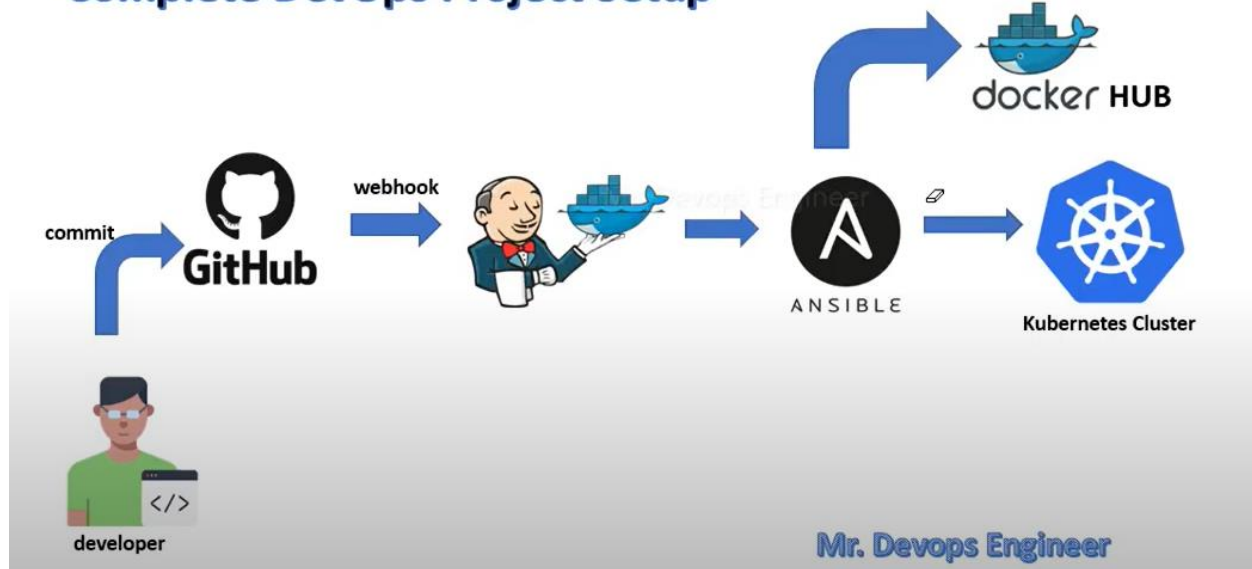


Complete DevOps Project Setup



We will have deployment on Kubernetes cluster using Jenkins CI/CD pipeline .

CODE pushed to GITHUB -> NEW COMMITS WILL BE NOTIFIED TO JENKINS USING WEBHOOK -> JENKINS WILL SSH CODE TO ANSIBLE AND KUBERNETES SERVER -> ANSIBLE WILL READ DOCKERFILE FROM CODE , BUILD THE IMAGE , TAG IT , PUSH to docker hub -> ansible will run playbook to fetch latest image that will run Kubernetes service and deployment .

From image container will be built and application accessible will be done on Kubernetes using service.yml .

PRE – REQs :

GITHUB , LINUX , JENKINS , DOCKER , DOCKERHUB , ANSIBLE , KUBERNETES .

3 ec2 instances :

1. Jenkins (default-jre+ jenkins)
2. Ansible (python+ansible+docker)
3. Webapp(kubernetes cluster) -->(docker+minikube)

Dockerfile, Git Commit and Trigger Jenkins Job using Webhook -03



Jenkins will be notified of new commit by web hooks and it will trigger job automatically .

Create pipeline . – we will write descriptive pipeline .

New item > pipeline

» Required field

Freestyle project
This is the central feature of Jenkins. Jenkins will build your project, combining any SCM with any build system, and this can be even used for something other than software build.

Pipeline
Orchestrates long-running activities that can span multiple build agents. Suitable for building pipelines (formerly known as workflows) and/or organizing complex activities that do not easily fit in free-style job type.

STAGE 1 IN PIPELINE :

Write pipeline script or we can use pipeline syntax also .

Sample Step

git: Git

git ?

Repository URL ?

First let's do git checkout of code using pipeline :

Pipeline script

Script ?

```
1 node{
2   stage('GIT_CHECKOUT'){
3     git 'https://github.com/sapnarsy2612/KUBERNETES_DEPLOYMENT_USING_JENKINS.git'
4   }
5 }
```



Once done .


To initiate webhook enable below property in pipeline .

☒ GitHub hook trigger for GITScm polling ?

Create Jenkins API token to add in webhook :

Current token(s) ?

11e4ac4c53bebb287359df693a6b93027c  

 Copy this token now, because it cannot be recovered in the future.

Add new Token

Also add webhook in github .

General

Access

Collaborators

Moderation options

Code and automation

Branches

Tags

Actions

Webhooks

Environments

Webhooks / Manage webhook

SettingsRecent Deliveries

We'll send a POST request to the URL below with details of any subscribed events format you'd like to receive (JSON, x-www-form-urlencoded, etc). More information [documentation](#).

Payload URL *

http://13.126.47.4:8080/github-webhook/

Content type

application/x-www-form-urlencoded

Add Jenkins API as secret in webhook , note the URL – <http://Jenkins-url/github-webhook>

STAGE 2 IN PIPELINE:

Now, Sending Docker file to ansible using ssh agent and build docker images.
Add 1 more stage in pipeline:

Check pipeline syntax:

Sample Step

sshagent: SSH Agent

sshagent ?

appadmin (ansible-server-new)

?

+ Add

☐ Ignore missing credentials ?

Generate Pipeline Script

```
sshagent(['ansible-server-new']) {  
    // some block  
}
```



Add ansible server creds in Jenkins – add private key of rsa of .pem file .

Dashboard > Manage Jenkins > Credentials > System > Global credentials (unrestricted) >

Global credentials (unrestricted)

+ Add Credentials

Credentials that should be available irrespective of domain specification to requirements matching.

ID	Name	Kind	Description
 ansible-server	ubuntu (ansible-server)	SSH Username with private key	ansible-server 

In this stage we will scp all files from Jenkins workspace to ansible server using pipeline .

Pipeline script

Script ?

```
1 node{
2   stage('GIT_CHECKOUT'){
3     git 'https://github.com/sapnarsy2612/KUBERNETES_DEPLOYMENT_USING_JENKINS.git'
4   }
5   stage('SENDING_DOCKERFILE_TO_ANSIBLE_SERVER'){
6     sshagent(['ansible-server']) {
7       sh 'ssh -T -o StrictHostKeyChecking=no ubuntu@13.233.96.242 pwd'
8       sh 'scp /var/lib/jenkins/workspace/KUBERNETES_DEPLOYMENT_PIPELINE/* ubuntu@13.233.96.242:/home/ubuntu'
9     }
10  }
11 }
```

Now scp is done to ansible server .

Ssh -o stricthostkeychecking :

command is used to set the level of strictness for checking the host key of a remote server when connecting through SSH. By default, SSH will prompt the user to confirm the host key fingerprint when connecting to a new server for the first time. This prompt is designed to protect against man-in-the-middle attacks, which can occur when an attacker intercepts the SSH connection and poses as the remote server. When you use the "ssh -

o stricthostkeychecking" command, you can set the level of strictness for checking the host key of the remote server to either "yes", "no", or "ask". "yes" will cause SSH to automatically reject the connection if the host key does not match the known key for the remote server. "no" will cause SSH to automatically accept any host key presented by the remote server, without checking it against the known key. "ask" will cause SSH to prompt the user to confirm whether they want to connect to the remote server, based on the host key presented by the server. It's important to note that setting the "stricthostkeychecking" option to "no" can be dangerous, as it removes the protection against man-in-the-

middle attacks. Therefore, it's recommended to use the "ask" or "yes" options, unless you have a specific reason to use "no". has context menu .

STAGE 3 BUILD AND TAG DOCKER IMAGE

Ansible will build and tag images using dockerfile that is transferred from Jenkins .

To maintain version of images , we will use tag docker image based on build number .

Now add 1 more stage in pipeline .

Pipeline script

Script ?

```
1 node{
2   stage('GIT_CHECKOUT'){
3     git 'https://github.com/sapnarsy2612/KUBERNETES_DEPLOYMENT_USING_JENKINS.git'
4   }
5   stage('SENDING_DOCKERFILE_TO_ANSIBLE_SERVER'){
6     sshagent(['ansible-server']) {
7       sh 'ssh -T -o StrictHostKeyChecking=no ubuntu@13.233.96.242 pwd'
8       sh 'scp /var/lib/jenkins/workspace/KUBERNETES_DEPLOYMENT_PIPELINE/* ubuntu@13.233.96.242:/home/ubuntu'
9     }
10  }
11   stage('BUILD_DOCKERIMAGE'){
12     sshagent(['ansible-server']) {
13       sh 'ssh -T -o StrictHostKeyChecking=no ubuntu@13.233.96.242 cd /home/ubuntu'
14       sh 'ssh -T -o StrictHostKeyChecking=no ubuntu@13.233.96.242 docker image build -t $JOB_NAME:v1.$BUILD_ID .'
15     }
16  }
17 }
```

`$JOB_NAME` – it will use job name of this particular pipeline as docker image name.

`$BUILD_ID` – it will use build number of this build as version for tagging docker image .

Once build is successful go to ansible server and check docker image :

docker image ls .

Run docker image command help for more information on a command.

```
ubuntu@ip-172-31-7-122:~$ docker image ls
REPOSITORY                TAG          IMAGE ID      CREATED        SIZE
kubernetes_deployment_pipeline  v1.17       7192a9cf466f  3 days ago    336MB
kubernetes_deployment_pipeline  v1.19       7192a9cf466f  3 days ago    336MB
hello-world                latest      feb5d9fea6a5  18 months ago 13.3kB
centos                      latest      5d0da3dc9764  18 months ago 231MB
```

TAG DOCKER IMAGE :

Push Docker image to Dockerhub : Create account in Dockerhub .

```
ubuntu@ip-172-31-7-122:~$ docker login
```

Login with your Docker ID to push and pull images from Docker Hub. If you don't have one create one.

Username: sravtar

Password:

WARNING! Your password will be stored unencrypted in /home/ubuntu/.docker/config.js

Configure a credential helper to remove this warning. See

<https://docs.docker.com/engine/reference/commandline/login/#credentials-store>

Login Succeeded

```
ubuntu@ip-172-31-7-122:~$
```

Login to Docker hub from ansible server.

First tag the image:

Add stage to tag image in Jenkins pipeline:

```
stage('TAG_IMAGE'){
    sshagent(['ansible-server']){
        sh 'ssh -T -o StrictHostKeyChecking=no ubuntu@43.204.233.113 cd /home/ubuntu'
        sh '''
        JOB_SMALL=$(echo "$JOB_NAME" | tr '[:upper:]' '[:lower:]')
        ssh -T -o StrictHostKeyChecking=no ubuntu@43.204.233.113 docker image tag $JOB_SMALL:v1.$BUILD_ID sravtar/$JOB_SMALL:v1.$BUILD_ID
        ssh -T -o StrictHostKeyChecking=no ubuntu@43.204.233.113 docker image tag $JOB_SMALL:v1.$BUILD_ID sravtar/$JOB_SMALL:latest
        '''
    }
}
```

Tag the image to your profile name, e.g.: sravtar for my account name.

PUSH IMAGE TO DOCKER HUB FROM ANSIBLE SERVER:

Add new stage in pipeline. As our image reside in ansible server first we have to ssh to ansible server from jenkins , after that login to docker hub from ansible . We have to provide password for dockerhub in jenkins script but we can't provide password as it is so we can check syntax for creds in Jenkins .

Overview

This **Snippet Generator** will help you learn the Pipeline Script code which can be used to define various steps. Pick a step you are interested in from the list, configure it, click **Generate Pipeline Script**, and you will see a Pipeline Script statement that would call the step with that configuration. You may copy and paste the whole statement into your script, or pick up just the options you care about. (Most parameters are optional and can be omitted in your script, leaving them at default values.)

Steps

Sample Step

withCredentials: Bind credentials to variables

withCredentials ?

Secret values are masked on a best-effort basis to prevent *accidental* disclosure. Multiline secrets, such as the contents of a SSH private key file, are not masked. See the inline help for details and usage guidelines.

Check syntax to bind password for DOCKERHUB .

Bindings

≡ Secret text ?

Variable ?

DOCKERHUB_PASSWORD

Credentials ?

+ Add

Jenkins

Add ▾

Now add credentials .

Add Credentials

Domain

Global credentials (unrestricted)

Kind

Username with password

Username with password

GitHub App

SSH Username with private key

Secret file

Secret text

Certificate

Add creds as : Secret text .

Secret text

Scope ?

Global (Jenkins, nodes, items, all child items, etc)

Secret

.....

ID ?

DOCKERHUB

Description ?

DOCKERHUB

Add

Cancel

Generate Pipeline Script

```
withCredentials([string(credentialsId: 'DOCKERHUB', variable: 'DOCKERHUB_PASSWORD')]) {  
    // some block  
}
```


Syntax.

```
withCredentials ([string(credentialsId: 'DOCKERHUB', variable: 'DOCKERHUB_PASSWORD')]) {  
    // some block  
}
```

Pipeline script :

```
}  
stage('PUSH_DOCKERIMAGE_TO_DOCKERHUB'){  
    sshagent(['ansible-server']){  
        withCredentials([string(credentialsId: 'DOCKERHUB', variable: 'DOCKERHUB_PASSWORD')]) {  
            sh 'ssh -T -o StrictHostKeyChecking=no ubuntu@43.204.233.113 docker login -u sravtar -p $DOCKERHUB_PASSWORD'  
            sh ''  
            JOB_SMALL=$(echo "$JOB_NAME" | tr '[:upper:]' '[:lower:]')  
            ssh -T -o StrictHostKeyChecking=no ubuntu@43.204.233.113 docker image push sravtar/$JOB_SMALL:v1.$BUILD_ID  
            ssh -T -o StrictHostKeyChecking=no ubuntu@43.204.233.113 docker image push sravtar/$JOB_SMALL:latest  
            ...  
        }  
    }  
}
```



Using above script we can login to docker hub and push docker image .



sravtar [Edit profile](#)
Community User Joined March 9, 2023

[Repositories](#) [Starred](#) [Contributed](#)

Displaying 1 to 1 repositories






sravtar/kubernetes_deployment_pipeline •  0 •  0
By [sravtar](#) • Updated a few seconds ago
[Image](#)


Image pushed to docker hub.

Pipeline KUBERNETES_DEPLOYMENT_PIPELINE

 Add description

[Disable Project](#)

Stage View

	GIT_CHECKOUT	SENDING_DOCKERFILE_TO_ANSIBLE_SERVER	BUILD_DOCKERIMAGE	TAG_IMAGE	PUSH_DOCKERIMAGE_TO_DOCKERHUB
Average stage times: (Average full run time: ~12s)	1s	31s	3s	1s	10s
 Mar 18 13:31 No Changes	840ms	1s	1s	897ms	29s