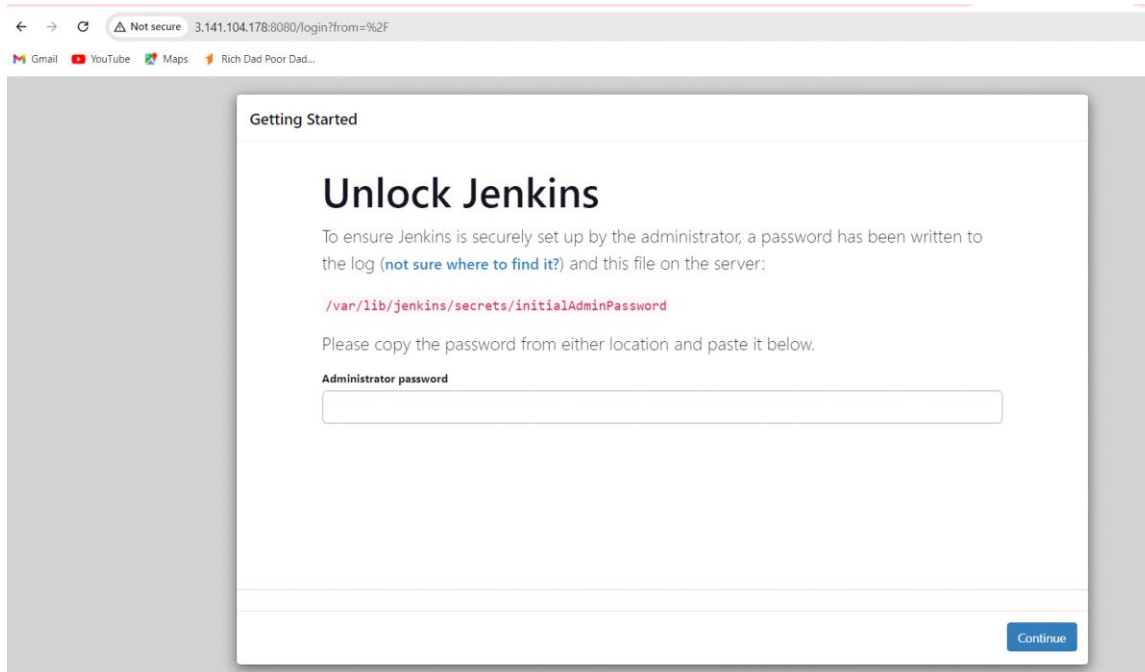
PLAY RECAP *****
Prod      : ok=2  changed=1    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
Test      : ok=2  changed=1    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
localhost : ok=2  changed=1    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0

ubuntu@ip-172-31-37-122:/etc/ansible$
```

i-05cc6da60a99fa3c0 (Master)

PublicIPs: 3.141.104.178 PrivateIPs: 172.31.37.122

8. Configure Jenkins



9. Created 2 node

New node

Node name

Type



Permanent Agent

Adds a plain, permanent agent to Jenkins. This is called "permanent" because Jenkins doesn't provide higher level of integration with these agents, such as dynamic provisioning. Select this type if no other agent types apply — for example such as when you are adding a physical computer, virtual machines managed outside Jenkins, etc.

Create

Name ?

Description ?

Plain text [Preview](#)

Number of executors ?

Remote root directory ?

Labels ?

Save

Usage ?

Launch method ?

Host ?

Credentials ?

+ Add

Host Key Verification Strategy ?

Advanced

New node

Node name

Type

☐ Permanent Agent

Adds a plain, permanent agent to Jenkins. This is called "permanent" because Jenkins doesn't provide higher level of integration with these agents, such as dynamic provisioning. Select this type if no other agent types apply — for example such as when you are adding a physical computer, virtual machines managed outside Jenkins, etc.

☒ Copy Existing Node

test

Create

- Status
- Delete Agent
- Configure
- Build History
- Load Statistics
- Log

Build Executor Status

Name ?

Description ?

prod node

Plain text Preview

Number of executors ?

Remote root directory ?

Labels ?

Save

Dashboard > Manage Jenkins > Nodes > prod > Configure

Usage ⓘ
Use this node as much as possible

Launch method ⓘ
Launch agents via SSH

Host ⓘ
172.31.33.8

Credentials ⓘ
ubuntu
+ Add

Host Key Verification Strategy ⓘ
Non verifying Verification Strategy ⓘ

Advanced Edited

Availability ⓘ
Keep this agent online as much as possible ⓘ

Save

Jenkins

Dashboard > Manage Jenkins > Nodes

Nodes + New Node Configure Monitors

S	Name	Architecture	Clock Difference	Free Disk Space	Free Swap Space	Free Temp Space	Response Time
	Built-In Node	Linux (amd64)	In sync	3.20 GiB	0 B	3.20 GiB	0ms
	prod	Linux (amd64)	In sync	4.14 GiB	0 B	4.14 GiB	97ms
	test	Linux (amd64)	In sync	4.14 GiB	0 B	4.14 GiB	71ms
Data obtained		3.9 sec	3.9 sec	3.8 sec	3.8 sec	3.8 sec	3.8 sec

Icon: S M L Legend

10. Set Up Git Workflow

Veishnavi-Golhar / website



<> Code Pull requests Actions Projects Wiki Security Insights Settings

master website / Go to file Add file



Vaishnavi-Golhar Create Dockerfile 25m5cd · 1 minute ago History

This branch is 1 commit ahead of hshar/website:master. Contribute Sync fork

Name	Last commit message	Last commit date
images	final	5 years ago
Dockerfile	Create Dockerfile	1 minute ago
index.html	modified	5 years ago

 Vaishnavi-Golhar / website

[Code](#) [Pull requests](#) [Actions](#) [Projects](#) [Wiki](#) [Security](#) [Insights](#) [Settings](#)


  master [website / Dockerfile](#)

Vaishnavi-Golhar Create Dockerfile


Code

Blame

5 lines (5 loc) · 109 Bytes

 Code 55% faster with GitHub Copilot

```
1 FROM ubuntu
2 RUN apt update
3 RUN apt install apache2 -y
4 ADD . /var/www/html
5 ENTRYPOINT apache2ctl -D FOREGROUND
```

 Vaishnavi-Golhar / website

Type to search

> + ↻

[Code](#) [Pull requests](#) [Actions](#) [Projects](#) [Wiki](#) [Security](#) [Insights](#) [Settings](#)

Branches

New branch

Overview Yours Active Stale All

Search branches...

Default

Branch

master


Create a branch


New branch name

Develop

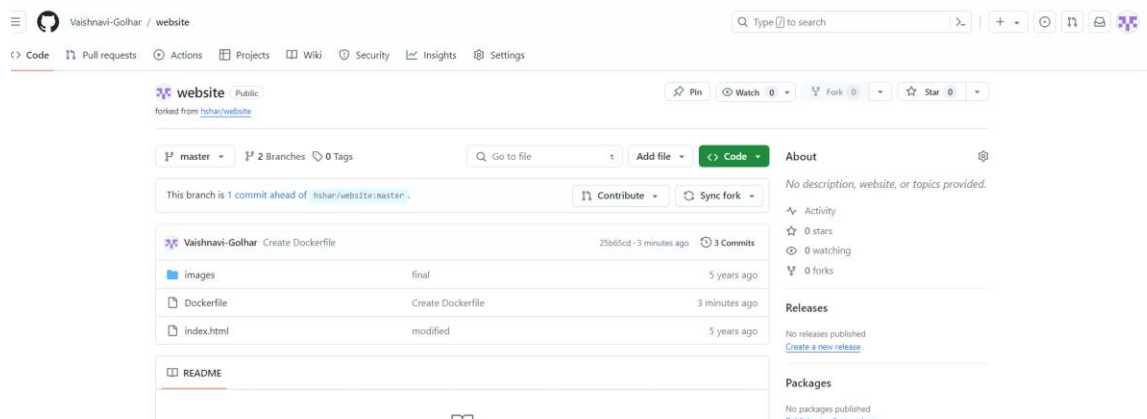
Source

Choose from this fork or its upstream repository.

 Vaishnavi-Golhar...

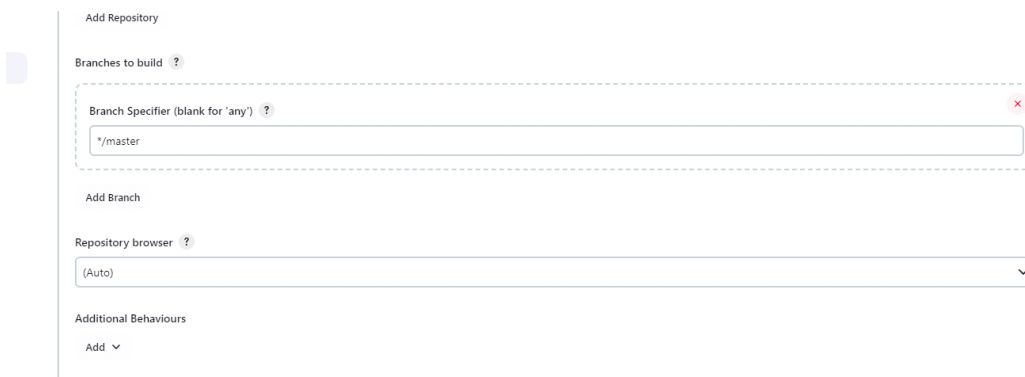
 master

Cancel Create new branch



11. Jenkins Pipeline Configuration

Job1:



Vaishnavi-Golhar / website

Code

Pull requests

Actions

Projects

Wiki

Security

Insights

Settings

General

Access

Collaborators

Moderation options

Code and automation

Branches

Tags

Rules

Actions

Webhooks

Environments

Codespaces

Pages

Security

Code security and analysis

Deploy keys

Secrets and variables

Webhooks / Add webhook

We'll send a POST request to the URL below with details of any subscribed events. You can also specify which data format you'd like to receive (JSON, x-www-form-urlencoded, etc). More information can be found in [our developer documentation](#).

Payload URL *

http://3.141.104.178:8080/github-webhook/

Content type *

application/x-www-form-urlencoded

Secret

SSL verification

By default, we verify SSL certificates when delivering payloads.

Enable SSL verification

Disable (not recommended)

Which events would you like to trigger this webhook?

Just the push event.

Send me everything.

Jenkins

Search (CTRL+K)

log out

Dashboard

Job1-Build

Status

Changes

Workspace

Build Now

Configure

Delete Project

GitHub Hook Log

GitHub

Rename

Job1-Build

Edit description

Disable Project

Permalinks

Last build (#1), 28 min ago

Last stable build (#1), 28 min ago

Last successful build (#1), 28 min ago

Last completed build (#1), 28 min ago

Build History

Filter...

1

Jun 20, 2024, 4:11 PM

Atom feed for all

Atom feed for failures

Job2:

Jenkins

Search (CTRL+K)

vish22

log out

Dashboard

>

JOB2

>

Configuration

Configure

General

Source Code Management

Build Triggers

Build Environment

Build Steps

Post-build Actions

General

Enabled

Description

JOB2

Plain text

Preview

Discard old builds

GitHub project

This project is parameterized

Throttle builds

Execute concurrent builds if necessary

Restrict where this project can be run

Label Expression

test

Label test matches 1 node. Permissions or other restrictions provided by plugins may further reduce that list.

Advanced

Save

Apply

Dashboard > JOB2 > Configuration

Configure

General

Source Code Management

Build Triggers

Build Environment

Build Steps

Post-build Actions

Git

Repositories

Repository URL

https://github.com/Vaishnavi-Golhar/website.git

Credentials

- none -

Add

Advanced

Add Repository

Branches to build

Branch Specifier (blank for 'any')

/ develop

Add Branch

Dashboard > JOB2 > Configuration

Configure

General

Source Code Management

Build Triggers

Build Environment

Build Steps

Post-build Actions

Build Steps

Execute shell

Command

See the list of available environment variables

sudo docker build . -t testing2

sudo docker run -itd -p 80:82 testing2

Advanced

Add build step

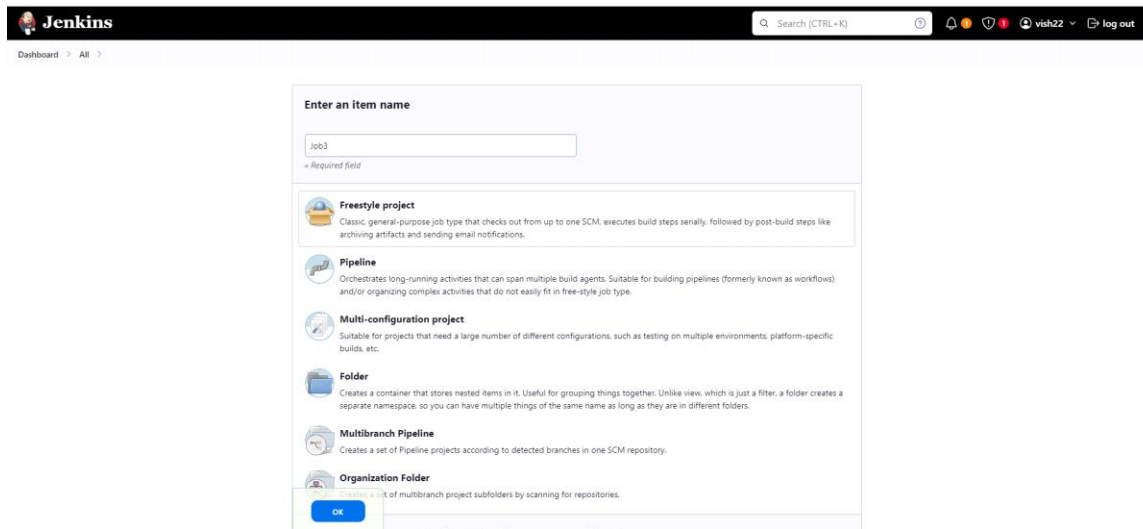
Post-build Actions

Add post-build action

Save

Apply

job3:



The screenshot shows the Jenkins 'New Job' configuration page. At the top, the Jenkins logo and navigation links are visible. A search bar and user profile 'vish22' are in the top right. The main heading is 'Enter an item name'. Below it, a text input field contains 'job3'. A list of job types is shown: Freestyle project, Pipeline, Multi-configuration project, Folder, Multibranch Pipeline, and Organization Folder. Each job type has a brief description. The 'Freestyle project' is selected. A blue 'OK' button is at the bottom left of the job type list.

Enter an item name

job3

Freestyle project

Pipeline

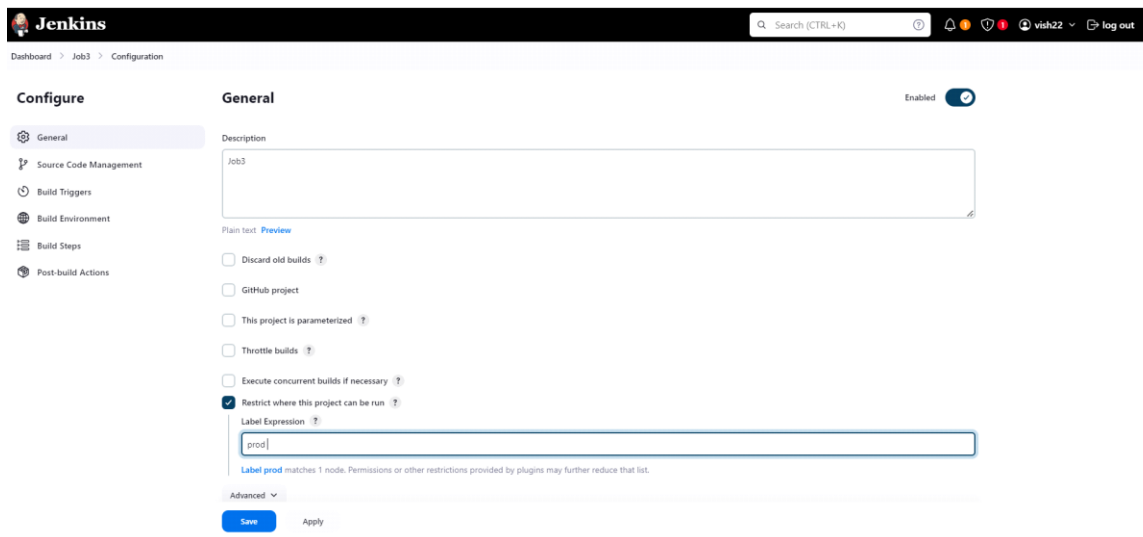
Multi-configuration project

Folder

Multibranch Pipeline

Organization Folder

OK



The screenshot shows the 'Configure' page for the 'job3' job. The 'General' tab is selected in the left sidebar. The 'Description' field contains 'job3'. Below it, several checkboxes are visible: 'Discard old builds', 'GitHub project', 'This project is parameterized', 'Throttle builds', 'Execute concurrent builds if necessary', and 'Restrict where this project can be run'. The 'Restrict where this project can be run' checkbox is checked. Below it, the 'Label Expression' field contains 'prod'. A blue 'Save' button is at the bottom left. The 'Advanced' section is collapsed.

Configure

General

Source Code Management

Build Triggers

Build Environment

Build Steps

Post-build Actions

General

Description

job3

Plain text [Preview](#)

☐ Discard old builds

☐ GitHub project

☐ This project is parameterized

☐ Throttle builds

☐ Execute concurrent builds if necessary

☒ Restrict where this project can be run

Label Expression

prod

Label **prod** matches 1 node. Permissions or other restrictions provided by plugins may further reduce that list.

Advanced

Save

Apply

Advanced ▾

Configure

- General
- Source Code Management
- Build Triggers
- Build Environment
- Build Steps
- Post-build Actions

Source Code Management

☐ None☒ Git ?

Repositories ?

Repository URL ?

<https://github.com/Vaishnavi-Golhar/website.git>

Credentials ?

- NONE -

+ Add +

Advanced ▾

Add Repository

Branches to build ?

Branch Specifier (blank for 'any') ?

Save

Apply

Configure

- General
- Source Code Management
- Build Triggers
- Build Environment
- Build Steps
- Post-build Actions

Build Triggers

- ☐ Trigger builds remotely (e.g., from scripts) ?
- ☐ Build after other projects are built ?
- ☐ Build periodically ?
- ☒ GitHub hook trigger for GITScm polling ?
- ☐ Poll SCM ?

Build Environment

- ☐ Delete workspace before build starts
- ☐ Use secret text(s) or file(s) ?
- ☐ Add timestamps to the Console Output
- ☐ Inspect build log for published build scans
- ☐ Terminate a build if it's stuck
- ☐ With Ant ?

Configure

- General
- Source Code Management
- Build Triggers
- Build Environment
- Build Steps
- Post-build Actions

Build Steps

Execute shell ?

Command

[See the list of available environment variables](#)

```
sudo docker build -t testing
sudo docker run -itd -p 80:80 testing
```

Advanced ▾

Add build step ▾

Post-build Actions

Add post-build action ▾

Save

Apply

Dashboard > Job3 >

- Status
- Changes
- Workspace
- Build Now
- Configure
- Delete Project
- GitHub Hook Log
- Rename

Job3

Job3


Edit description



Disable Project

Permalinks

Build History trend

Filter...

 #1
Jun 20, 2024, 4:40 PM

 Atom feed for all  Atom feed for failures

Dashboard > Job1-Build >

- Status
- Changes
- Workspace
- Build Now
- Configure
- Delete Project
- GitHub Hook Log
- GitHub
- Rename

Job1-Build

Job1-Build

Edit description

Disable Project

Permalinks

- Last build (#1), 28 min ago
- Last stable build (#1), 28 min ago
- Last successful build (#1), 28 min ago
- Last completed build (#1), 28 min ago

Build History trend

Filter...

 #1
Jun 20, 2024, 4:11 PM

 Atom feed for all  Atom feed for failures

