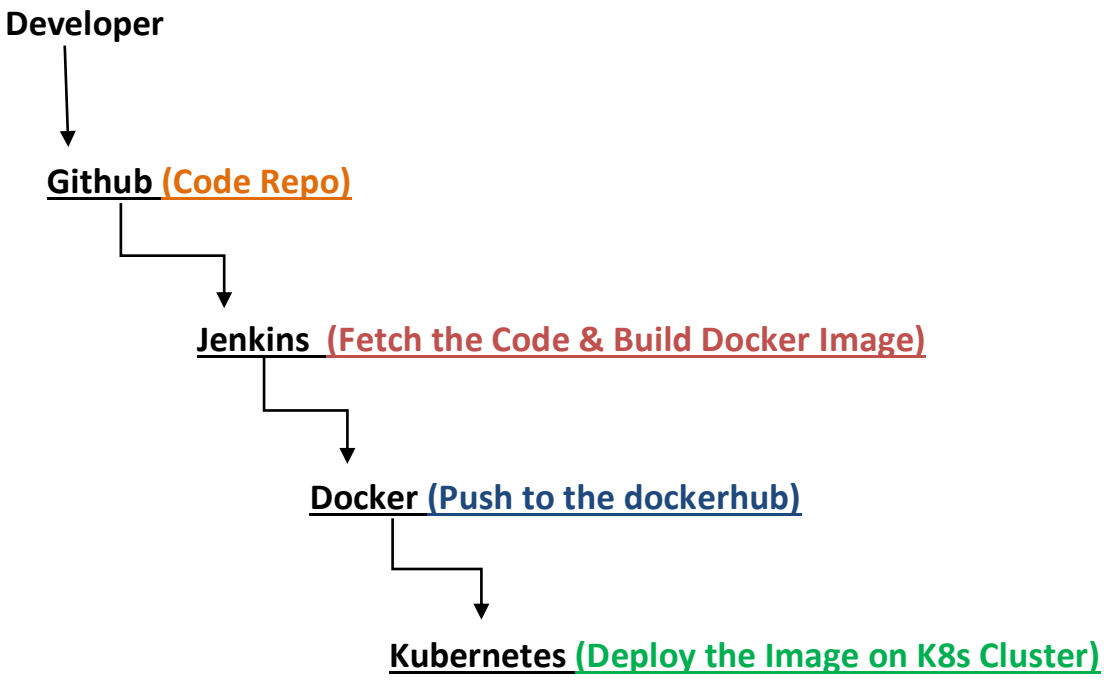
K8s CICD Pipeline Project

In this project we're deploying amazon clone without backend services on the K8s Cluster by Using Github, Docker and Jenkins Pipeline Script.

Clone This Repo: -

https://github.com/Hussain147/k8s-deploy-pipeline.git

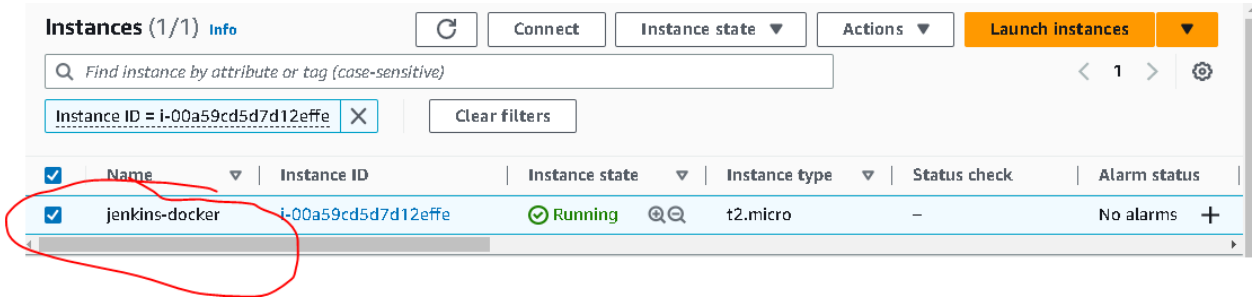
Project Architecture :-



Whenever the developer push the code to the Github repo, Jenkins will fetch the code & Build the Docker Image by using Docker Plugin & once the build completes Jenkins will push the image to the docker hub. And once it is pushed successfully, K8s Cluster will pull the image from docker hub and deploy the image on the worker nodes by using DeploymentService.Yaml file.

Now, Let's Get Started

Launch a **Ubuntu Instance** with Security Group allowing port **8080 & 80**



Connect it through ssh:-

```
Hussain@DESKTOP-572PBGQ MINGW64 ~/OneDrive/Desktop
$ ssh -i horizon.pem ubuntu@54.89.30.221
```

install Java, Jenkins & Docker in it.

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

Debian/Ubuntu

On Debian and Debian-based distributions like Ubuntu you can install Jenkins through apt.

Long Term Support release

A LTS (Long-Term Support) release is chosen every 12 weeks from the stream of regular releases as the stable release for that time period. It can be installed from the debian-stable apt repository.

```
curl -fsSL https://pkg.jenkins.io/debian-stable/jenkins.io.key | sudo tee \
  /usr/share/keyrings/jenkins-keyring.asc > /dev/null
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
sudo apt-get install jenkins
```

Once Jenkins Installed, Check the status

systemctl status Jenkins

```
root@ip-172-31-53-40:~# systemctl status jenkins
● jenkins.service - Jenkins Continuous Integration Server
     Loaded: loaded (/lib/systemd/system/jenkins.service; enabled; vendor prese
     Active: active (running) since Wed 2023-03-15 06:35:55 UTC; 9s ago
   Main PID: 6113 (java)
      Tasks: 44 (limit: 1143)
     Memory: 323.5M
        CPU: 43.201s
     CGroup: /system.slice/jenkins.service
             └─6113 /usr/bin/java -Djava.awt.headless=true -jar /usr/share/java
```

Now, install Docker :-

https://docs.docker.com/engine/install/ubuntu/

Once Installed, Check the status by :- docker ps

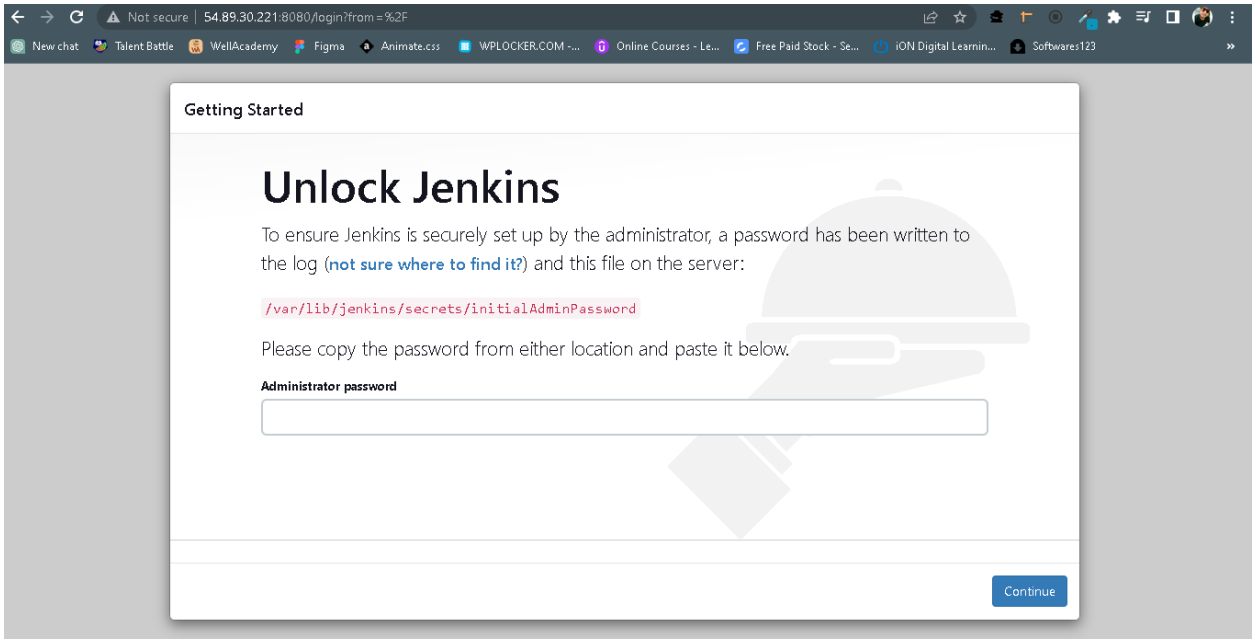
```
root@ip-172-31-53-40:~# sudo docker ps
CONTAINER ID   IMAGE     COMMAND   CREATED   STATUS    PORTS     NAMES
root@ip-172-31-53-40:~#
```

Now, add Jenkins user in docker group

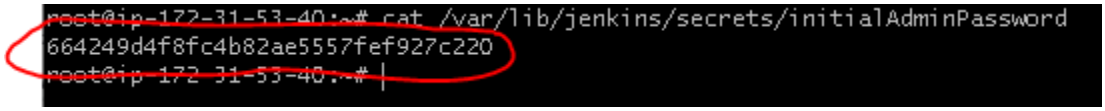
usermod –aG docker Jenkins

```
root@ip-172-31-53-40:~# usermod -aG docker jenkins
root@ip-172-31-53-40:~#
```

Now, Copy th Public ip of Jenkins Instance & paste it in URL bar with port 8080 to access Jenkins dashboard

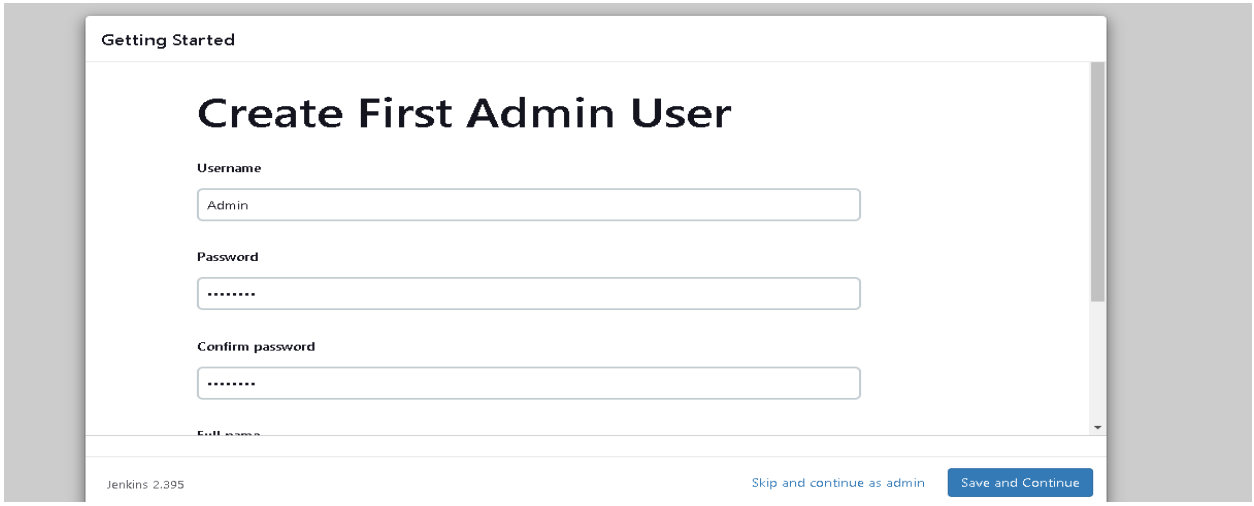


Copy the `/var/lib/jenkins/secrets/initialAdminPassword` and paste it in the Jenkins server in ssh. You'll get the initial password.



Copy that initial password and paste it in the browser

Click Continue > Click Suggested Plugins > Setup the Credentials.



Click Save and Continue. > Start using Jenkins

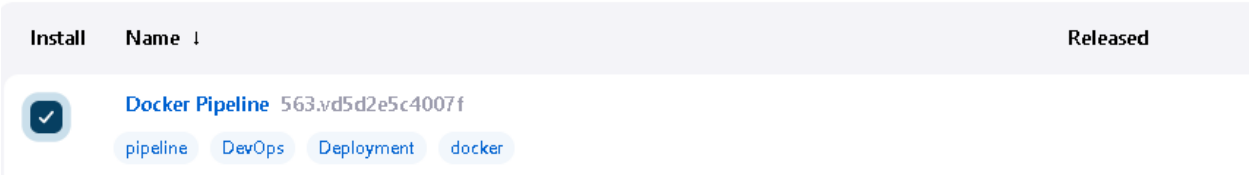
Now Install Plugins :-

Go to Manage Jenkins > Manage Plugins > Available Plugins

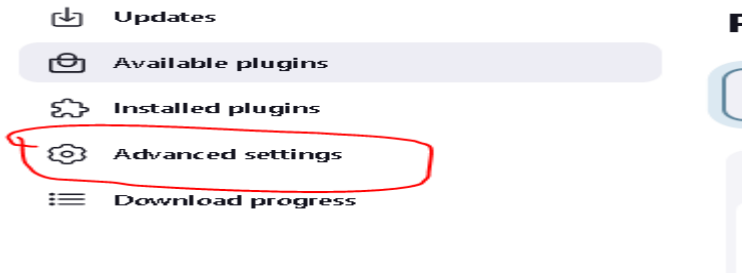
Install these plugins:-

Docker pipeline

Kubernetes Continuous deploy



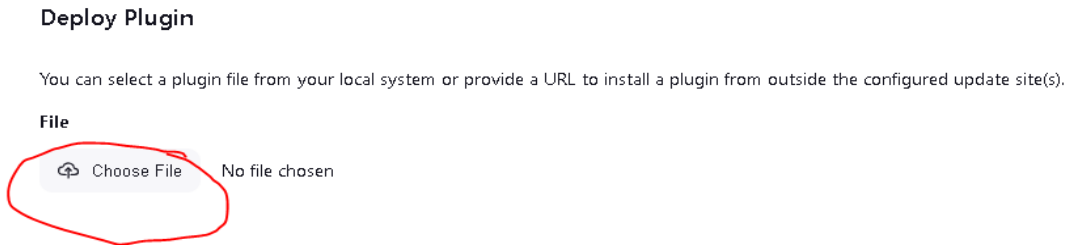
Click on Advanced Settings to upload/download our own plugin:-



Click on Choose file in Deploy Plugin or give the URL of the file

https://github.com/Hussain147/k8s-deploy-pipeline/blob/main/kubernetes-cd.hpi

Click on View Raw to download the file



Now Launch an ubuntu Based Instance with t2 medium type for Kubernetes Master Node.(Give SSH Permission & Allow All Traffic In SG)

Now Launch an Ubuntu Based Instance with t2 micro type for Kubernetes Worker Node.(Give SSH Permission & Allow All Traffic In SG)

Connect it and install Kubeadm as per the steps from the given link:-

https://github.com/Hussain147/k8s-deploy-pipeline/blob/main/Kubeadm%20Installation.docx

Once installed Validate by **kubectl get pods in Master node**

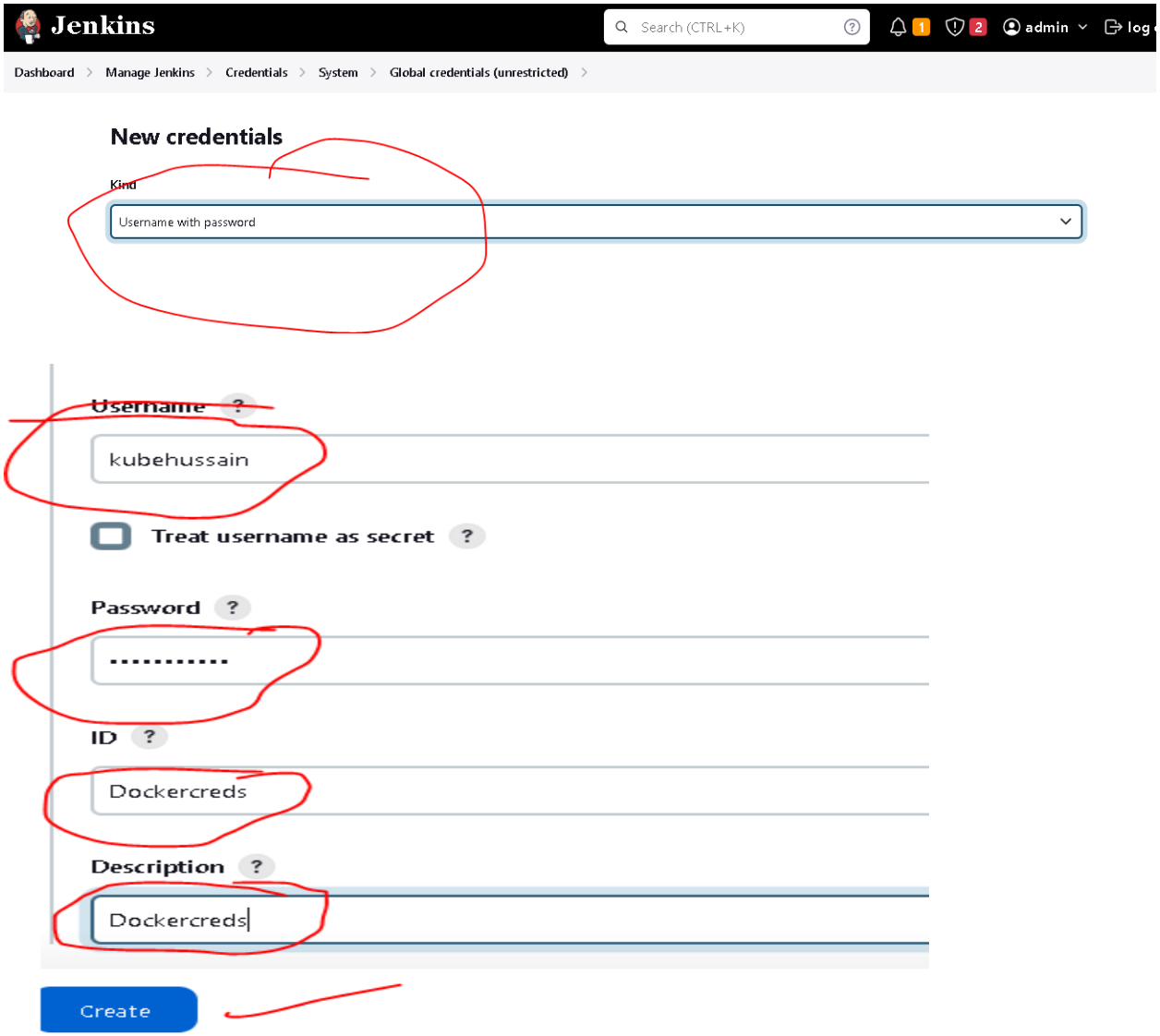
```
ubuntu@ip-172-31-25-255:~$ kubectl get pods
No resources found in default namespace.
```

Now, copy the kube config file and note it down somewhere

```
ubuntu@ip-172-31-25-255:~$ cat ~/.kube/config
```

<Copy all the content>

Now, Go to Manage Jenkins > Manage Credentials > System /Jenkins > Global Credentials > Add Credentials



Kind : Username with password

Username : < your dockerhub username>

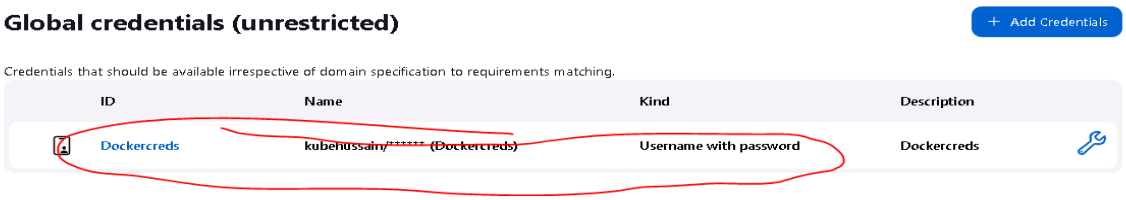
Password : <Your Dockerhub password>

Id: Dockercreds

Desc : Dockercreds

- Click **Create**

It will look like this,



Now **Again click on Add Credentials >**

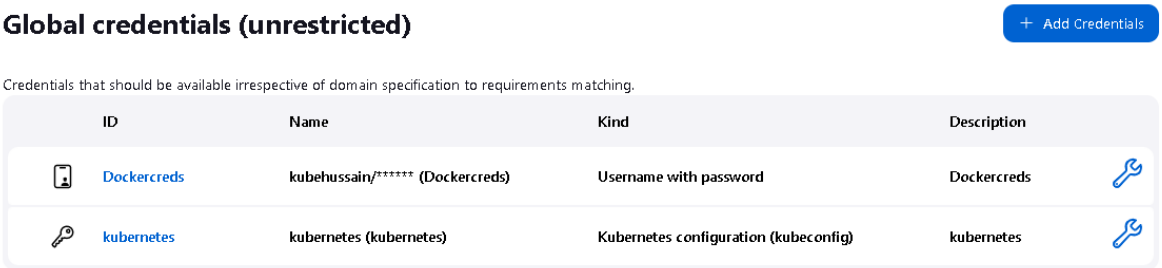
Kind : Kubernetes Configuration

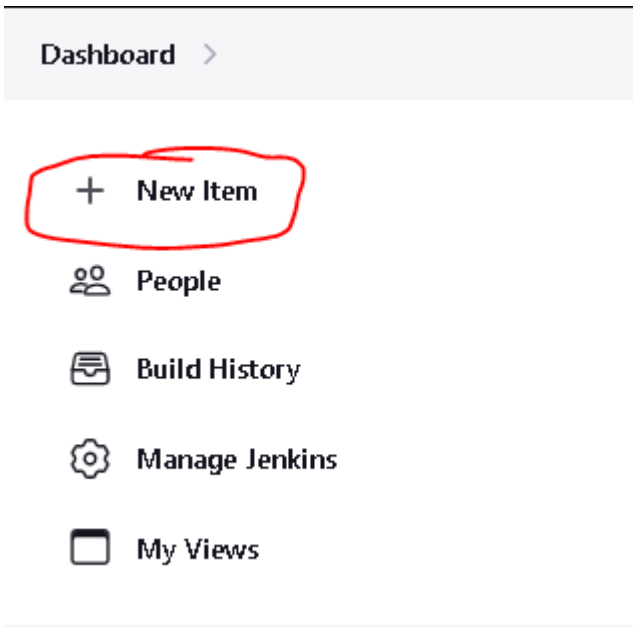
Id : kubernetes, Desc : kubernetes

Kubeconfig : <paste the config file here>

Click **Create**

Now, You'll see like this



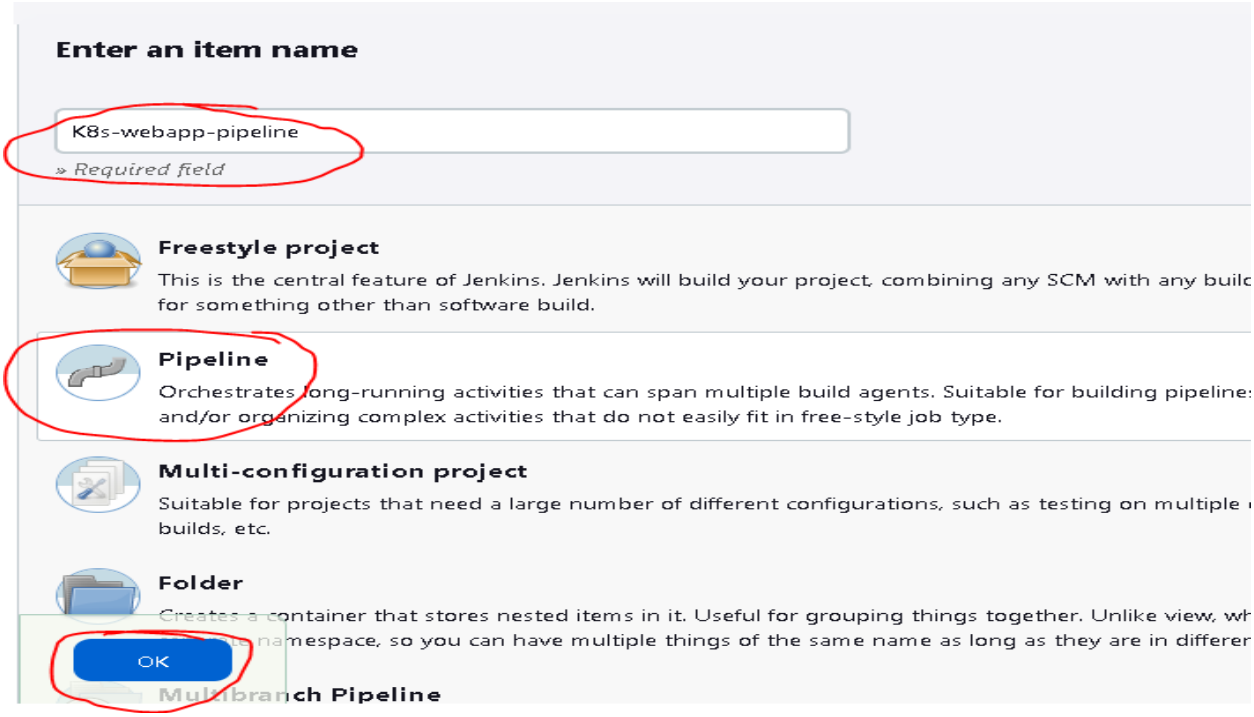


Now, Come to Dashboard > Click On New Item >

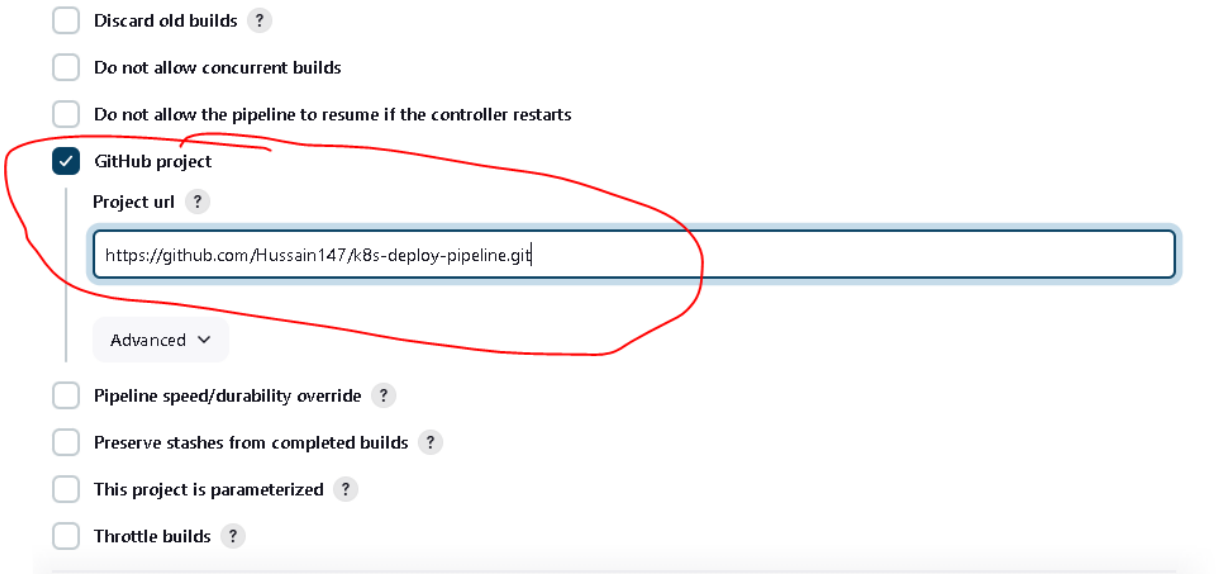
Item Name : **K8s-webapp-pipeline**

Select **Pipeline**

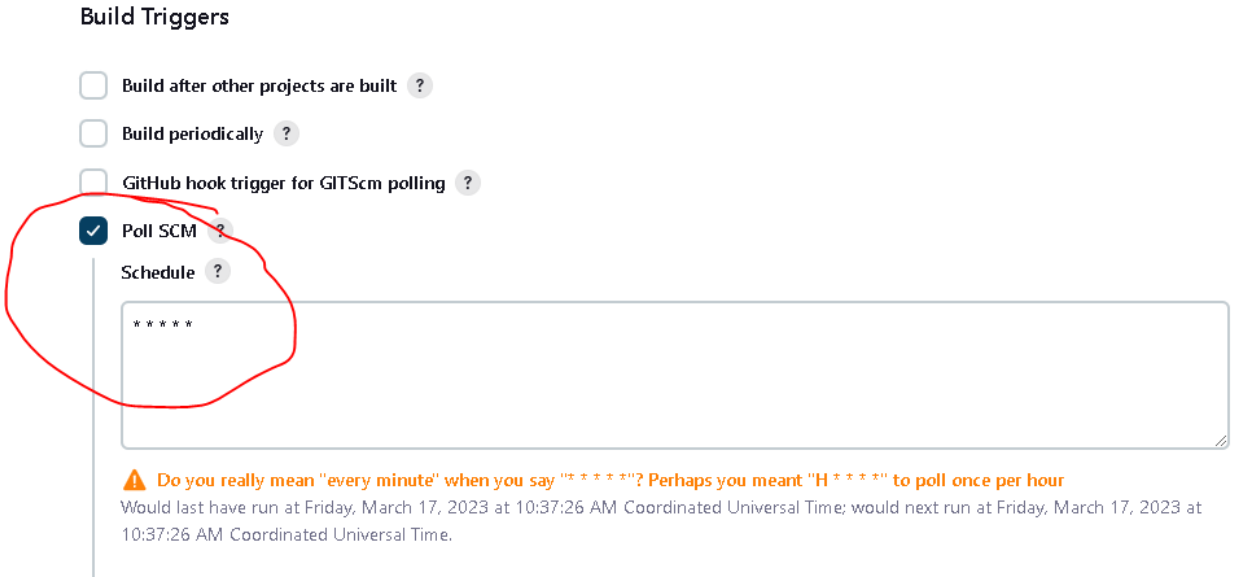
Click **Ok**



Github Project : https://github.com/Hussain147/k8s-deploy-pipeline.git

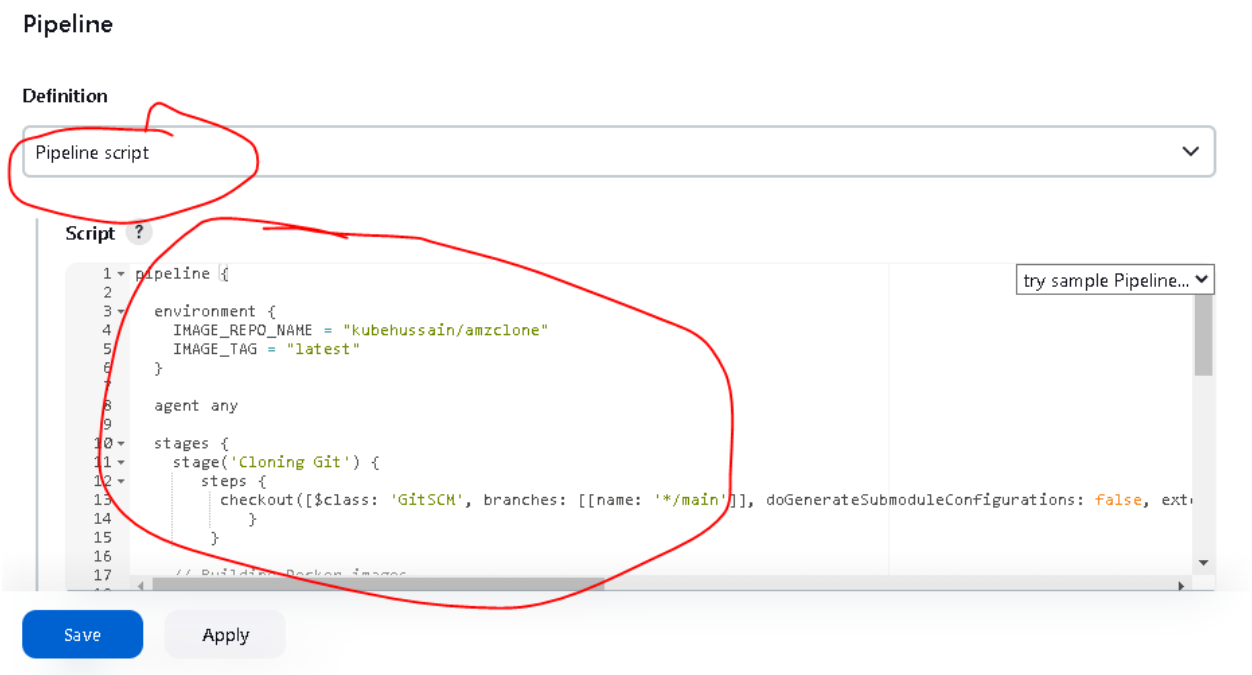


Poll SCM : * * * * *



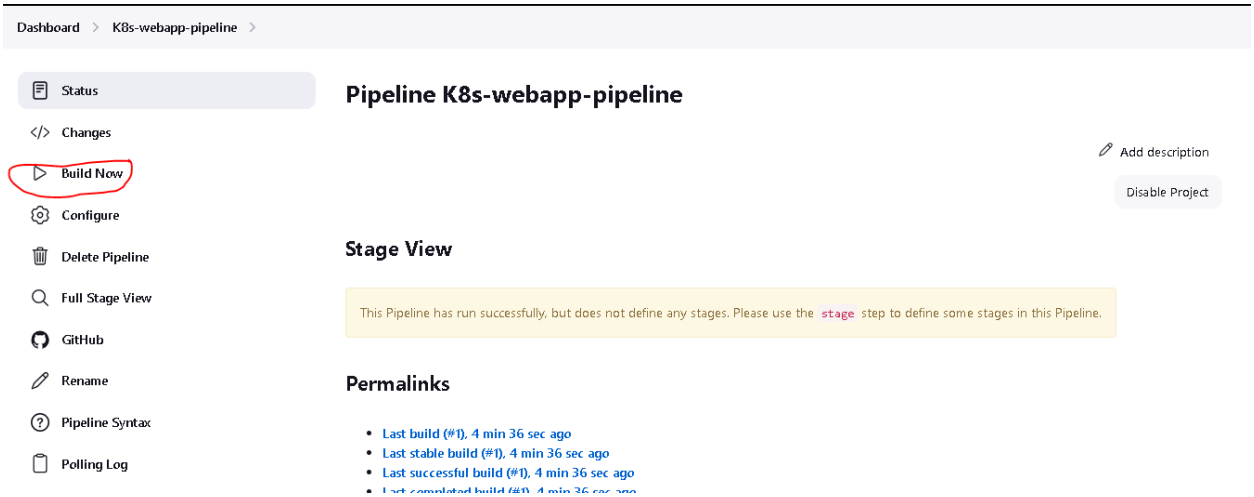
In Pipeline, Copy the script from the below link & paste(also read the Script for better understanding)

https://github.com/Hussain147/k8s-deploy-pipeline/blob/main/Jenkinsfile

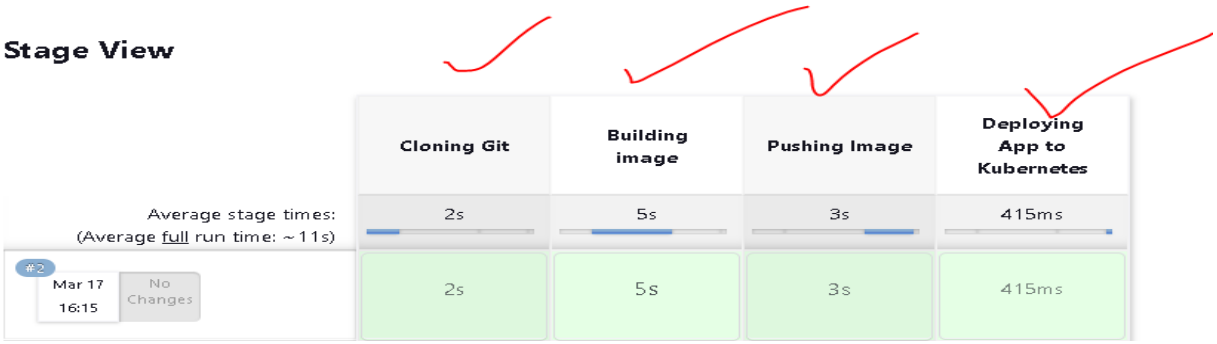


Click **Save**

Now, In Dashboard **>** K8s-webapp-pipeline **>** Click **Build Now**



See, Our all stages got succeed.



Our Amazon webapp clone has been successfully deployed on Kubernetes worker Node with replicas.

Now, Check in the master node,

Kubectl get deployment

```
ubuntu@ip-172-31-90-196:~$ kubectl get deployment
NAME                    READY   UP-TO-DATE   AVAILABLE   AGE
amazonclone-deployment   2/2     2            2           3h33m
```

kubectl get pods

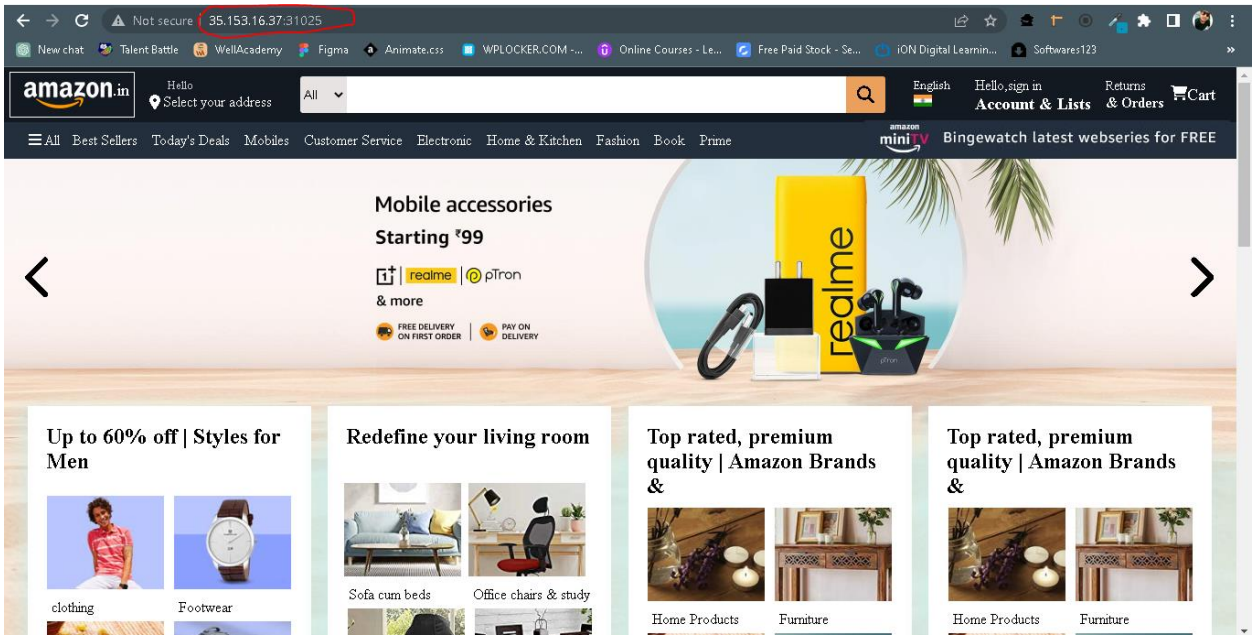
```
ubuntu@ip-172-31-90-196:~$ kubectl get pods
NAME                                     READY   STATUS    RESTARTS   AGE
amazonclone-deployment-79ccfb9f59-qpm5l   1/1     Running   0          3h34m
amazonclone-deployment-79ccfb9f59-wznkj   1/1     Running   0          3h34m
```

kubectl get svc

```
ubuntu@ip-172-31-90-196:~$ kubectl get svc
NAME             TYPE           CLUSTER-IP       EXTERNAL-IP   PORT(S)        AGE
kubernetes       ClusterIP      10.96.0.1        <none>        443/TCP        4h23m
webapp-service   LoadBalancer   10.101.184.244   <pending>     80:31025/TCP   3h34m
```

See, our port 80 which is mapping to port 31025.

Now, Copy the worker node public ip with the port 31025



Congratulations…

You have deployed a Amazon Clone without backend on Kubernetes Cluster…

Now, If you do any changes to the github repo & push to central then CICD process will begin automatically.