Day 24,25 : Complete Jenkins CI/CD Project

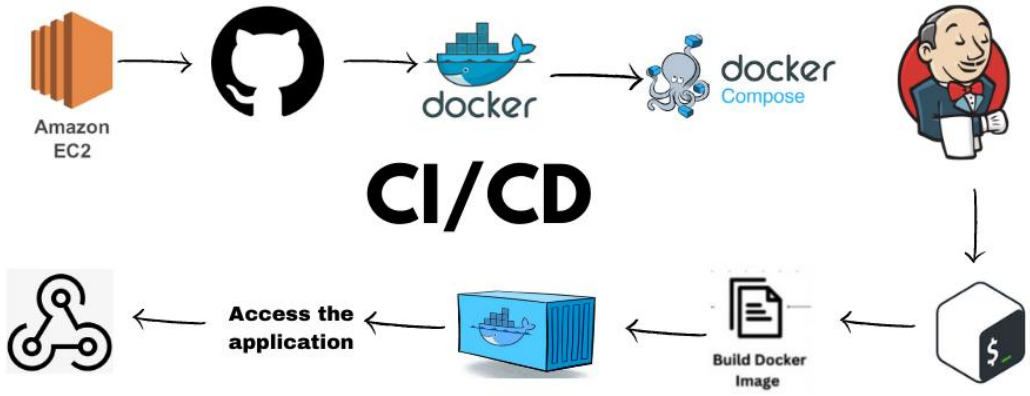
This is [#90DaysofDevops]() challenge under the guidance of [Shubham Londhe]() sir.

Day 24,25 TASK

check this for task:

https://github.com/LondheShubham153/90DaysOfDevOps/blob/master/2023/day24/tasks.md

https://github.com/LondheShubham153/90DaysOfDevOps/blob/master/2023/day25/tasks.md



In this article we will be deploying a node.js application on EC2 instance and we will create a CICD pipeline using Jenkins.

Tools we will be using in the project:

1. AWS-EC2
2. GitHub
3. Docker
4. Jenkins

What is CICD pipeline?

CI/CD (Continuous Integration/Continuous Deployment) pipeline is a set of automated processes that helps to integrate code changes, build, test, and deploy applications continuously. The primary goal of a CI/CD pipeline is to enable fast and reliable delivery of changes to production.

A typical CI/CD pipeline consists of several stages, including:

1. Code Integration: In this stage, developers integrate their code changes into a shared repository.
2. Build: In this stage, the CI system builds the code and runs any necessary tests.
3. Test: In this stage, the code is tested using various testing techniques, including unit tests, integration tests, and end-to-end tests.
4. Deployment: In this stage, the code is deployed to production or a staging environment.
5. Monitoring: In this stage, the system monitors the deployed application for performance and stability.

Step 1: Create EC2 instance and ssh into it

ec2-user@ip-172-31-44-4:~

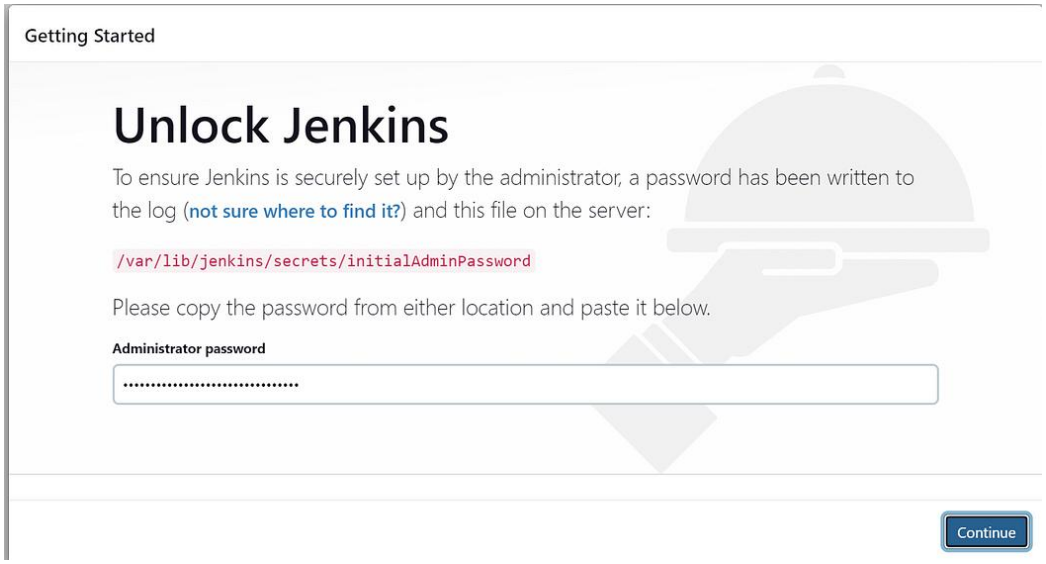
```
login as: ec2-user
Authenticating with public key "jen"

       __|  __|_  )
       _|  (     /   Amazon Linux 2 AMI
      ___|\___|___|

https://aws.amazon.com/amazon-linux-2/
[ec2-user@ip-172-31-44-4 ~]$ sudo yum  update -y
Loaded plugins: extras_suggestions, langpacks, priorities, update-motd
Resolving Dependencies
```

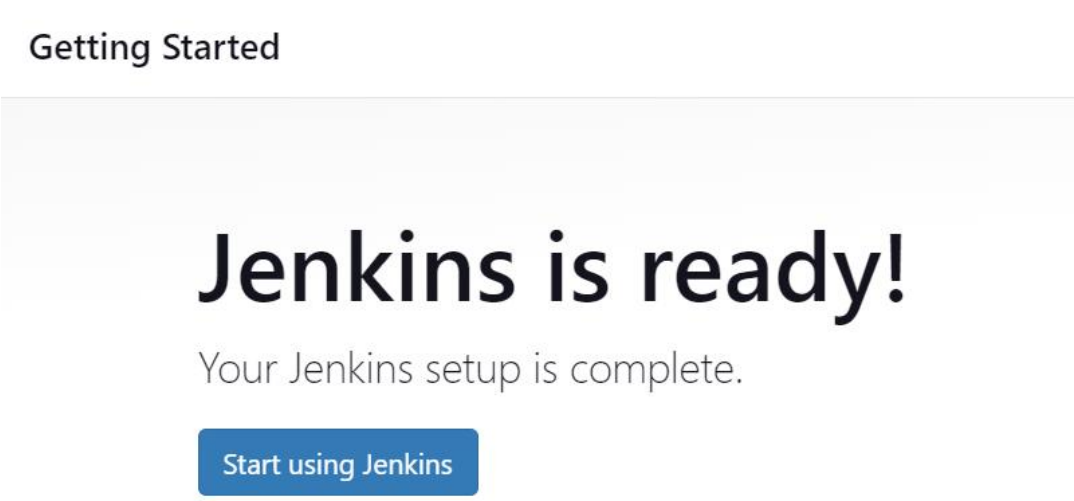
Step 2: Install Jenkins on the server

Use the below link for the installation.

https://www.trainwithshubham.com/blog/install-jenkins-on-aws

Jenkins is Accessible





Before starting with the Jenkins configurations we need to add the public key so that we can create a bridge between jenkins and Github for accessing the source code from the Github repo.

Go to your EC2 instance and type command

#ssh-keygen

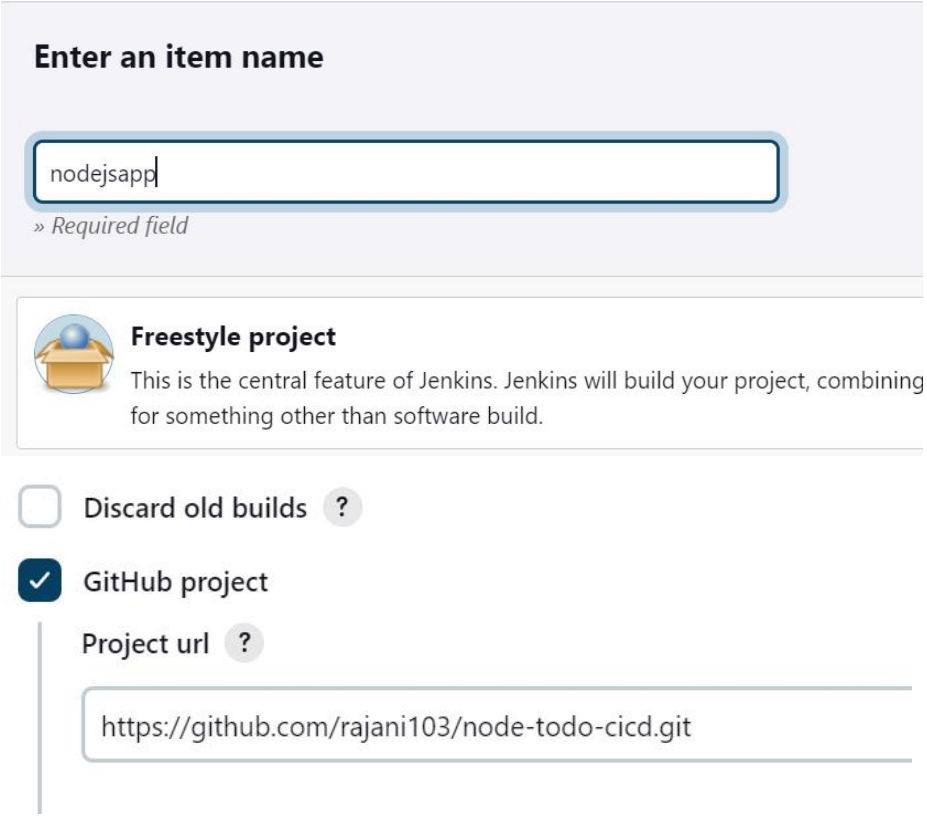
It will create 2 keys. CD to .ssh and check the keys.

```
ubuntu@ip-172-31-43-190:~/.ssh$ ssh-keygen
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:plo6X2mnzPbd1wriW4uyytMQQYtNrtZEZSoHHI+qjdw ubuntu@ip-172-31-43-190
The key's randomart image is:
+---[RSA 3072]----+
|    .oo+.o        |
|     .X.+         |
|     + O.         |
|    . *.          |
|   . o ..S        |
|.+..   .o .       |
|o..E  oo+ o o    .|
|     .=.=++ = +   o|
|     oo++=+=.o oo |
+----[SHA256]-----+
ubuntu@ip-172-31-43-190:~/.ssh$ ls
authorized_keys  id_rsa  id_rsa.pub
```

We need to add the Public key to Github so that we can create the bridge.

Go to Github -> setting -> SSH and GPG key ->Add new key -> do cat id_rsa_pub in the EC2instance and copy the key -> give a name to the key -> paste the copied key.

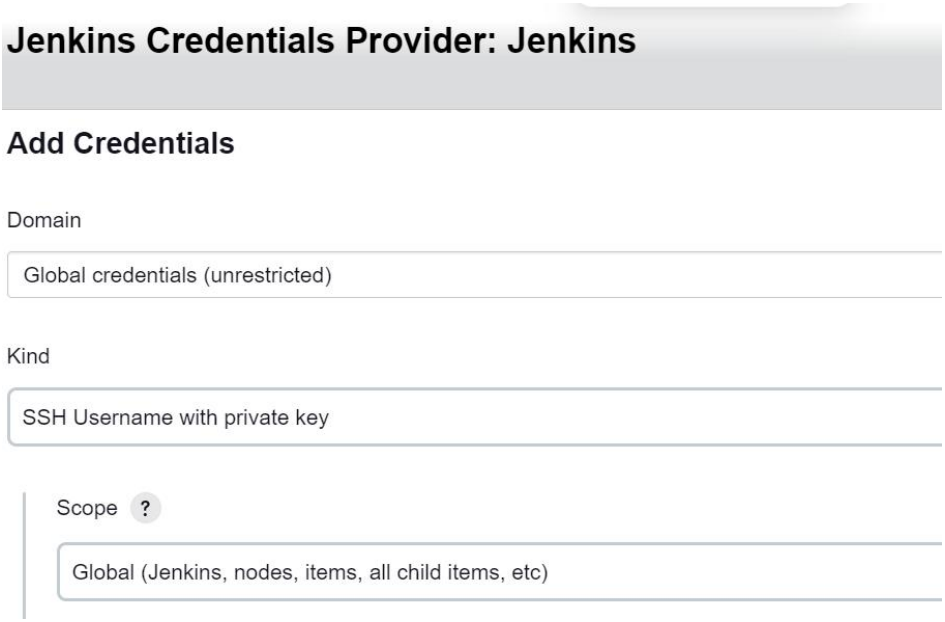
Create a item in jenkins -> Add the URL of the repo



Now we will add the credentials so that jenkins can access the code from the Github.

In Source Core Management

Go to Add credentials



ID ?

project

Description ?

github jenkins integration

Username

ubuntu

Treat username as secret ?

Private Key

Enter directly

Key

xDAhcFUGRfl+mSpH+KuStKF/+tjy/qK73P/t7oJhw3zFJCRT4dnWzk/dp+LVBoAkwTvRzV
ZuVAVRuRaRjnknAAAAF3VidW50dUBpcC0xNzItMzEtNDMtMTkwAQID
-----END OPENSSH PRIVATE KEY-----

Passphrase

Add Cancel

Click on Add -> save it

Now we are all ready to Build the job now. Click on Build now.

It will get build.

Dashboard > nodejs > #1 > Console Output

Status

Changes

Console Output

View as plain text

Edit Build Information

Delete build '#1'

Git Build Data

Console Output

```
Started by user raj
Running as SYSTEM
Building in workspace /var/lib/jenkins/workspace/nodejs
The recommended git tool is: NONE
using credential github
Cloning the remote Git repository
Cloning repository https://github.com/rajani103/node-todo-cicd.git
 > git init /var/lib/jenkins/workspace/nodejs # timeout=10
Fetching upstream changes from https://github.com/rajani103/node-todo-cicd.git
```

Go to instance and check if the repo is cloned there.

```
ubuntu@ip-172-31-43-190:/var/lib/jenkins/workspace/nodejs$ ls
Dockerfile  README.md  app.js  package-lock.json  package.json  views
ubuntu@ip-172-31-43-190:/var/lib/jenkins/workspace/nodejs$
```

Now check the readme and install the necessary dependencies.

README.md

node-todo-cicd

sudo apt install nodejs sudo apt install npm

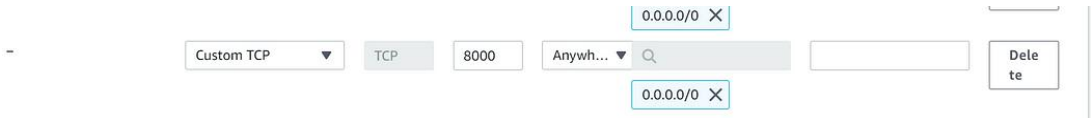
npm install

node app.js

After executing all these commands. check if you can access the URL . It is not accessible as we have not given access to the port 8000.

```
To address all issues (including breaking changes), run:
  npm audit fix --force

Run `npm audit` for details.
root@ip-172-31-43-190:/var/lib/jenkins/workspace/nodejs# node app.js
Todolist running on http://0.0.0.0:8000
```

Go to instance -> Security -> Edit inbound rules -> Add rule



Save it.

Now take public ip of the instance and port 8000 and you can access the application.

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What shoud I do? Add

Now we will dockerize the application so that it can be accessed anywhere by anyone.

Go to instance -> install docker

```
#sudo install docker.io  (#apt-get install docker)(apt  install docker.io)
```

Create your Dockerfile

```
FROM node:12.2.0-alpine
WORKDIR app
COPY . .
RUN npm install
EXPOSE 8000
CMD ["node","app.js"]
```

Now build the image using this Dockerfile.

```
#docker build . -t todoapp
```

```
Removing intermediate container 9f050ee5c5f7
 ---> fc9c9152abb1
Step 5/6 : EXPOSE 8000
 ---> Running in 68ce9ab12ed1
Removing intermediate container 68ce9ab12ed1
 ---> 5d79f77289ee
Step 6/6 : CMD ["node","app.js"]
 ---> Running in dcae66873979
Removing intermediate container dcae66873979
 ---> 50b418f876d5
Successfully built 50b418f876d5
Successfully tagged todo:latest
```

Image (todo:latest) has been created successfully.

Now we will create container from this image.

```
#docker run -d --name todoappnode -p 8000:8000 todo:latest
```

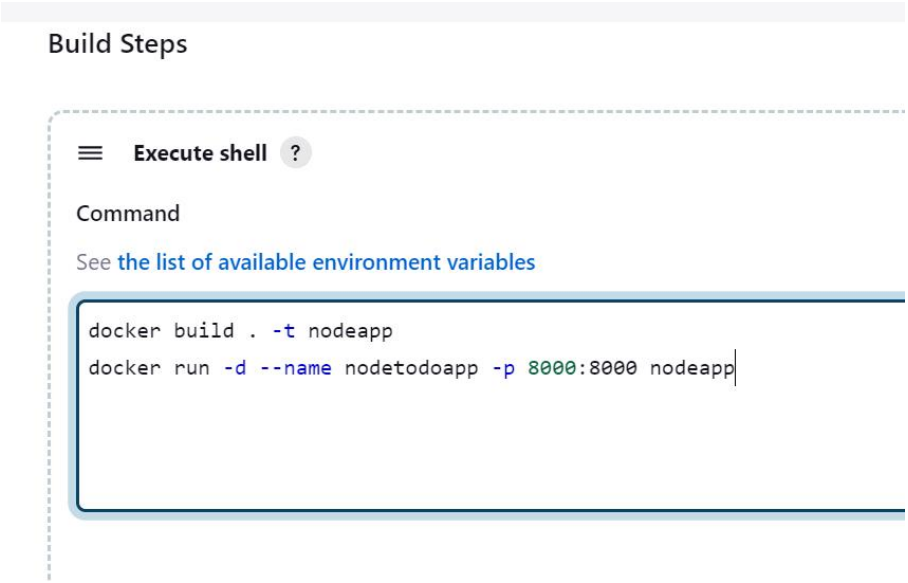
Container will be created after this.

```
root@ip-172-31-43-190:/var/lib/jenkins/workspace/nodejs# docker ps
CONTAINER ID   IMAGE          COMMAND          CREATED          STATUS          PORTS
                                   NAMES
58d27de56d99   50b418f876d5   "node app.js"    3 minutes ago    Up 3 minutes    0.0.0.0:
000->8000/tcp, :::8000->8000/tcp   todoappnode
```

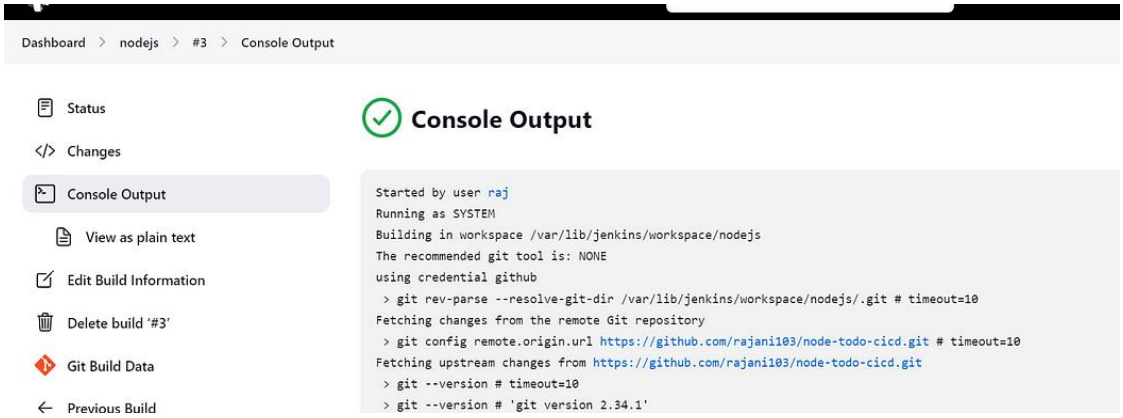
Try accessing the same using the public IP and port 8000.

It is accessible.

Now we will automate this process by adding the commands in the shell.



Build is successsful. We can access the same on browser.



Now all the processes that we were doing manually will be performed automatically as we did the automation.

Now we will configure web-hook so that every time there is any updation, deletion on the repository the job should be automatically triggered and it should perform the upcoming processes.

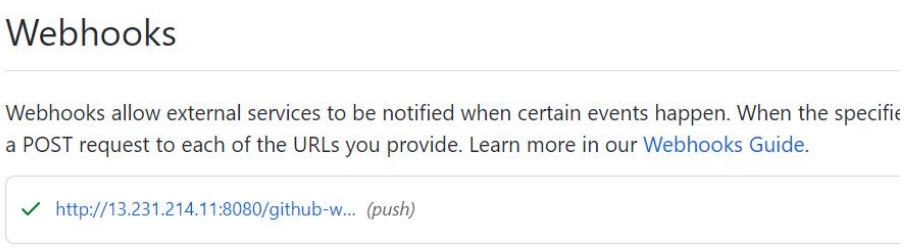
Kill the existing container first.

Jenkins -> Manage Jenkins -> Manage Plugins -> Install github integration plugin

Go to repository settings -> webhook -> Add webhook -> Payload URL add jenkins URL here -> (http://13.231.214.11:8080/github-webhook/)

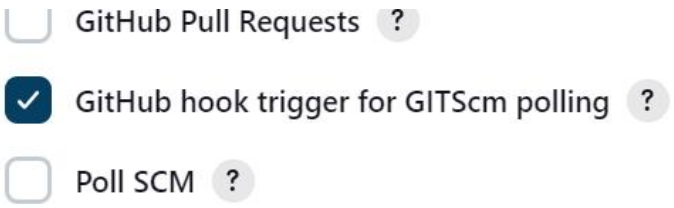
Content type -> application.json

Add webhook.

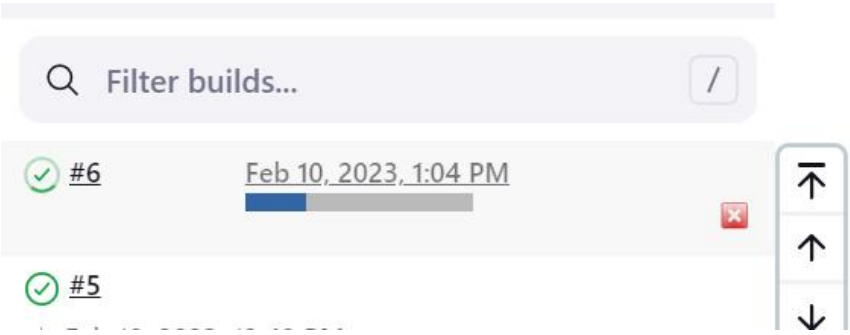


It has been added successfully.

Go to jenkins -> configure -> tick this



Now just update something in the repo and your job will be triggered automatically.



Console Output

```
Started by GitHub push by rajani103
Running as SYSTEM
Building in workspace /var/lib/jenkins/workspace/nodejs
The recommended git tool is: NONE
using credential github
 > git rev-parse --resolve-git-dir /var/lib/jenkins/workspace/nodejs/.git # timeout=10
Fetching changes from the remote Git repository
 > git config remote.origin.url https://github.com/rajani103/node-todo-cicd.git # timeout=10
Fetching upstream changes from https://github.com/rajani103/node-todo-cicd.git
 > git --version # timeout=10
```

So the build is successful.

Resources used :

Video : https://www.youtube.com/watch?v=nplH3BzKHPk&t=5689s

Github : https://github.com/rajani103/node-todo-cicd

Notes : https://docs.google.com/document/d/1qos4eUfY4vZojjnZLSGw8D3A46Yy2r42uiZPyPxL17A/edit#

Please, feel free to drop any questions in the comments below. I would be happy to answer them.

If this post was helpful, please do follow and click the clap

_Thank you for reading

_Rajani