

### Description

## Demonstrate the continuous integration and delivery by building a Docker Jenkins Pipeline.

### Problem Statement Scenario:

You are a DevOps consultant in AchiStar Technologies. The company decided to implement DevOps to develop and deliver their products. Since it is an Agile organization, it follows Scrum methodology to develop the projects incrementally. You are working with multiple DevOps Engineers to build a Docker Jenkins Pipeline. During the sprint planning, you agreed to take the lead on this project and plan on the requirements, system configurations, and track the efficiency. The tasks you are responsible for:

### Solution

As part of the Course End Project -2

- 1) We have a Code repository with its commit.

Using the code located in - <https://github.com/Sonal0409/DevOpsCodeDemo.git>

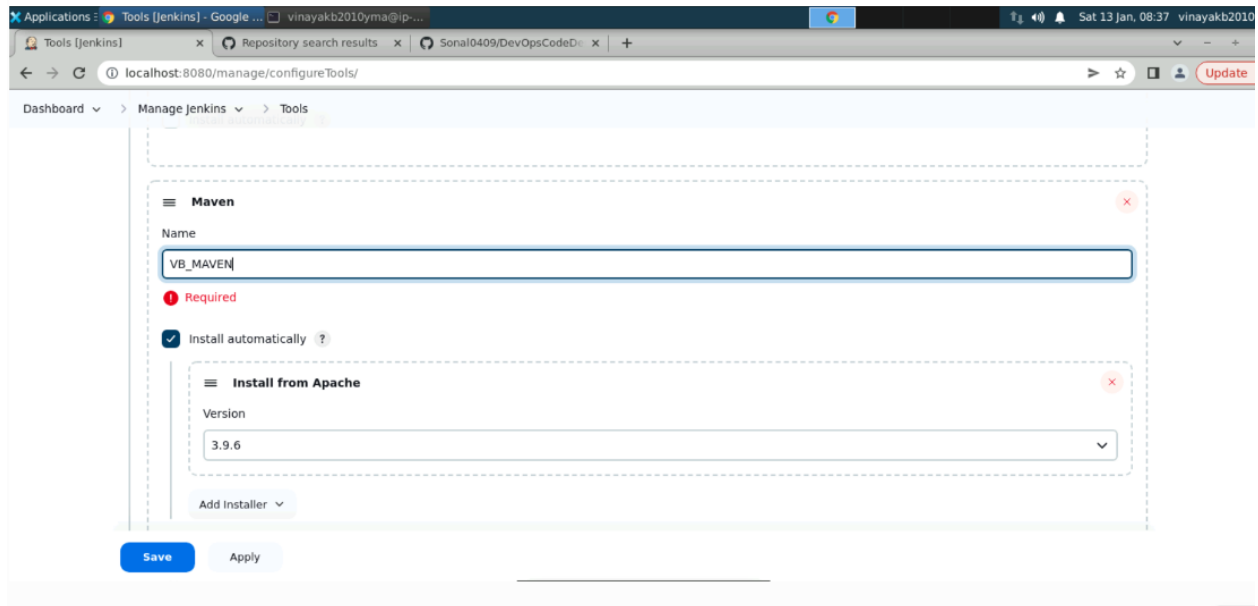
- 2) CI Tool used is Maven server
  - a. We use Jenkins pipeline to get the code



- b. Get the code Code → github → maven(maven Command to compile, test, and package the code) Artifacts/build
- c. Once the Build is available, we will have to deploy the code on a container

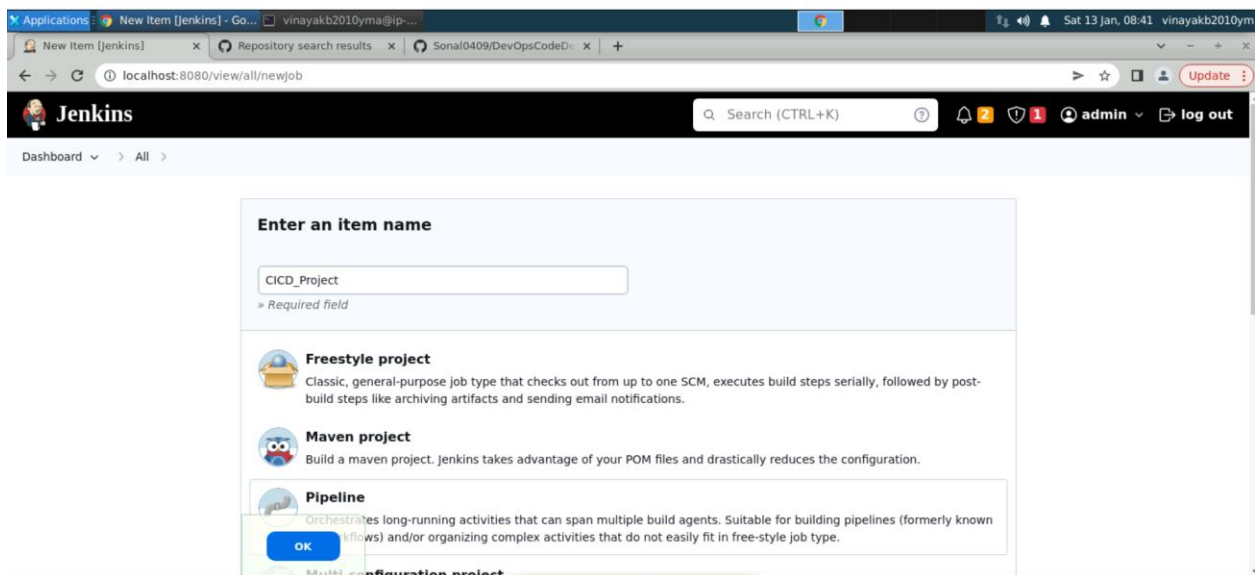
## Continuous Integration

- 1) Launch Jenkins and Setup Maven tool configuration as we must perform the CI.

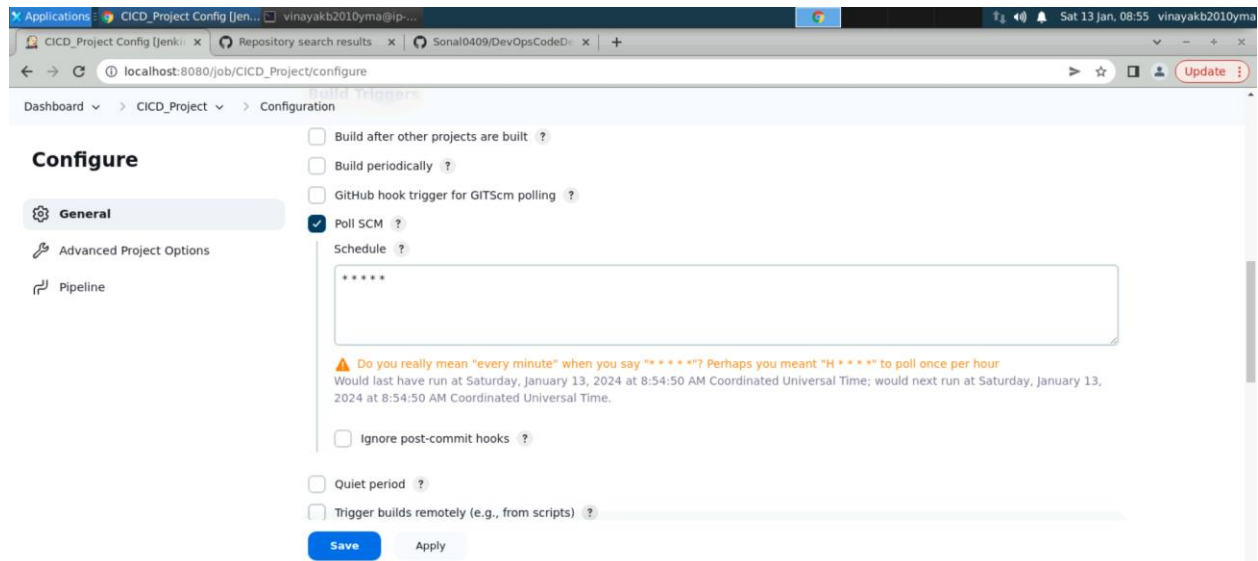
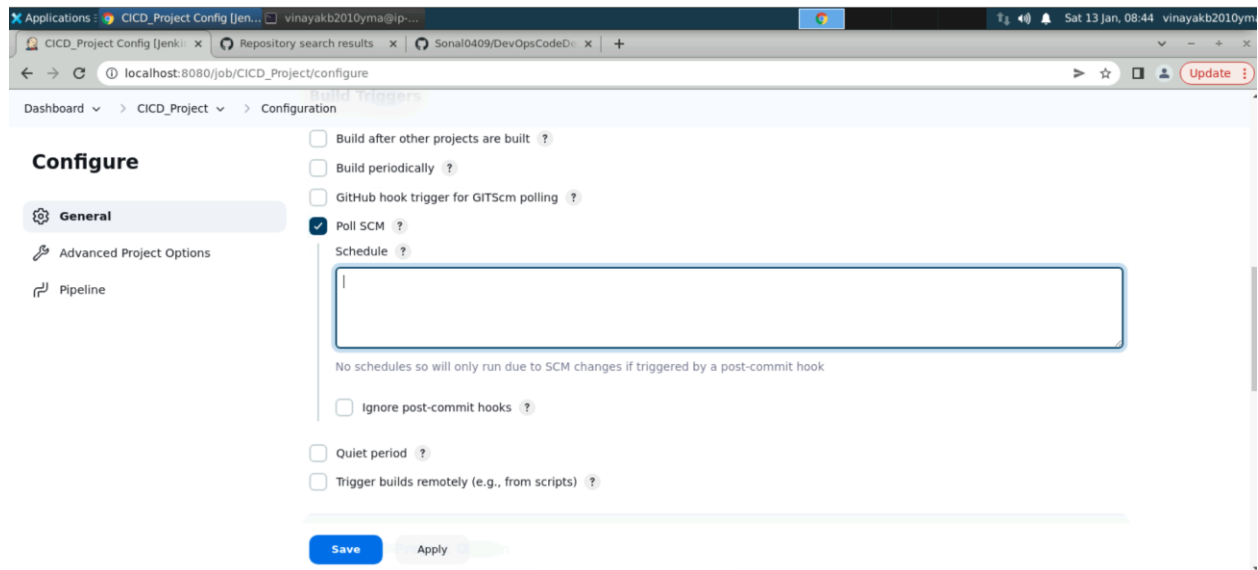


## 2) Create the Jenkins Pipeline

- a. Create a Pipeline a job in which we write code to clone the repository and package the code.



- The below Trigger was chosen because every time there is a new commit, we should be able to deploy the new code.
- Jenkins will be running this job if there is a new code in the Git.
- Jenkins Pulls the Git every minute.
- 
- 



**In the pipeline enter the script**

```
pipeline{
  tools{ maven 'VB_MAVEN' }

  agent any

  stages{
    stage('Clone the repo')
      {
        steps{ git 'https://github.com/Sonal0409/DevOpsCodeDemo.git' }
      }

    stage('build the code'){
      steps{
        sh 'mvn package'
      }
    }
  }
}
```

**Save the above pipeline and build it, we will find the package in the Jenkins workspace Target Folder**

Dashboard > CICD\_P10 > Stage View

Delete Pipeline  
Full Stage View  
Favorite  
Open Blue Ocean  
Rename  
Pipeline Syntax  
Git Polling Log

Build History trend  
Filter...  
#1  
Jan 13, 2024, 10:55 AM

Average stage times:  
(Average full run time: ~15s)

	Declarative: Tool Install	Clone the repo	build the code
Average stage times: (Average full run time: ~15s)	925ms	1s	10s
Jan 13 10:55 No Changes	925ms	1s	10s

Permalinks

- Last build (#1), 1 hr 46 min ago
- Last stable build (#1), 1 hr 46 min ago
- Last successful build (#1), 1 hr 46 min ago
- Last completed build (#1), 1 hr 46 min ago

dockerfile Show all

Applications: CICD\_P10 #1 Console [Jenkins]

Dashboard > CICD\_P10 > #1

Status  
Changes  
Console Output  
View as plain text  
Edit Build Information  
Delete build '#1'  
Git Build Data  
Open Blue Ocean  
Restart from Stage  
Replay

Console Output

Skipping 114 KB.. Full Log

Downloading from central: <https://repo.maven.apache.org/maven2/org/apache/maven/maven-plugin-api/2.0.9/maven-plugin-api-2.0.9.jar>  
 Downloading from central: <https://repo.maven.apache.org/maven2/org/apache/maven/maven-project/2.0.9/maven-project-2.0.9.jar>  
 Downloading from central: <https://repo.maven.apache.org/maven2/org/apache/maven/maven-profile/2.0.9/maven-profile-2.0.9.jar>  
 Downloading from central: <https://repo.maven.apache.org/maven2/org/apache/maven/maven-settings/2.0.9/maven-settings-2.0.9.jar>  
 Progress (1): 13 kB

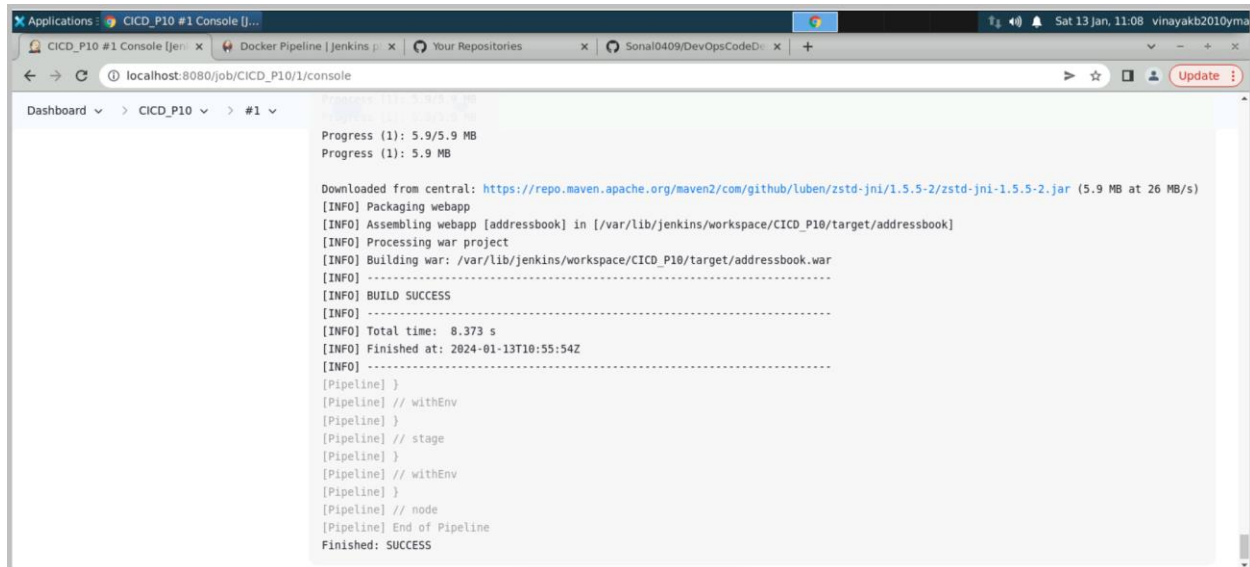
Downloaded from central: <https://repo.maven.apache.org/maven2/org/apache/maven/maven-plugin-api/2.0.9/maven-plugin-api-2.0.9.jar> (13 kB at 3.2 MB/s)  
 Progress (1): 16/122 kB

Downloading from central: <https://repo.maven.apache.org/maven2/org/apache/maven/maven-artifact-manager/2.0.9/maven-artifact-manager-2.0.9.jar>  
 Progress (1): 33/122 kB  
 Progress (1): 49/122 kB

Downloaded from central: <https://repo.maven.apache.org/maven2/org/apache/maven/maven-model/2.0.9/maven-model-2.0.9.jar> (122 kB at 3.2 MB/s)

We need to copy the path where the Application Package is present

Building war: /var/lib/jenkins/workspace/CICD\_P10/target/addressbook.war



Step 3 )

## Continuous Delivery

- 1) Use the linux command to copy the **addressbook.war** into the same directory that of Docker file
- 2) We need to take the above file and build the DockerFile that creates a custom image.
  - a. Below is the Docker File

DockerFile

**FROM** tomcat:9

**ADD** addressbook.war/usr/share/tomcat/webapps.

**EXPOSE** 8080

**CMD** ["cataline.sh", "run"] //Cataline.sh is a home directory where a script is available in tomcat.

\*\*\*\*

*Build file must be placed where the Docker file is placed.*

*By Default Jenkins user can't run Docker Commands.*

*Permission needs to be given to the user to run the Docker Commands*

*Execute the below command to allow the user to provide the commands*

*Chmod 777 /var/run/docker.sock*

.....  
*pipeline{*

*tools{ maven 'VB\_MAVEN' }*

*agent any*

*stages{*

*stage('Clone the repo')*

*{*

*steps{ git 'https://github.com/Sonal0409/DevOpsCodeDemo.git' }*

*}*

*stage('build the code'){*

*steps{*

*sh 'mvn package'*

*}*

*}*

*stage ('Copy the Build to workspace directory') {*

*steps {*

*//Copy the file from target folder to workspace folder where Docker File exists*

*// In the below command end, "." means in the current directory*

*sh 'cp /var/lib/jenkins/workspace/CICD\_P10/target/addressbook.war .'*

*}*

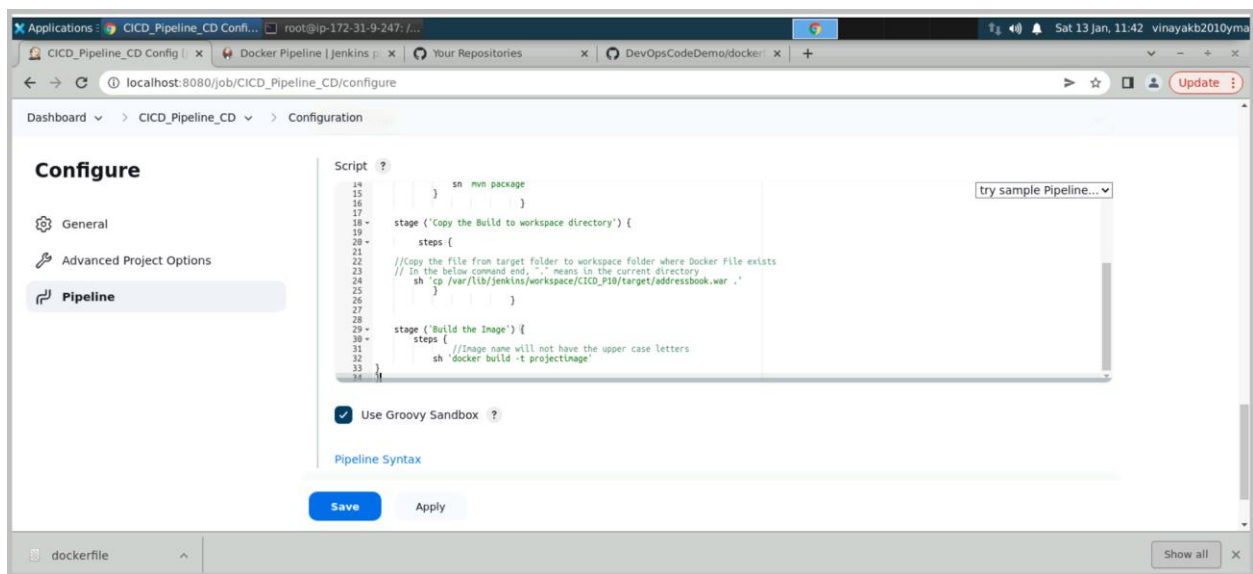
*}*

```

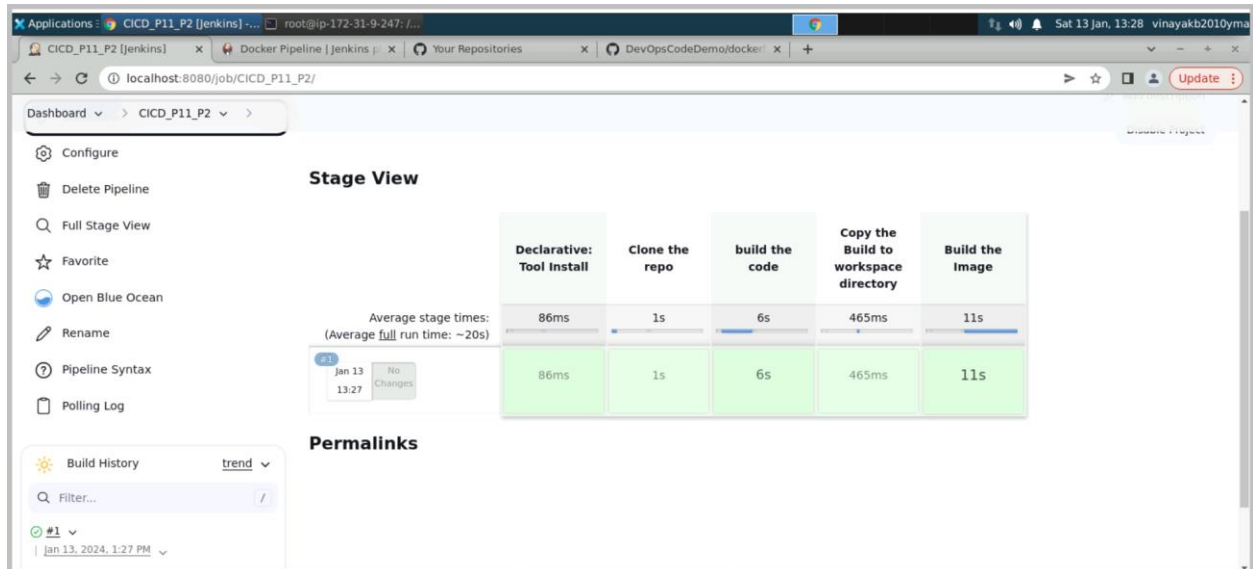
stage ('Build the Image') {
    steps {
        //Image name will not have the upper case letters
        sh 'docker build -t projectimage'
    }
}
}

*****

```



Let's Build this





Applications: CICD\_P11\_P2 #1 Consol... root@ip-172-31-9-247: /...

CICD\_P11\_P2 #1 Console | Docker Pipeline | Jenkins | Your Repositories | DevOpsCodeDemo/docker: | +

localhost:8080/job/CICD\_P11\_P2/1/console

# Jenkins

Search (CTRL+K) admin log out

Dashboard > CICD\_P11\_P2 > #1

## Console Output

Status

Changes

Console Output

View as plain text

Edit Build Information

Delete build '#1'

Git Build Data

Open Blue Ocean

Restart from Stage

Replay

Started by user admin

```
[Pipeline] Start of Pipeline
[Pipeline] node
Running on Jenkins in /var/lib/jenkins/workspace/CICD_P11_P2
[Pipeline] {
[Pipeline] stage
[Pipeline] { Declarative: Tool Install
[Pipeline] tool
[Pipeline] envVarsForTool
[Pipeline] }
[Pipeline] // stage
[Pipeline] withEnv
[Pipeline] {
[Pipeline] stage
[Pipeline] { Clone the repo
[Pipeline] tool
[Pipeline] envVarsForTool
[Pipeline] withEnv
```

Applications: CICD\_P11\_P2 #1 Consol... root@ip-172-31-9-247: /...

CICD\_P11\_P2 #1 Console | Docker Pipeline | Jenkins | Your Repositories | DevOpsCodeDemo/docker: | +

localhost:8080/job/CICD\_P11\_P2/1/console

Dashboard > CICD\_P11\_P2 > #1

```
Successfully built c7cfedac1155
Successfully tagged projectimage:latest
[Pipeline] }
[Pipeline] // withEnv
[Pipeline] }
[Pipeline] // stage
[Pipeline] }
[Pipeline] // withEnv
[Pipeline] }
[Pipeline] // node
[Pipeline] End of Pipeline
Finished: SUCCESS
```

Digest: sha256:c71cbf54fa9f449bf89c8d6e861e8890dcd2083c6aba68e055ef536c591863

Status: Downloaded newer image for tomcat:9

---> 74c8f5a47223

Step 2/4 : ADD addressbook.war /usr/local/tomcat/webapps

---> 5a733f687f29

Step 3/4 : CMD ["catalina.sh", "run"]

---> Running in af5705ebd6b6

Removing intermediate container af5705ebd6b6

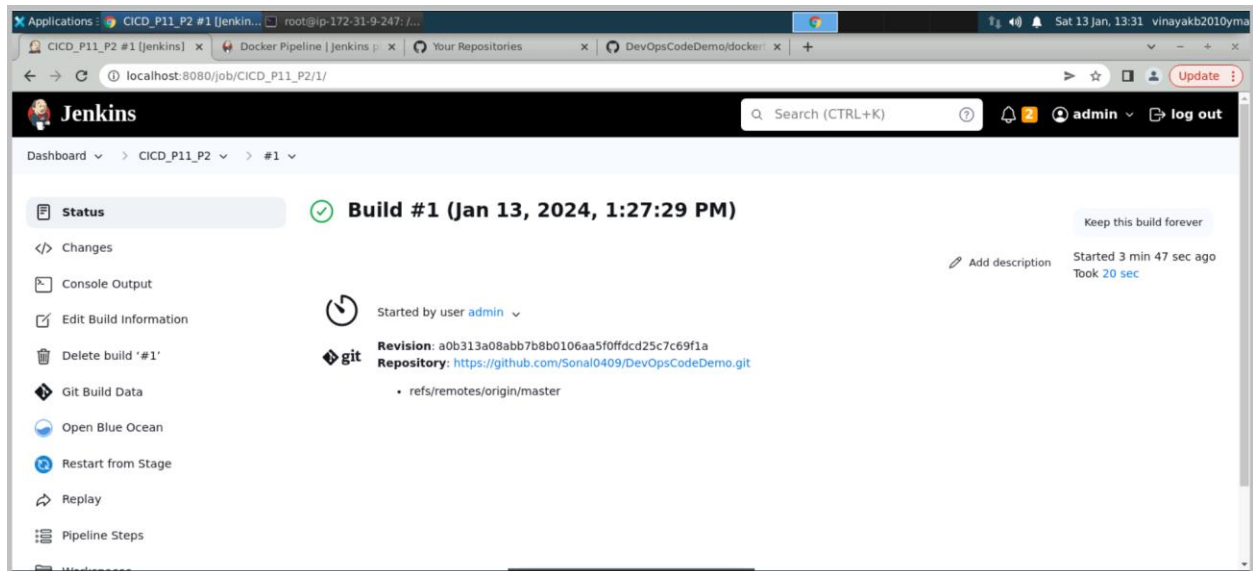
---> 34129c74dd6c

Step 4/4 : EXPOSE 8080

---> Running in 73cfc357957f

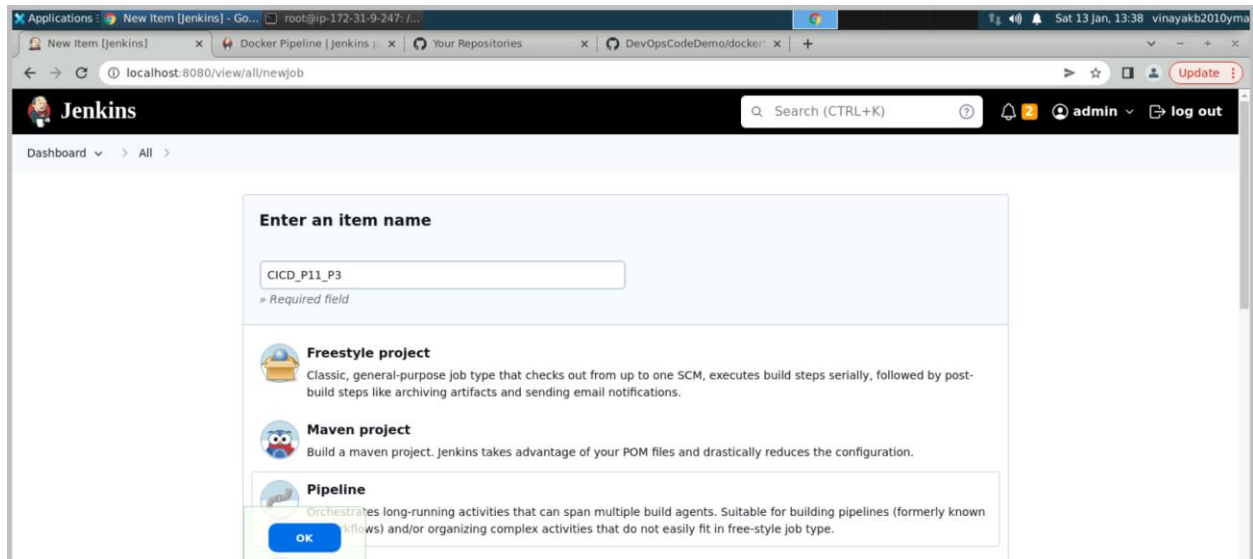
Removing intermediate container 73cfc357957f

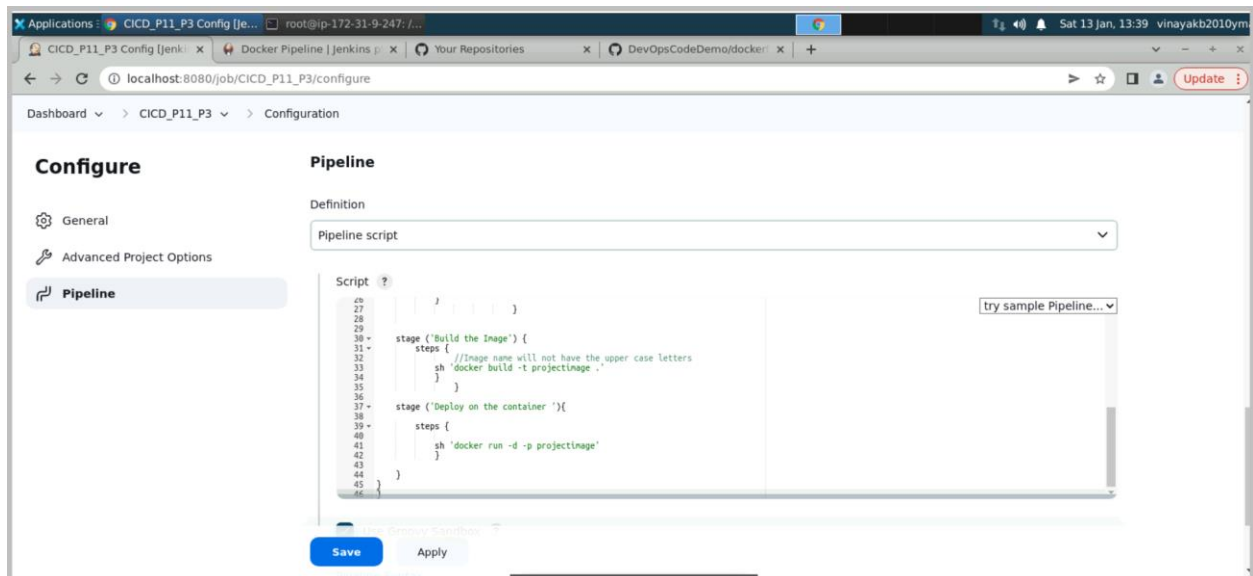
---> c7cfedac1155



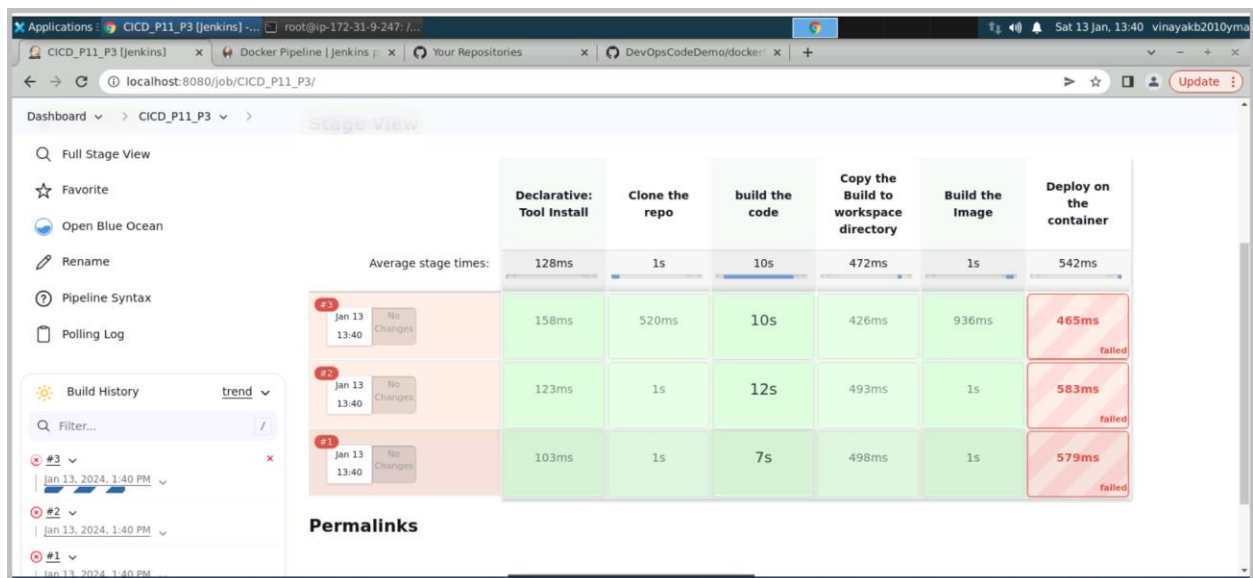
Now add the stage to run the image and deploy the application.

```
stage ('Deploy on the container'){
    steps {
        sh 'docker run -d -p projectimage'
    }
}
```



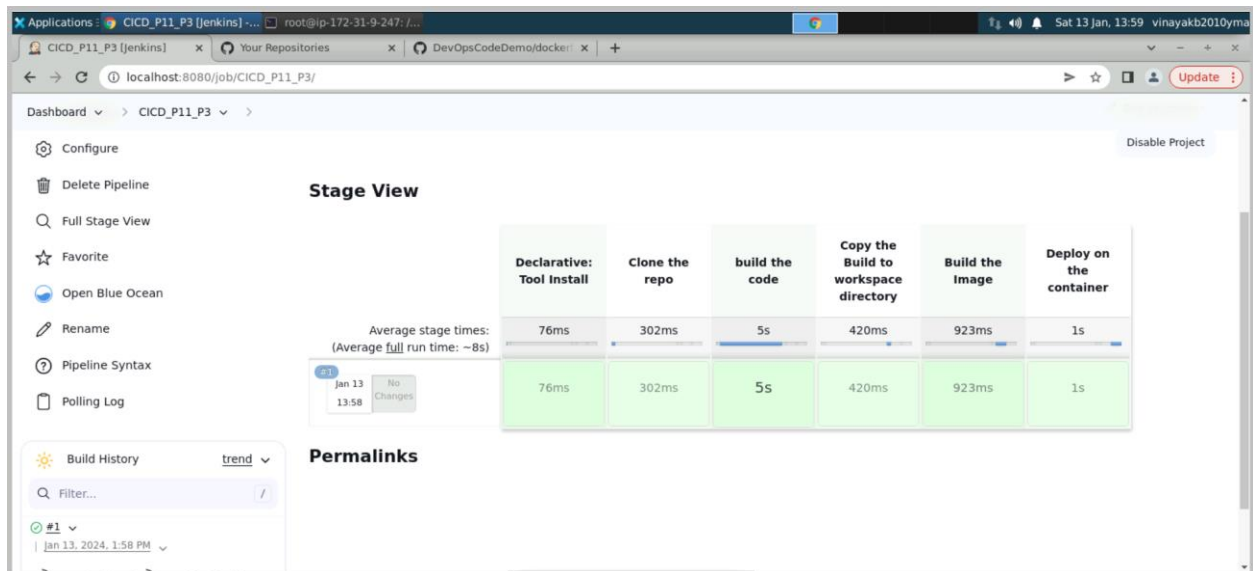


## Initial Error



Later fixing the error in the command

steps { sh 'docker run -d -P projectimage' }



Confirming the same from OS level

Command to confirm the same >> from the command line **docker ps --latest**

```
root@ip-172-31-9-247:/var/run# docker ps --latest
CONTAINER ID   IMAGE          COMMAND                  CREATED        STATUS        PORTS                               NAMES
629a0cd535b9   projectimage   "catalina.sh run"       2 minutes ago Up 2 minutes   0.0.0.0:49154->8080/tcp, :::49154->8080/tcp   condescending_bhabha
root@ip-172-31-9-247:/var/run# date
Sat Jan 13 14:02:06 UTC 2024
root@ip-172-31-9-247:/var/run# logout
vinayakb2010yma@ip-172-31-9-247:~$ whoami
vinayakb2010yma
vinayakb2010yma@ip-172-31-9-247:~$
```

The Post mentioned in the above screen is 49154 – Using the same port we are launching the O/P

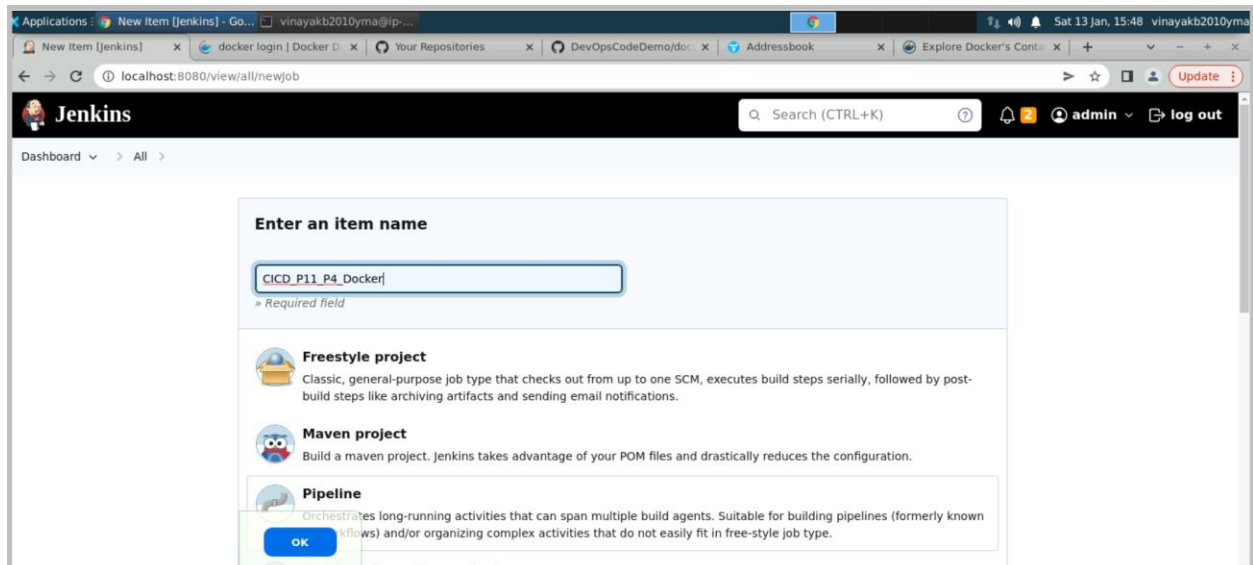
First Name	Last Name	Email
George	White	george@white.com
Daniel	Thompson	daniel@thompson.com
Timothy	Jones	timothy@jones.com
Peter	Wilson	peter@wilson.com
Dan	Robinson	dan@robinson.com
Dan	Davis	dan@davis.com
Olivia	Davis	olivia@davis.com
Dan	Smith	dan@smith.com
Daniel	Anderson	daniel@anderson.com
Alice	Thomas	alice@thomas.com
Linda	Harris	linda@harris.com
Daniel	Robinson	daniel@robinson.com
Mike	Young	mike@young.com
Umberto	Anderson	umberto@anderson.com

Create Image in docker.

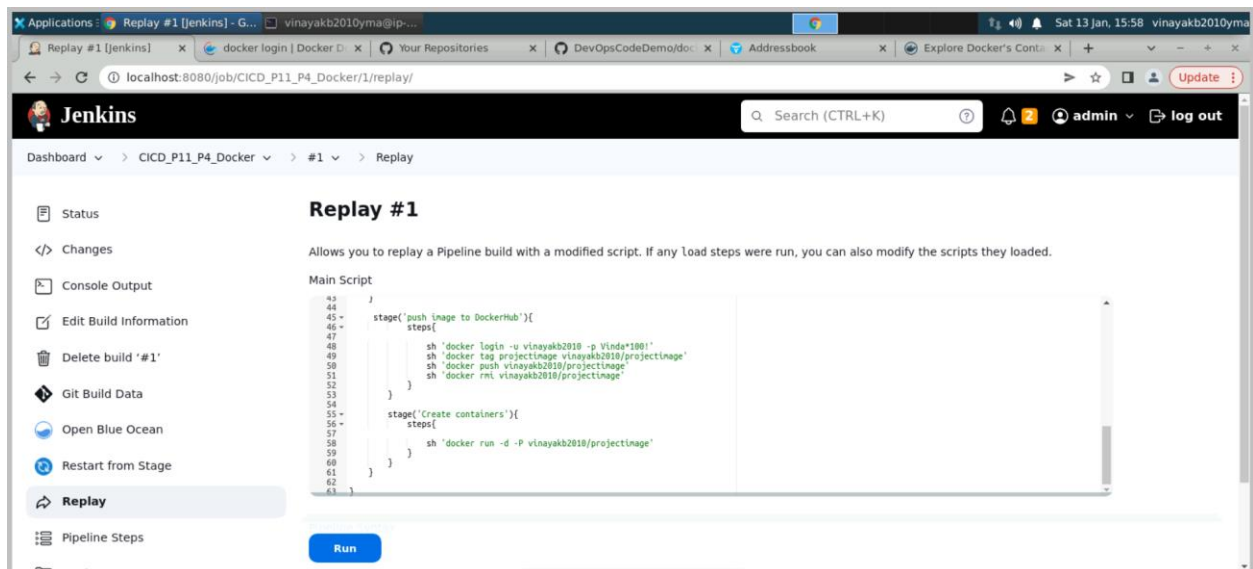
```
    stage('push image to DockerHub'){
    steps{

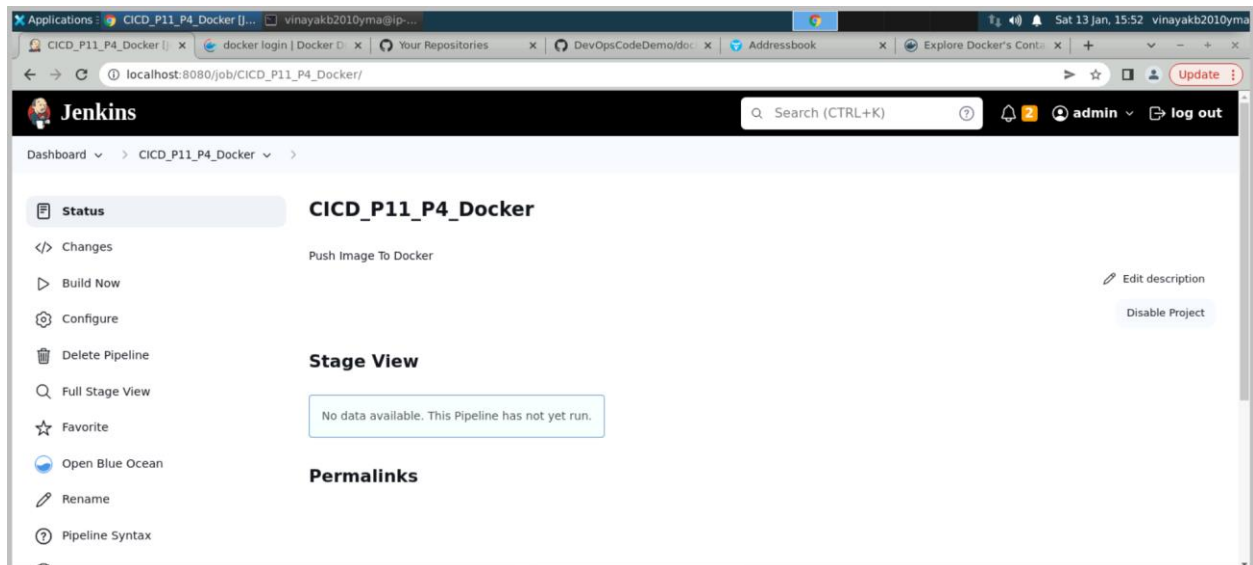
        sh 'docker login -u vinayakb2010 -p Vinda*100!'
        sh 'docker tag projectimage vinayakb2010/projectimage'
        sh 'docker push vinayakb2010/projectimage'
        sh 'docker rmi vinayakb2010/projectimage'
    }
}

stage('Create containers'){
    steps{
        sh 'docker run -d -P vinayakb2010/myaddressbook'
    }
}
}
```

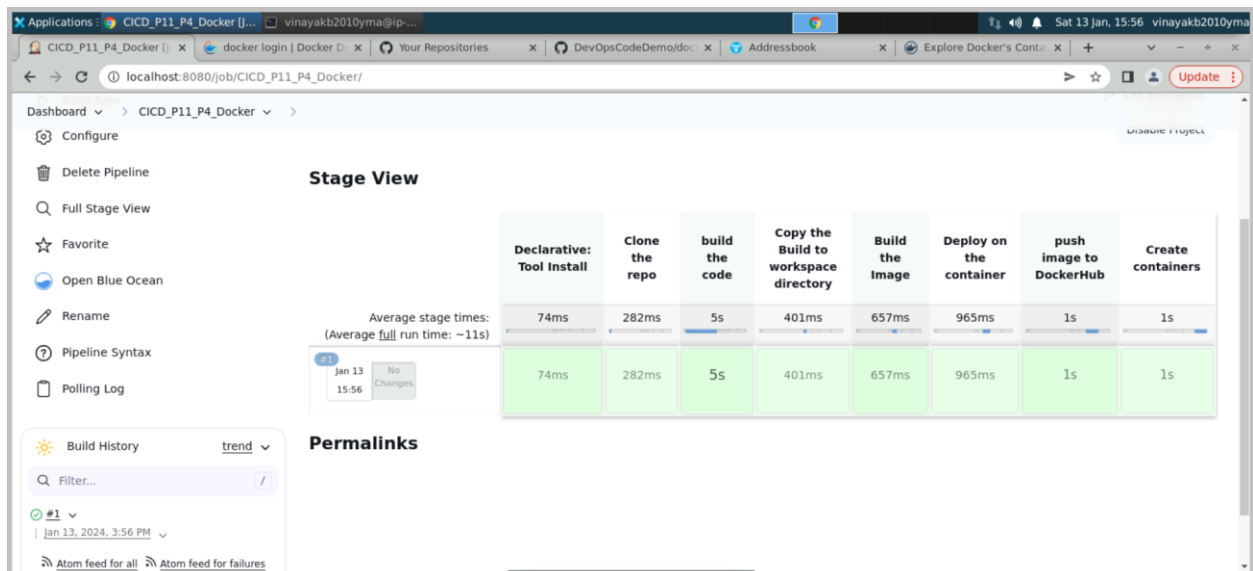


## Creating a Pipeline to push the image





Building it now



Applications: CICD\_P11\_P4\_Docker #... vinayakb2010yma@ip...

CICD\_P11\_P4\_Docker # x docker login | Docker D... x Your Repositories x DevOpsCodeDemo/doc... x Addressbook x Explore Docker's Cont... x +

localhost:8080/job/CICD\_P11\_P4\_Docker/1/console

# Jenkins

Search (CTRL+K) admin log out

Dashboard > CICD\_P11\_P4\_Docker > #1

Status **Console Output**

Changes

Console Output

View as plain text

Edit Build Information

Delete build '#1'

Git Build Data

Open Blue Ocean

Restart from Stage

Replay

Started by user admin

```
[Pipeline] Start of Pipeline
[Pipeline] node
Running on Jenkins in /var/lib/jenkins/workspace/CICD_P11_P4_Docker
[Pipeline] {
[Pipeline] stage
[Pipeline] { (Declarative: Tool Install)
[Pipeline] tool
[Pipeline] envVarsForTool
[Pipeline] }
[Pipeline] // stage
[Pipeline] withEnv
[Pipeline] {
[Pipeline] stage
[Pipeline] { (Clone the repo)
[Pipeline] tool
[Pipeline] envVarsForTool
[Pipeline] withEnv
```

Applications: CICD\_P11\_P4\_Docker #... vinayakb2010yma@ip...

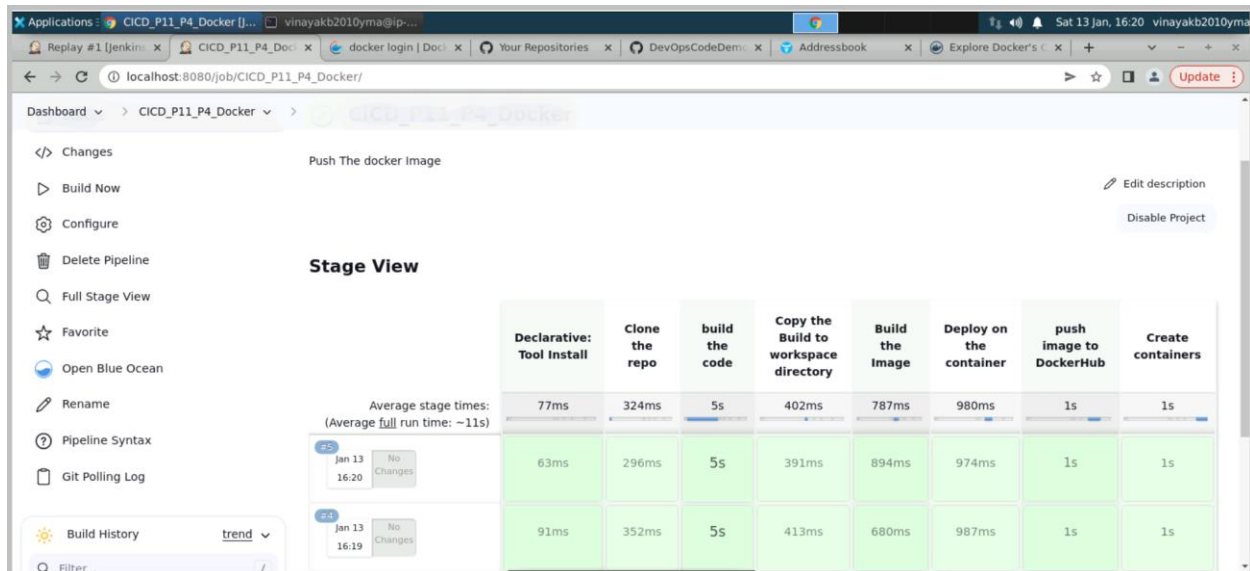
CICD\_P11\_P4\_Docker # x docker login | Docker D... x Your Repositories x DevOpsCodeDemo/doc... x Addressbook x Explore Docker's Cont... x +

localhost:8080/job/CICD\_P11\_P4\_Docker/1/console

Dashboard > CICD\_P11\_P4\_Docker > #1

```
[Pipeline] { (Create containers)
[Pipeline] tool
[Pipeline] envVarsForTool
[Pipeline] withEnv
[Pipeline] {
[Pipeline] sh
+ docker run -d -P vinayakb2010/projectimage
Unable to find image 'vinayakb2010/projectimage:latest' locally
latest: Pulling from vinayakb2010/projectimage
Digest: sha256:f9f4d7f7b0994cc48db41b8e61ade61e66c44f5fa24dc994698d71b0b94102ac
Status: Downloaded newer image for vinayakb2010/projectimage:latest
e267997ea68642c9836315a4ef36faf26b5fc7308c4bd508e8527dc029051ddf
[Pipeline] }
[Pipeline] // withEnv
[Pipeline] }
[Pipeline] // stage
[Pipeline] }
[Pipeline] // withEnv
[Pipeline] }
[Pipeline] // node
[Pipeline] End of Pipeline
Finished: SUCCESS
```





Final Code That was used to build the above Pipelines and Images

pipeline{

tools{ maven 'VB\_MAVEN' }

agent any

stages{

stage('Clone the repo')

{

steps{ git 'https://github.com/Sonal0409/DevOpsCodeDemo.git' }

}

stage('build the code'){

steps{

sh 'mvn package'

}

}

```
stage ('Copy the Build to workspace directory') {  
  
    steps {  
  
        //Copy the file from target folder to workspace folder where Docker File exists  
        //In the below command end, "." means in the current directory  
  
        sh 'cp /var/lib/jenkins/workspace/CICD_P10/target/addressbook.war .'    }  
}
```

```
stage ('Build the Image') {  
    steps {  
        //Image name will not have the upper case letters  
        sh 'docker build -t projectimage .'    }  
}
```

```
stage ('Deploy on the container'){  
  
    steps {  
        sh 'docker run -d -P projectimage'  
    }  
}
```

```
stage('push image to DockerHub'){
```

```
steps{

    sh 'docker login -u vinayakb2010 -p Vinda*100!'
    sh 'docker tag projectimage vinayakb2010/projectimage'
    sh 'docker push vinayakb2010/projectimage'
    sh 'docker rmi vinayakb2010/projectimage'
}

}

stage('Create containers'){
    steps{

        sh 'docker run -d -P vinayakb2010/projectimage'
    }
}

}
```