CS-816 Software Production Engineering

Abhinil Agarwal

IMT2016015

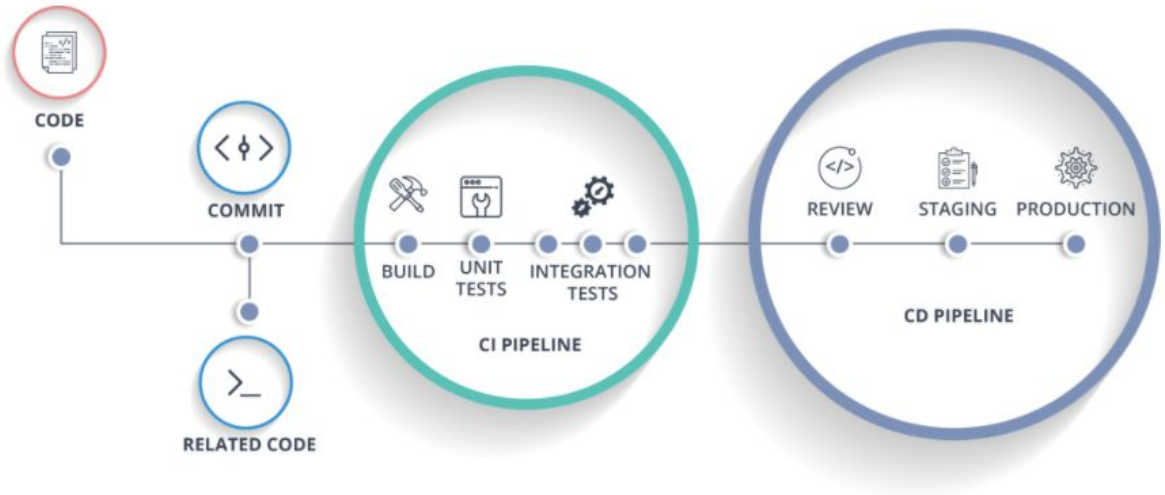
Calculator

Introduction

This is to cover the DevOps automation life cycle at a local level with a calculator program with simple functions like addition, subtraction, multiplication. This was to understand different automation tools in running a smooth automation process. Tools used were git, Jenkins, Docker, maven, rundeck, pytest, ELK.

Software development life cycle

The SDLC is given in the diagram below:



CI- Continuous Integration

CD- Continuous Deployment

Source Code Manager(SCM)

Source Code Management (SCM) is a software tool used by programmers to **manage** the **source codes**. SCMs are used to give versions/revisions to the program. Each version is given a timestamp and includes the person responsible for the change. Even various versions can be compared and merged with other versions.

I have used the GitHub repository to push the code:
Code along with Jenkin file and Docker file can be found on the git clone link given below:
https://github.com/t-phoenix/calculator.git

PIPELINE

Jenkins was used to building the pipeline.

Jenkinsfile was used to run the pipeline.

JenkinsFIle

#environment

```
pipeline {
    environment {
        registry = "abhinil/calculator"
        registryCredential = 'abhinil'
        dockerImage = ''
    }
    agent any
```

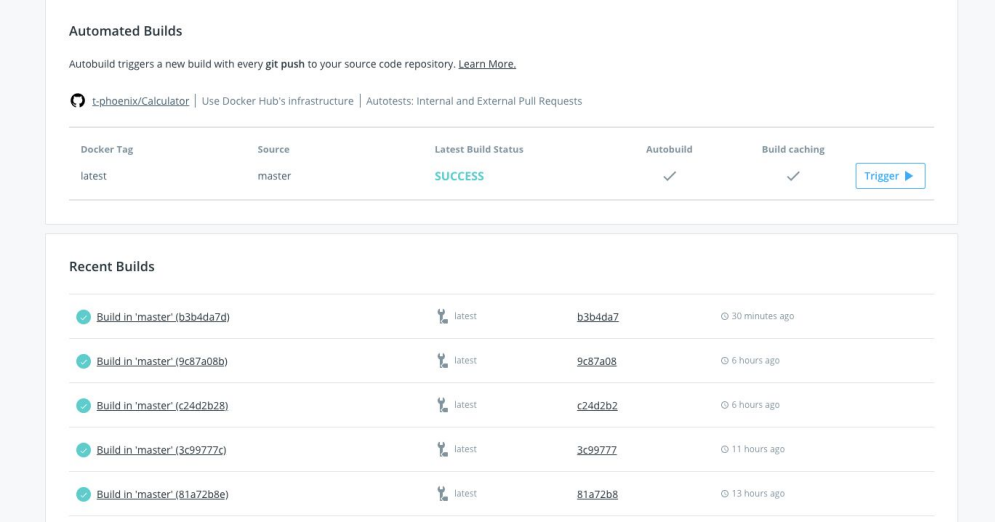
Docker hub repository link along with credentials.

#Stage1 -Build

Docker helps developers to easily pack, ship, and run any application as a lightweight container. So we used the docker hub to create an image of our application using the GitHub repository and linked it to Jenkins using JenkinsFile. This JenkinsFile triggers the First Stage of the pipeline, i.e. to build the container.

```
pipeline {
    environment {
        registry = "abhinil/calculator"
        registryCredential = 'abhinil'
        dockerImage = ''
    }
    agent any
    stages {
        stage('Build') {
            steps{
                script {
                    dockerImage = docker.build registry + ":latest"
                }
            }
        }
        stage('test'){
```

The following image shows the build updates in the DockerHub repository of our application.



#Stage2- Test

Pytest is a testing framework that allows us to write test code using python.

Python pytest module was used to write the test case codes.

Jeninsfile stage2 pf the pipeline tests these pytest test cases.

```
pipeline {
    environment {
        registry = "abhinil/calculator"
        registryCredential = 'abhinil'
        dockerImage = ''
    }
    agent any
    stages {
        stage('Build') {
            steps{
                script {
                    dockerImage = docker.build registry + ":latest"
                }
            }
        }
        stage('test'){
            steps {
                sh 'pip3 install pytest'
                sh 'pytest'
            }
```

#stage3- Archive

Docker Hub is used and connected to preserve the pipeline builds.

Images are stored with their different tags, the status of creation timestamp of creation and other important information.

Deploy

I have integrated rendeck using Jenkins freestyle project.

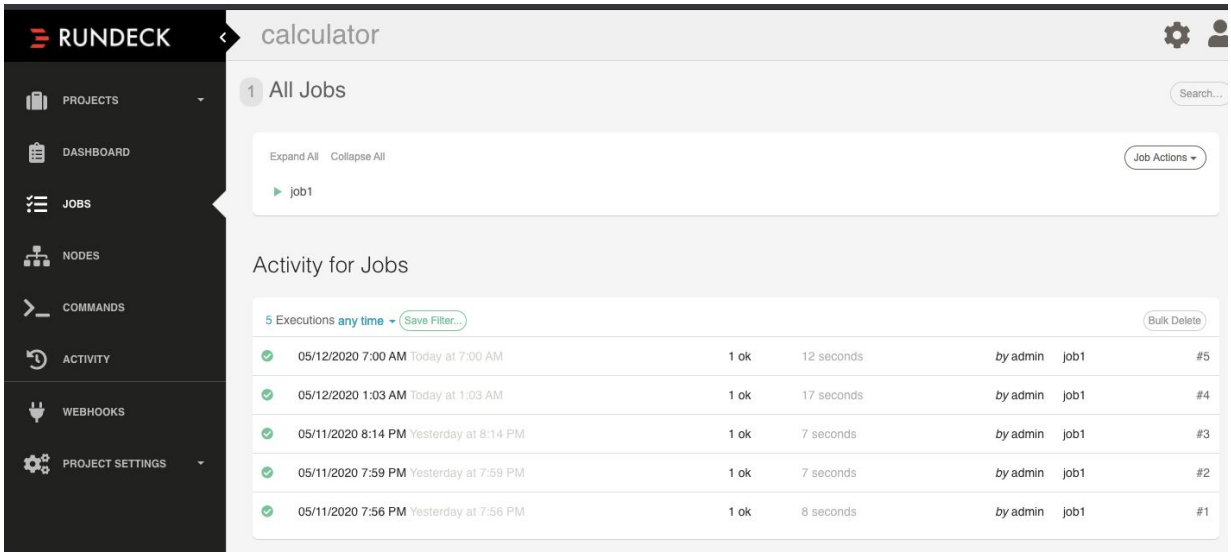
Rundeck runs on port:4440 on the same machine.

Jenkins file was configured to the last stage of deployment using Jenkins plugin.
Calculator2 included a freestyle project of deploying the application using rundeck.

```
        stage('test'){
            steps {
                sh 'pip3 install pytest'
                sh 'pytest'
            }
        }
        stage('Archive'){
            steps{
                script {
                    docker.withRegistry( '', registryCredential ) {
                    dockerImage.push()
                    }
                }
            }
        }
        stage('Deploy') {
            steps {
                build 'calculator2'
            }
        }
    }
}
```


Jenkins
calculator2
#2
Back to Project
Status
Changes
Console Output
View as plain text
Edit Build Information
Delete build '#2'
Rundeck Execution Result
Previous Build
Console Output
Started by user abhinil agarwal
Running as SYSTEM
Building in workspace /Users/abhinilagarwal/.jenkins/workspace/calculator2
Instance 'RundeckProd' with rundeck user 'admin': Notifying Rundeck...
Looking for jobId : 3b613033-0a10-467a-9f4f-aa388b7544d3
Notification succeeded ! Execution #5, at http://Abhinils-MacBook-Air.local:4440/api/35/execution/5 (status : RUNNING)
Finished: SUCCESS

Rundeck :


RUNDECK
calculator
PROJECTS
DASHBOARD
JOBS
NODES
COMMANDS
ACTIVITY
WEBHOOKS
PROJECT SETTINGS
1 All Jobs
Search...
Expand All
Collapse All
Job Actions
job1
Activity for Jobs
5 Executions any time
Save Filter...
Bulk Delete
05/12/2020 7:00 AM Today at 7:00 AM 1 ok 12 seconds by admin job1 #5
05/12/2020 1:03 AM Today at 1:03 AM 1 ok 17 seconds by admin job1 #4
05/11/2020 8:14 PM Yesterday at 8:14 PM 1 ok 7 seconds by admin job1 #3
05/11/2020 7:59 PM Yesterday at 7:59 PM 1 ok 7 seconds by admin job1 #2
05/11/2020 7:56 PM Yesterday at 7:56 PM 1 ok 8 seconds by admin job1 #1

Result folder in the above GitHub link include screenshots of the tools used along with their BUILD SUCCESS messages in the console.