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Date:

Ex No: 1

Create Maven Build pipeline in Azure

Aim

To create a maven project and build a pipeline in Azure

Procedure

1. **Install Java and Maven and set the system environment variables**
   a. Download maven and extract it
   b. Add JAVA_HOME and MAVEN_HOME in environment variable
      i. Right click on **MyComputer -> properties -> Advanced System Settings -> Environment variables -> click new button.**
      ii. Add **MAVEN_HOME** in variable name and path of maven in variable value. click on **OK** button. Similary create **JAVA_HOME**
   c. Add maven and java path in environment variable
      i. Click on new tab and then set the path of maven and java till bin directory. If it is set, edit the path and append the path of maven and java
   d. Verify Maven and Java
      open the command prompt and write:
      i. mvn −version
      ii. java -version

2. **Create a github account**
   1. Go to https://github.com/join in a web browser
   2. Enter your personal details.
   3. Click Verify to start the verification puzzle.
   4. Click the green Create account button.
   5. Verify your email by entering the code.
   6. Select your preferences and click Continue.
   7. Note the types of plans offered by GitHub.
   8. Select the free plan.

3. **Create an Azure student login and enter into Azure DevOps**

   Create an Azure Student Account:
   - Visit the Azure for Students page.
   - Sign up using your university or school email. You'll need to renew this account each year while you're a student.
   - You'll receive a USD 100 credit to use with Azure services. No credit card is required, and you get 12 months of free Azure services1.

   Sign Up for Azure DevOps:
   - Go to Azure DevOps.
   - Choose either a Microsoft account or a GitHub account to sign up.
   - If you don't have a Microsoft account, create one.
   - Select Start free and enter your account credentials.
   - Azure DevOps will create an organization for you.
   - It will also create a project named after your newly created Microsoft account.
   - If you signed up with an existing Microsoft account, you'll need to create a project next.

   Access Azure DevOps:
   - Sign in to your organization anytime at dev.azure.com{Your_Organization}.

4. **Install a Java IDE (**Eclipse, NetBeans, IntelliJ IDEA**, VS code)**

5. **Develop a Java Maven Project and build the application in the local server**
   Create a New Maven Project:
   - Open VS Code.
   - Install the Maven for Java extension by searching for it in the Extensions view (Ctrl+Shift+X).
   - Create a new Maven project using one of the following methods:
   - Use the command palette (Ctrl+Shift+P) and type "Maven: Create Maven Project."
   - Right-click on a folder and select "Generate from Maven Archetype."
   - Choose the "maven-archetype-quickstart" archetype.
   - Modify the pom.xml file to specify your project details and dependencies.

   Write Your Java Code:
   - Create your Java classes in the src/main/java directory.
   - Define your application logic, classes, and methods.

   Build the Project:
   - Open the integrated terminal in VS Code (Ctrl+`).
   - Run the following command to build the project:
     mvn clean install
   - This will compile your code, run tests, and package the application into a JAR file.

   Run the Application Locally:
   - After successful build, use the following command to start a local server:
     java -jar target/your-artifact-id-version.jar
   - Replace your-artifact-id-version with the actual name of your JAR file.

   Access Your Application:
   - Open a web browser and navigate to http://localhost:8080 (or the port specified in your application).
   - You should see your Java application running locally.

6. **Push the java maven project into Git Repository**
   Initialize Git Repository:
   - Open a terminal or command prompt.
   - Navigate to the root directory of your Maven project using the cd command.
   - Initialize a new Git repository:
     git init

   Add and Commit Your Files:
   - Use the following commands to stage all files and commit them:
     git add .
     git commit -m "Initial commit"

   Create a New Repository on GitHub:
   - Go to GitHub and log in (or sign up if you don't have an account).
   - Click the "+" icon in the top right corner and select "New repository."
   - Give your repository a name, choose visibility (public or private), and create it.
   - Link Your Local Repository to GitHub:
   - Copy the HTTPS URL of your newly created GitHub repository.
   - In your terminal, add the remote origin (replace <me> with your GitHub username and <myrepo> with your repository name):
   - git remote add origin https://github.com/<me>/<myrepo>.git

   Push your code to the master branch on GitHub:
   - git push -u origin master

7. **Create Azure DevOps organization and import or clone the git repo of the java maven project**
   Sign in to Azure DevOps:

- Log in to your Azure DevOps organization.
- Select Your Project:
- Choose the project where your Java Maven project resides.
- CCreate a New Git Repo in Your Project:
- Open the Repos page in your project by browsing to dev.azure.com/OrganizationName.
- Hover over the name of your project and select the Repos icon.
- From the repo drop-down, select New repository.
- Verify that Git is the repository type and enter a name for your new repository.
- Optionally, add a README and create a .gitignore file.
- Select Create.

8. **Create a pipeline in Azure and build the project**

Create a New Pipeline:

- Navigate to Pipelines (usually on the left side menu).
- Click on New pipeline.
- Select Azure Repos Git as the source location.

Choose Your Repository:

- Select the Git repository where your Java Maven project is hosted.
- Configure the Pipeline:

You'll be guided through a wizard:

- First, choose the Maven, Gradle, or Ant template based on your build preference.
- Save your configuration.
- Commit an azure-pipelines.yml file to your repo.
- Save and run the pipeline.

Watch Your Pipeline in Action:

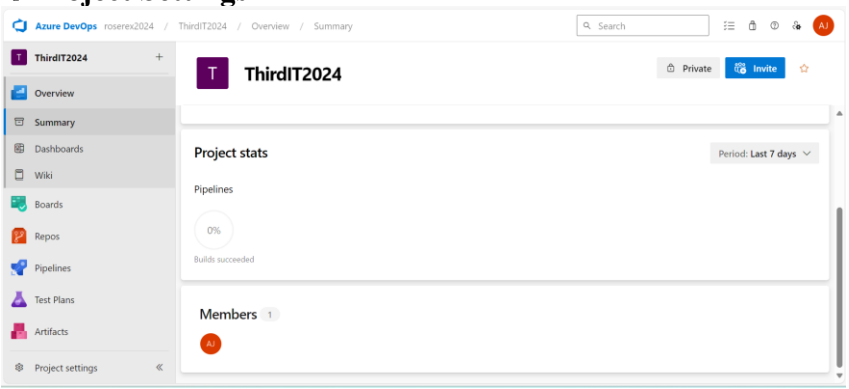
- If you want to see your pipeline executing, select the build job.

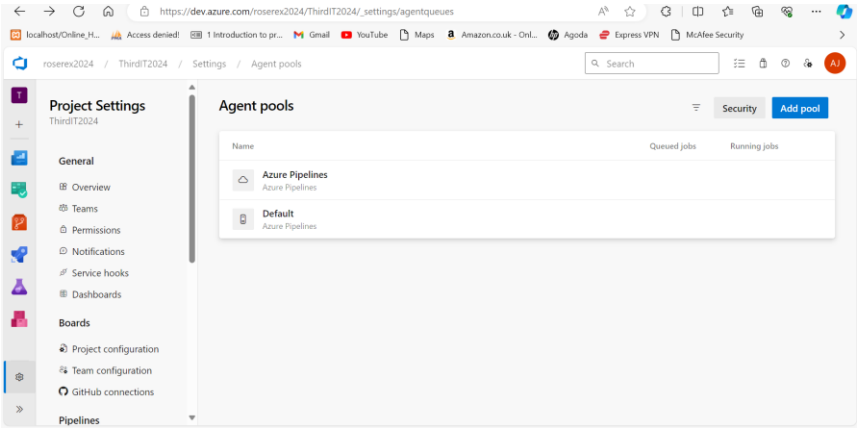
Customize Your Pipeline:

- When you're ready to make changes, go to the Pipelines page, select your pipeline, and edit the azure-pipelines.yml file.

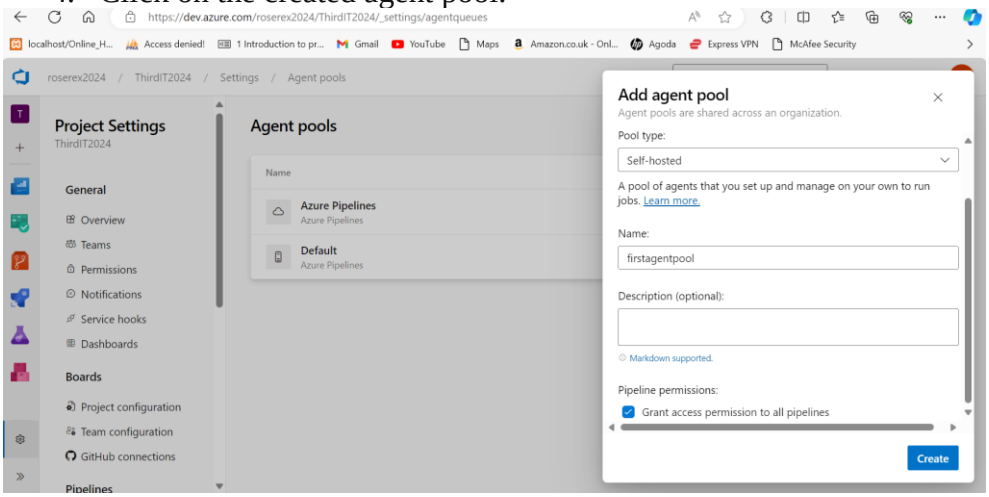
Output

→Project Settings





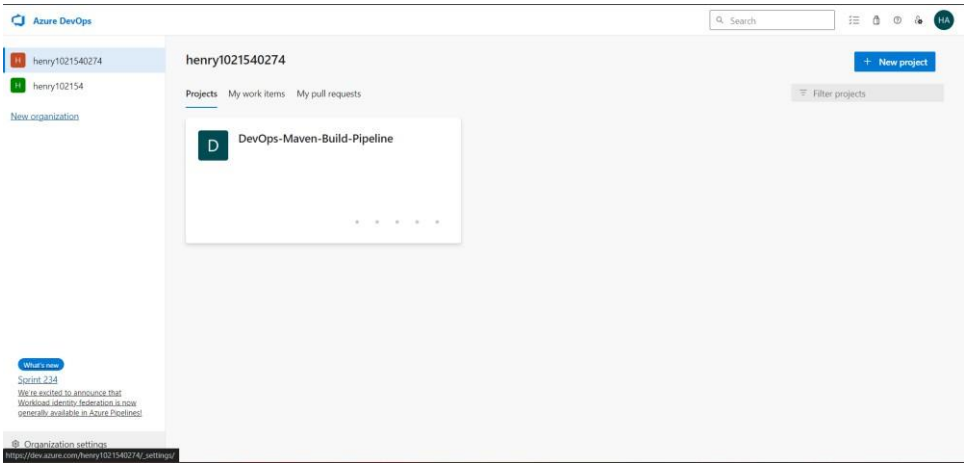
1. Choose Agent pools.
2. Click on Add pool.
3. Select Pool-type as Self-hosted, give it a name and click on Create.
4. Click on the created agent pool.



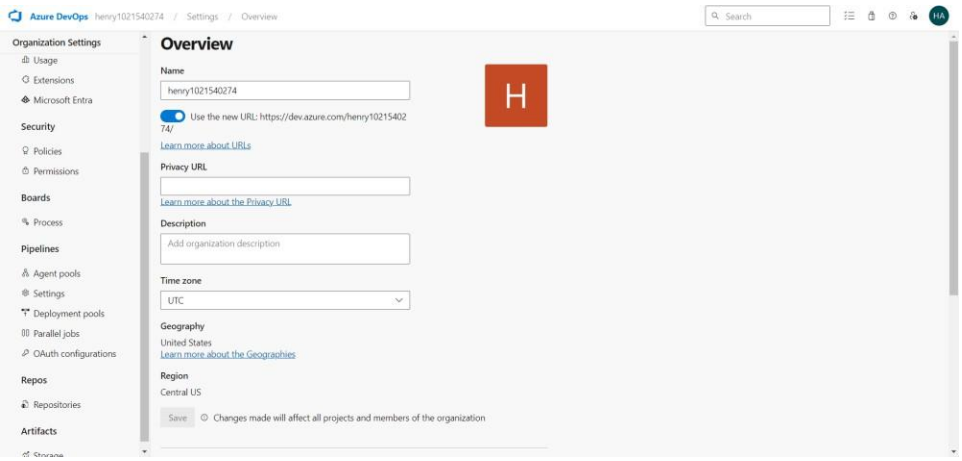
Conclusion

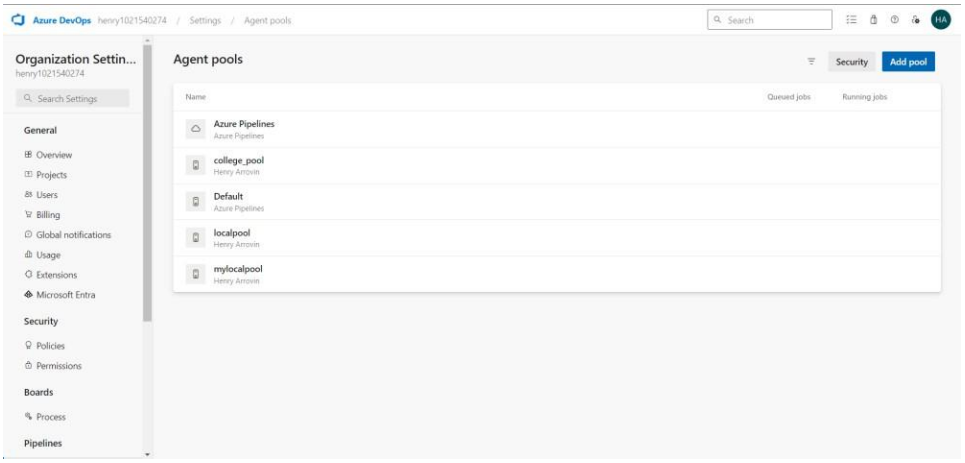
To create an Agent:

- Click on organization setting

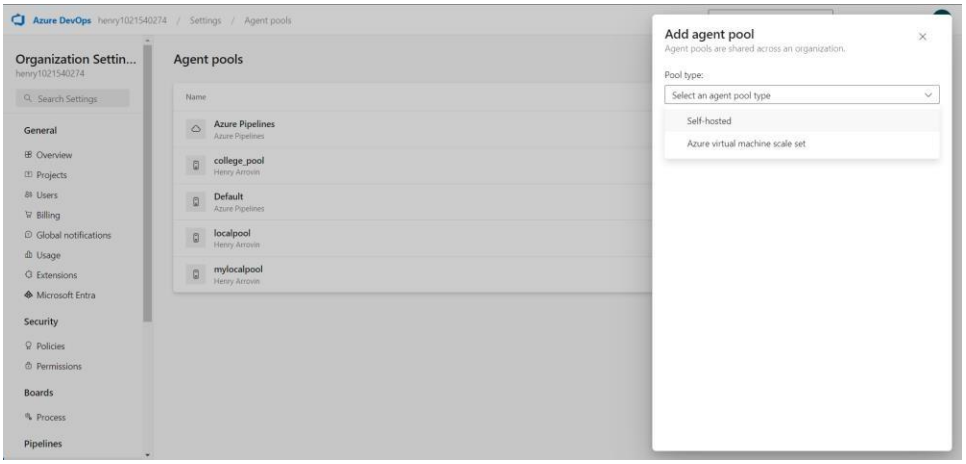


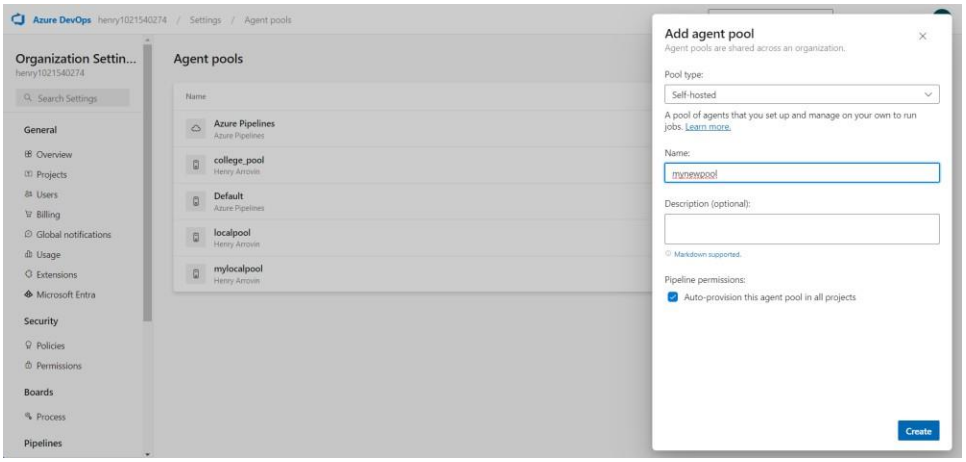
- Create a new pool in Agent Pools

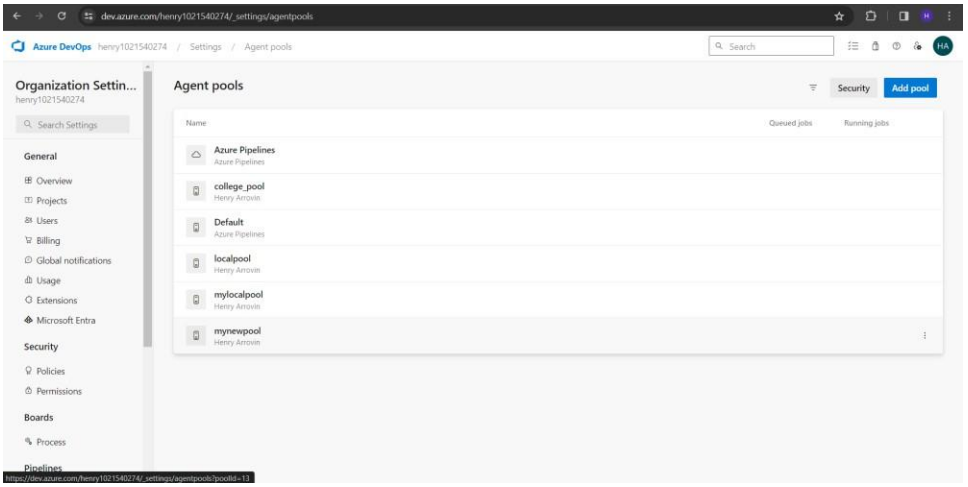




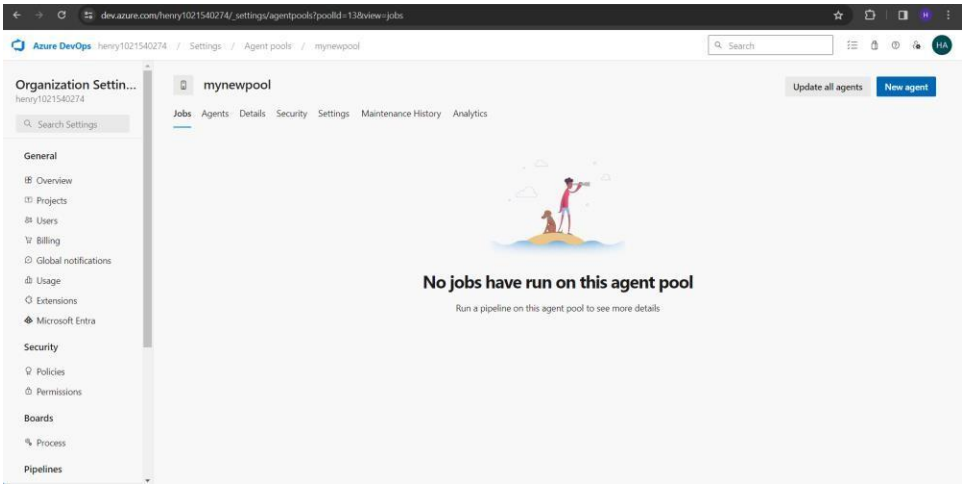
- Create a new Agent



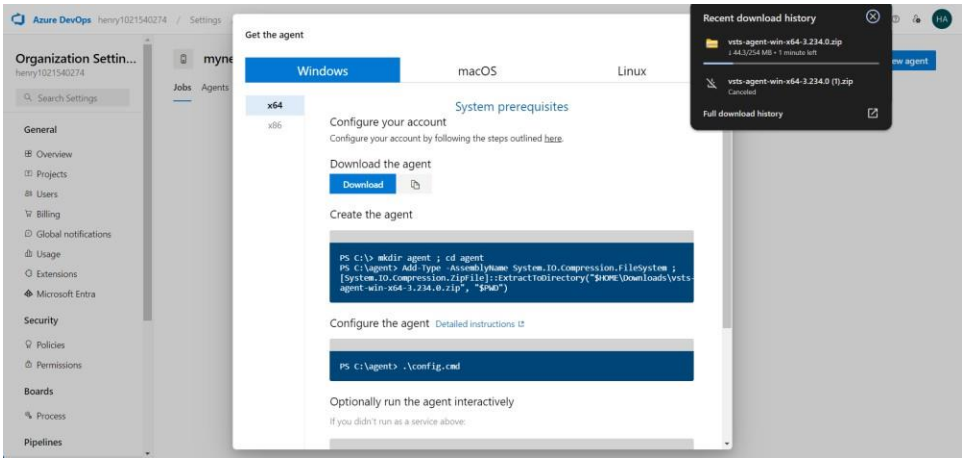


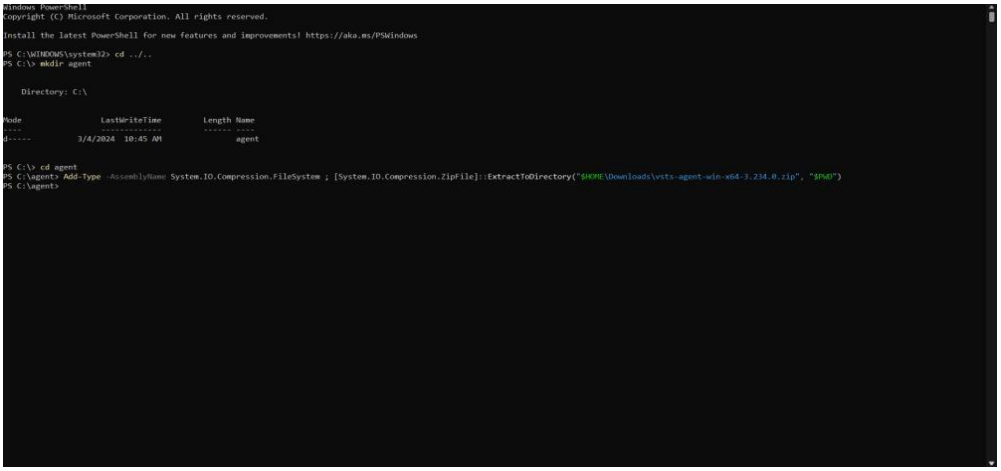


- Go inside the pool created and create a new agent



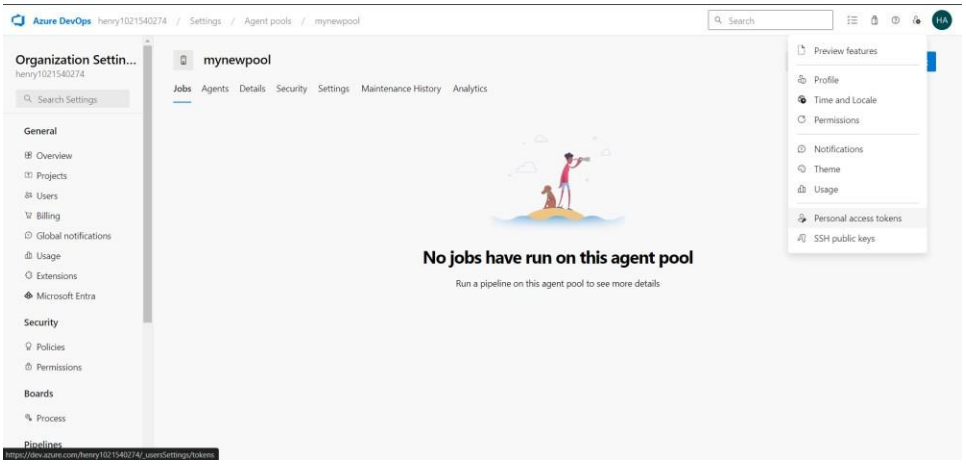
- Follow the steps shown in the screen



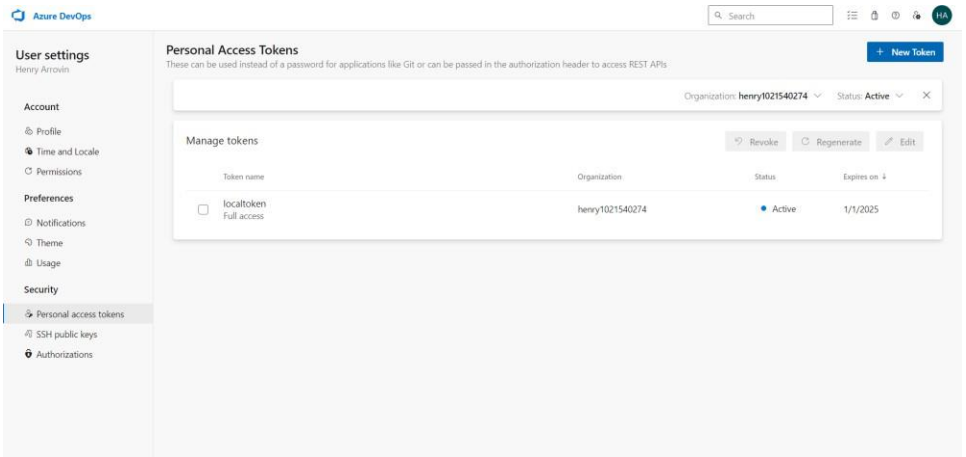


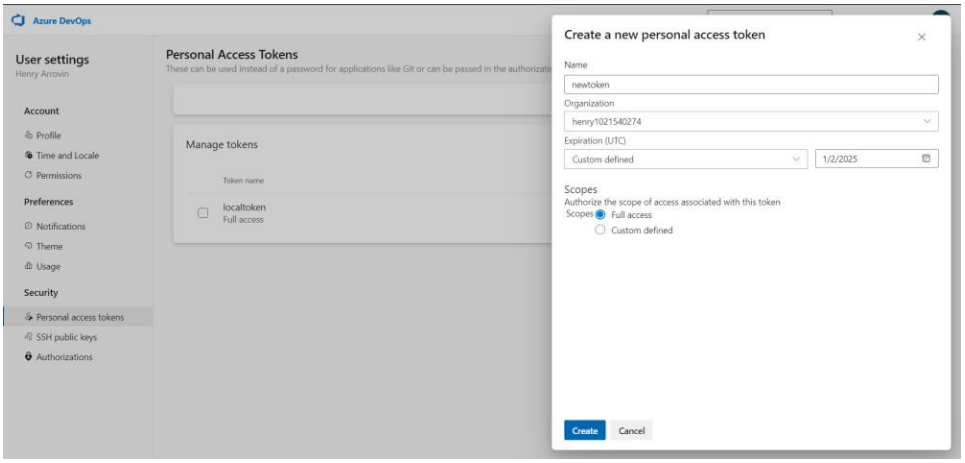
- Give the URL till organization name
- For PAT follow the below steps

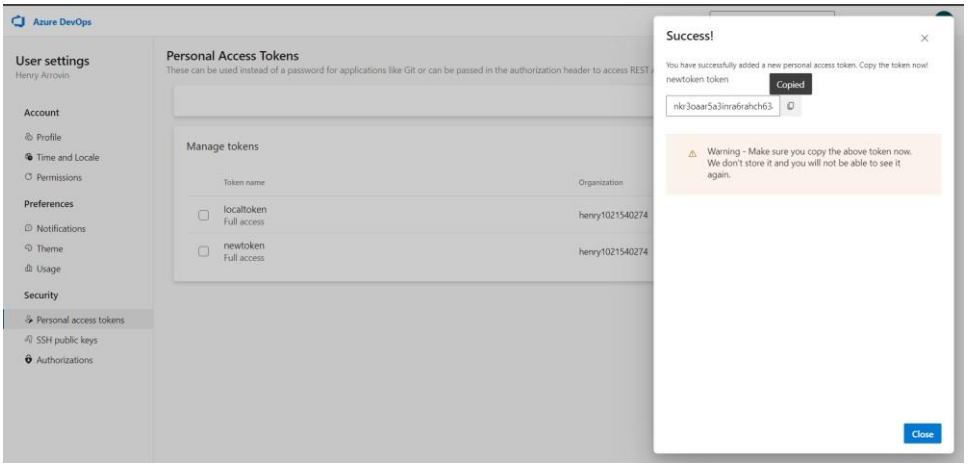
- Click on Personal Access Tokens

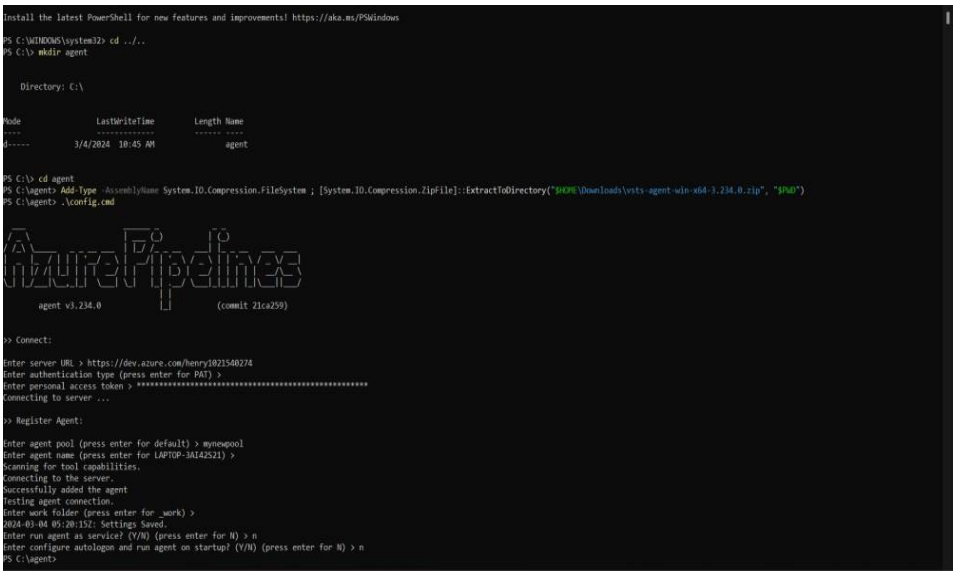


- Create a new token

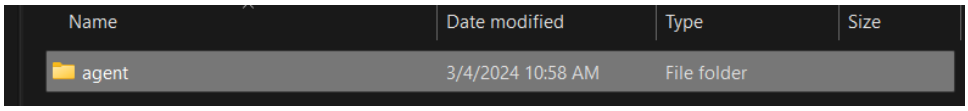


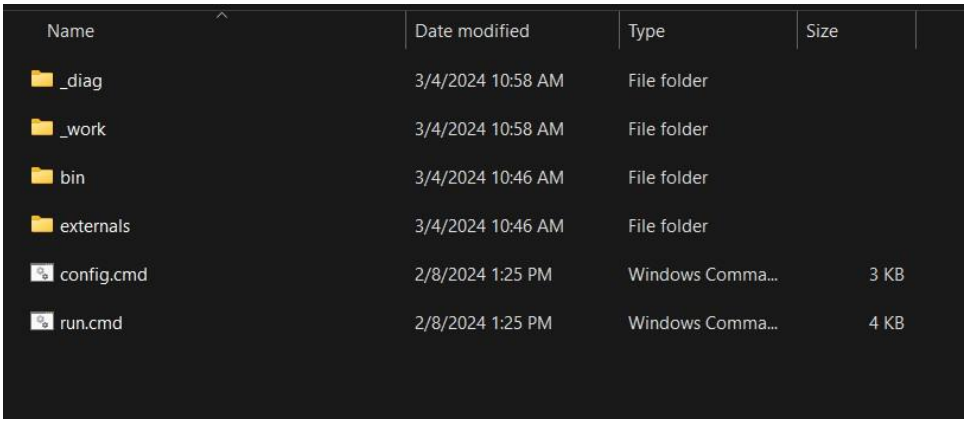






- Copy the token and paste it

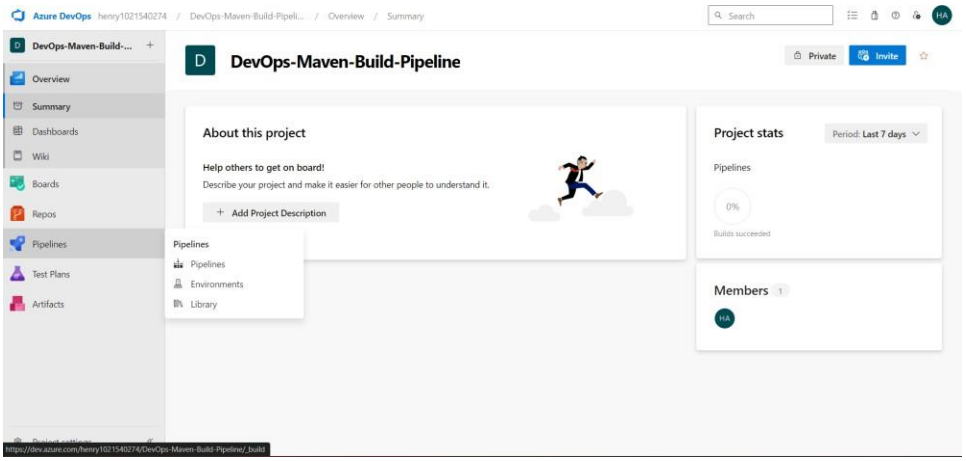




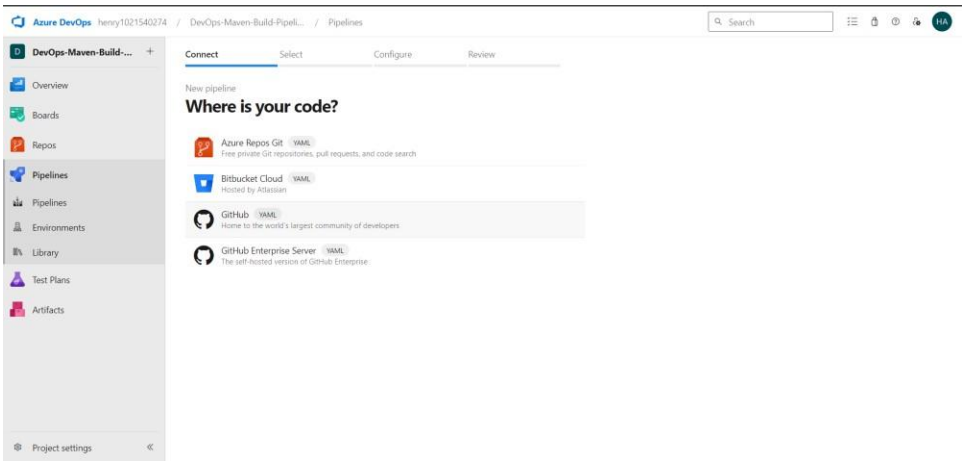
Name	Date modified	Type	Size
_diag	3/4/2024 10:58 AM	File folder	
_work	3/4/2024 10:58 AM	File folder	
bin	3/4/2024 10:46 AM	File folder	
externals	3/4/2024 10:46 AM	File folder	
config.cmd	2/8/2024 1:25 PM	Windows Comma...	3 KB
run.cmd	2/8/2024 1:25 PM	Windows Comma...	4 KB

Now to create a pipeline

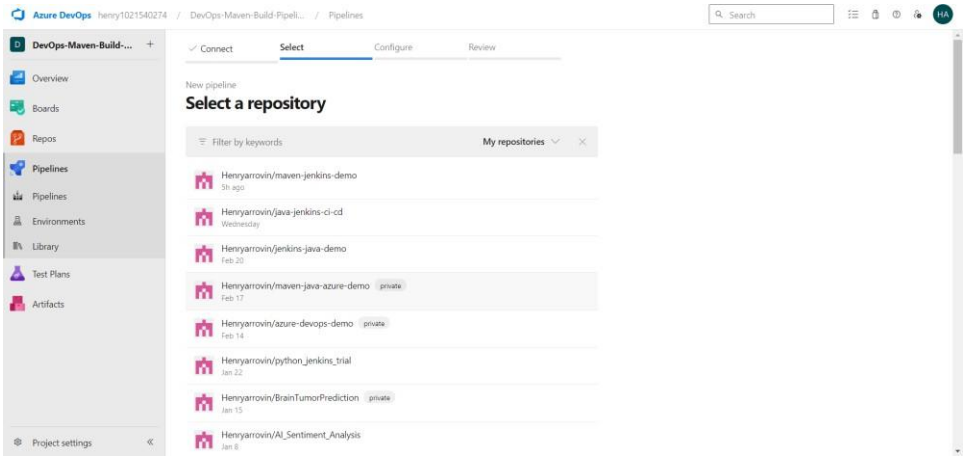
- Go to pipelines in Azure Devops



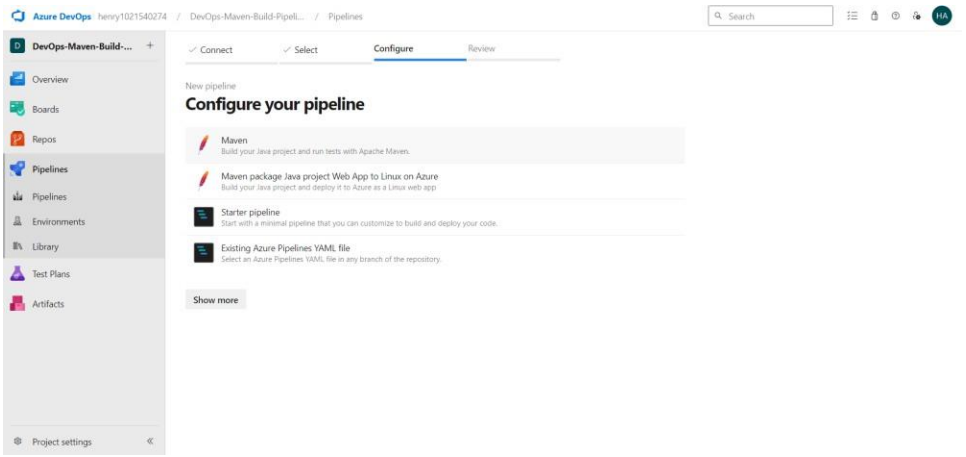
- Click GitHub or where your code is stored
- GitHub is used in this Demo



- Choose your source code



- Make sure it is a maven project by verifying whether there is pom.xml in that project



- Since maven project click on Maven to Generate a sample YAML script for basic test and build

```
steps:
Settings
- task: Maven@3
  inputs:
    mavenPomFile: 'pom.xml'
    mavenOptions: '-Xmx3072m'
    JDK version  on: 'JDKVersion'
    jdkVersionOption: '1.8'
    jdkArchitectureOption: 'x64'
    publishJUnitResults: true
    testResultsFiles: '**/surefire-reports/TEST-*.xml'
    goals: 'package'
```

- Since we want to create an artifact (jar/war) change the YAML script as given below

trigger:

```
- master
pool: mynewpool
```

Conclusion

Thus, a maven project was created and build a pipeline in Azure

Date:

Ex No: 2

Run regression tests using Maven Build pipeline in Azure

Aim

To create a maven project and build a pipeline in Azure and create test cases to run regression test

Procedure

Create a Maven Project:

If you haven't already, create a basic Java project with the following structure:

- package main:
  - Main class
  - Calculator class
  - Add method
- package test:
  - CalculatorTest class
  - addTest method

- Ensure that your tests use the JUnit framework.

Azure DevOps Pipeline Configuration:

- In your Azure DevOps project, import your Java project from GitHub.
- Create a new pipeline using the starter template.
- Modify the pipeline YAML file to include the necessary tasks.

Configure the Pipeline YAML:

- Define the trigger (e.g., on each commit to the master branch).
- Specify the VM image (e.g., 'Ubuntu-16.04').
- Add tasks to build, test, and deploy your project. For testing, you'll need to run your JUnit tests.

Run Tests Automatically:

- To run your tests automatically after each commit, follow these steps:
- Open the Test Plans web portal.
- Select your test plan.
- Choose a test suite containing your automated tests.
- Select the specific tests you want to run.
- Click "Run test."
- Ensure that the test binaries are available in the build artifacts generated by your build pipeline.

View Results:

- You'll see the test results (including code coverage) in the pipeline summary.
- For code coverage, consider integrating tools like JaCoCo or Cobertura.

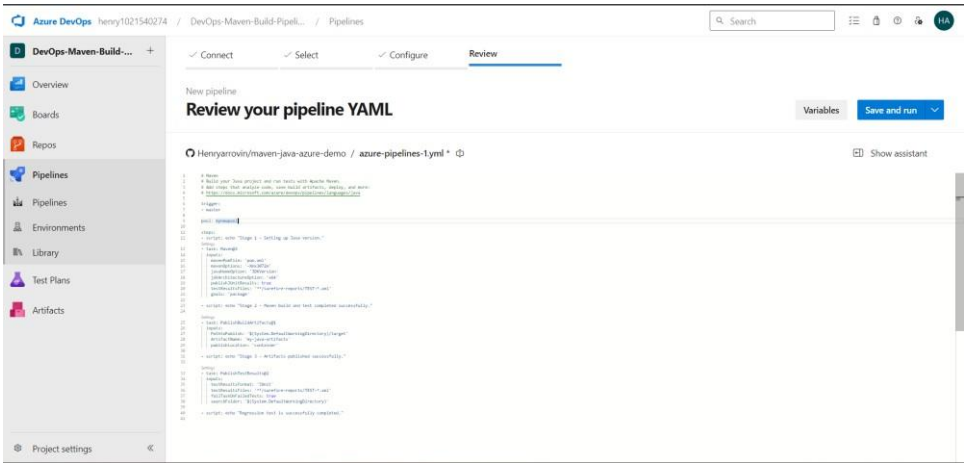
Publish Build Artifacts:

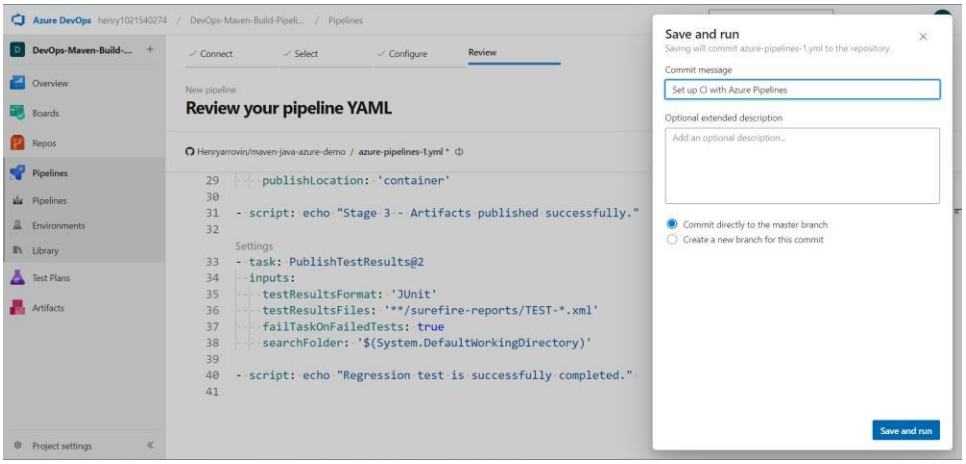
- To publish build artifacts, add the following task to your pipeline YAML:
  - task: PublishBuildArtifacts@1

Note that the warning "Directory '/home/vsts/work/1/a' is empty" means that no files were found to include in the artifact. Make sure your build generates the necessary output files.

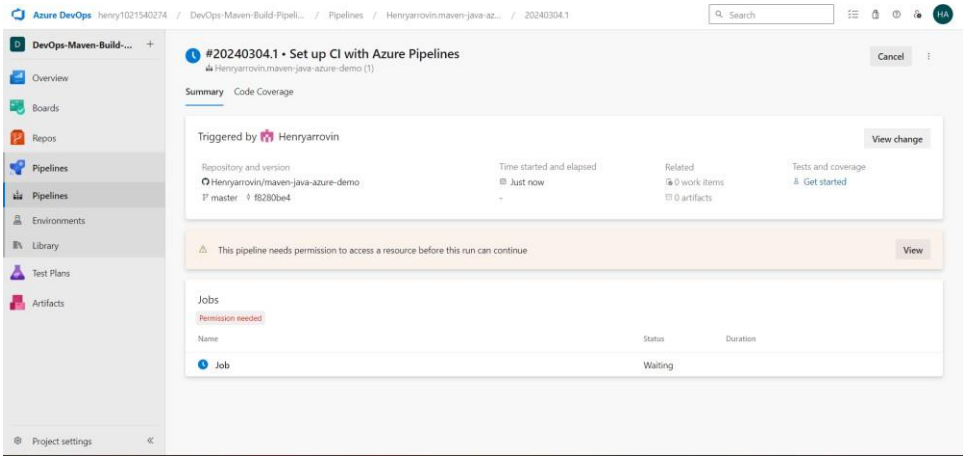
Output

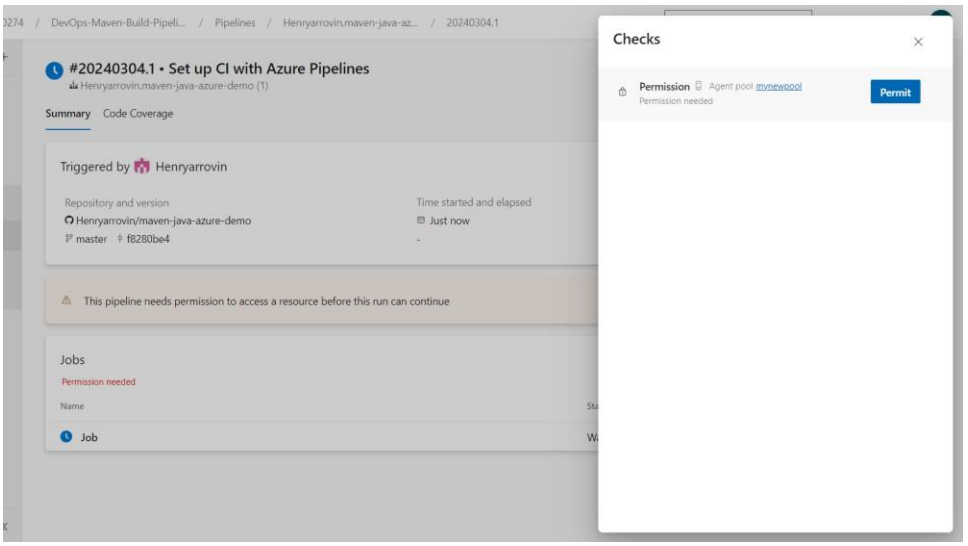
```
steps:
- script: echo "Stage 1 - Setting up Java version."
- task: Maven@3
  inputs:
    mavenPomFile: 'pom.xml' mavenOptions: '-
    Xmx3072m' javaHomeOption: 'JDKVersion'
    jdkArchitectureOption: 'x64'
    publishJUnitResults: true
    testResultsFiles: '**/surefire-reports/TEST-*.xml' goals:
    'package'

- script: echo "Stage 2 - Maven build and test completed successfully."


- task: PublishBuildArtifacts@1
  inputs:
    PathtoPublish: '$(System.DefaultWorkingDirectory)/target' ArtifactName: 'my-java-
    artifacts'
    publishLocation: 'container'


- script: echo "Stage 3 - Artifacts published successfully."


- task: PublishTestResults@2
  inputs:
    testResultsFormat: 'JUnit'
    testResultsFiles: '**/surefire-reports/TEST-*.xml'
    failTaskOnFailedTests: true
    searchFolder: '$(System.DefaultWorkingDirectory)'


- script: echo "Regression test is successfully completed."
```



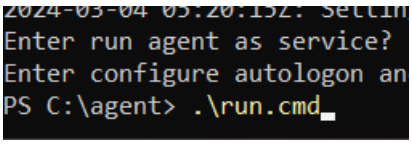


- Commit the YAML script to the main branch directly or to a newly created branch and merge it to the main branch.
- If the pipeline has no access, then give permission by clicking on to “Permission Needed”.

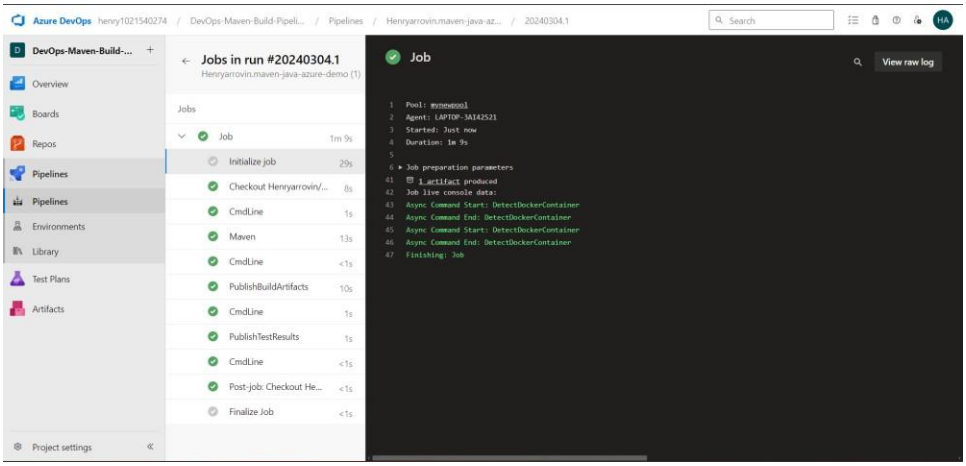


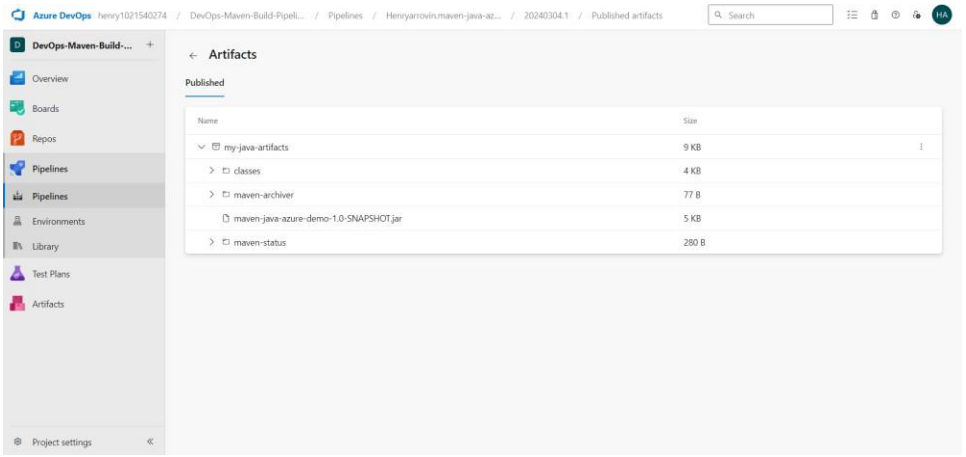


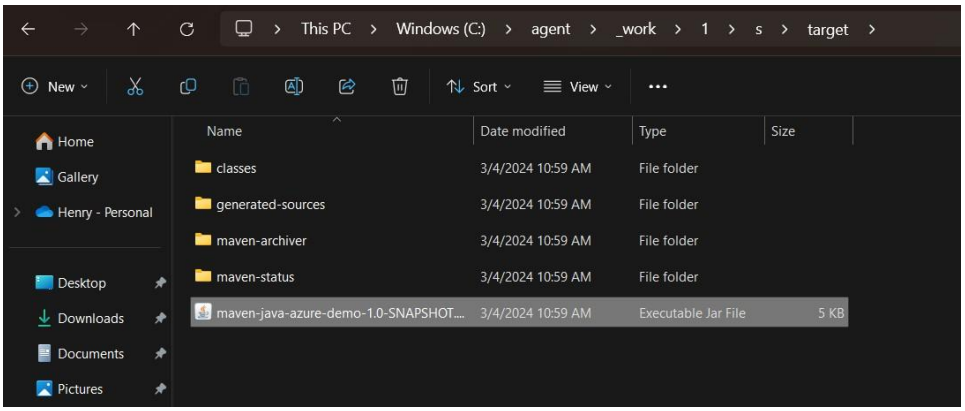
- Don't forget to run the agent created using the run command so that our agent can be used to run the job.



- Now if we run pipeline or commit any changes in our code the job will get executed.







Conclusion

Thus a regression test cases are executed using Maven Build pipeline in Azure

Date:

Ex No: 3

Install Jenkins in Cloud

Aim

To install Jenkins in Cloud

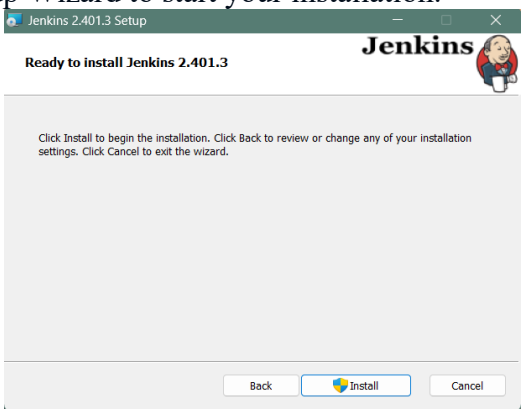
Procedure

Windows

Downloading Jenkins from the link https://www.jenkins.io/download/ stable LTS release of the Windows installer. After the download completes, open the Windows installer and follow the steps below to install Jenkins.

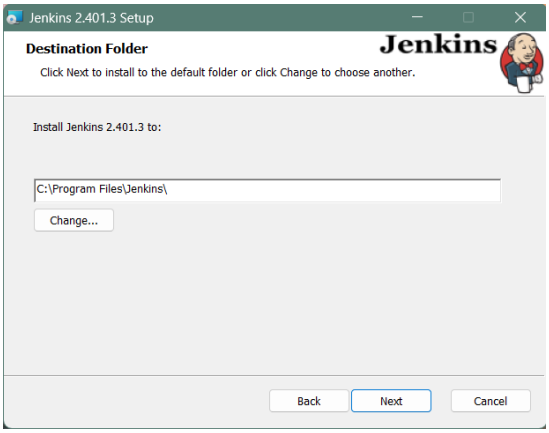
Step 1: Setup wizard

On opening the Windows Installer, an **Installation Setup Wizard** appears, Click **Next** on the Setup Wizard to start your installation.



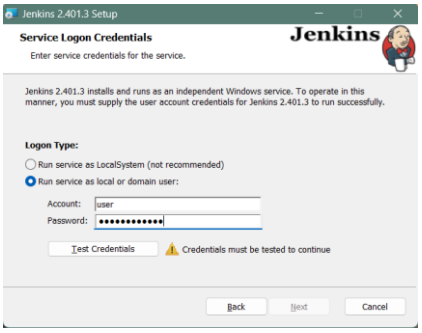
Step 2: Select destination folder

Select the destination folder to store your Jenkins Installation and click **Next** to continue.



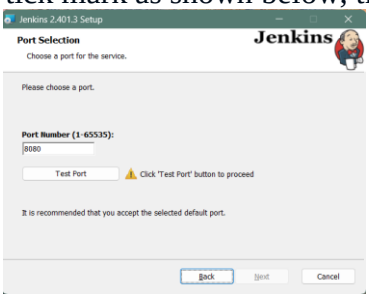
Step 3: Service logon credentials

When Installing Jenkins, it is recommended to install Jenkins using **LocalSystem(Windows equivalent of root)** which will grant Jenkins full access to your machine and services. click on **Test Credentials** to test your domain credentials and click on **Next**.



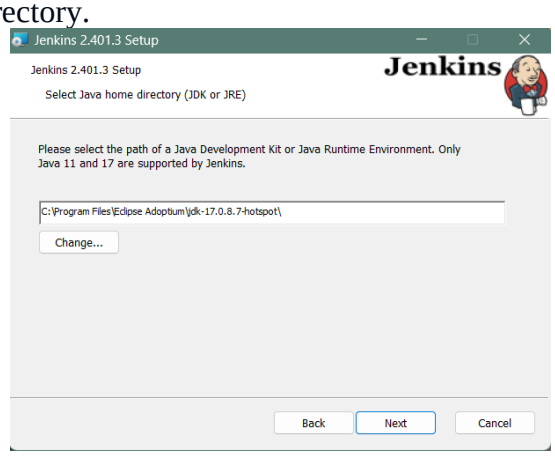
Step 4: Port selection

Specify the port on which Jenkins will be running, **Test Port** button to validate whether the specified port if free on your machine or not. Consequently, if the port is free, it will show a green tick mark as shown below, then click on **Next**.



Step 5: Select Java home directory

The installation process checks for Java on your machine and prefills the dialog with the Java home directory.



Step 6: Install Jenkins

Click on the **Install** button to start the installation of Jenkins.

Step 7: Finish Jenkins installation

Once the installation completes, click on **Finish** to complete the installation.

Post-installation setup wizard

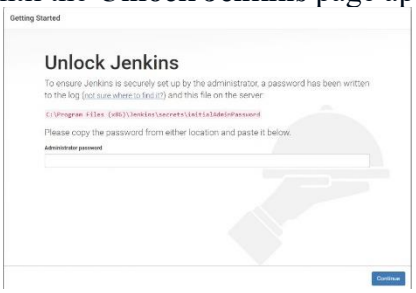
After downloading, installing and running Jenkins, the post-installation setup wizard begins.

Unlocking Jenkins

When you first access a new Jenkins instance, you are asked to unlock it using an automatically-generated password.

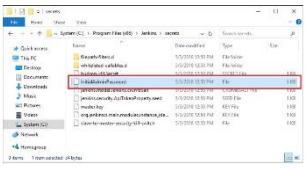
Step 1

Browse to http://localhost:8080 (or whichever port you configured for Jenkins when installing it) and wait until the **Unlock Jenkins** page appears.



Step 2

The initial Administrator password should be found under the Jenkins installation path. For default installation location to C:\Program Files\Jenkins, a file called **initialAdminPassword** can be found under C:\Program Files\Jenkins\secrets.



Step 3

Open the highlighted file and copy the content of the **initialAdminPassword** file.

Step 4

On the **Unlock Jenkins** page, paste this password into the **Administrator password** field and click **Continue**.

This password must be entered in the setup wizard on new Jenkins installations before you can access Jenkins's main UI.

Customizing Jenkins with plugins

After unlocking Jenkins, the **Customize Jenkins** by installing any number of useful plugins as part of your initial setup.

Click one of the two options shown:

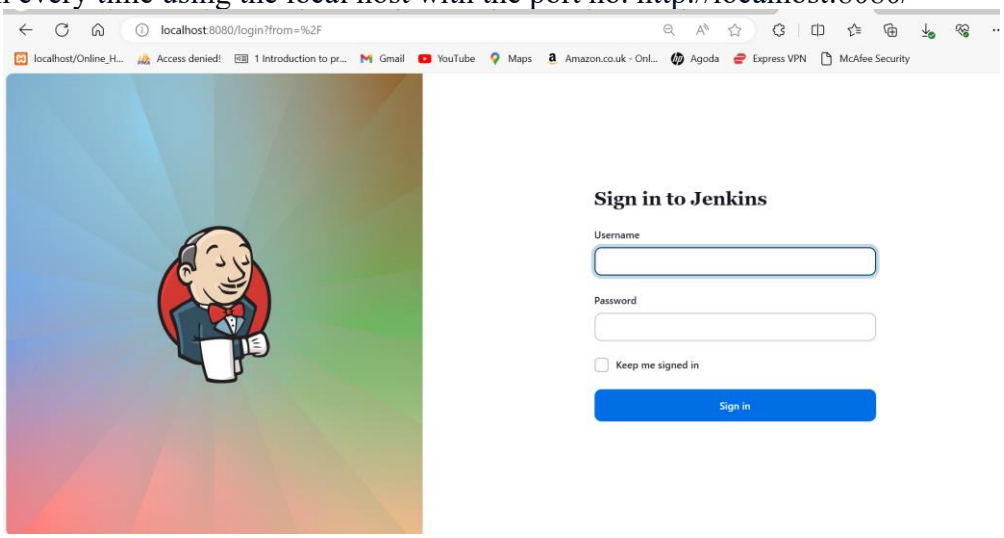
- **Install suggested plugins** - to install the recommended set of plugins, which are based on most common use cases.

- **Select plugins to install** - to choose which set of plugins to initially install. When you first access the plugin selection page, the suggested plugins are selected by default.

Creating the first administrator user
Finally, after customizing Jenkins with plugins, Jenkins asks you to create your first administrator user.

1. When the **Create First Admin User** page appears, specify the details for your administrator user in the respective fields and click **Save and Finish**.
2. When the **Jenkins is ready** page appears, click **Start using Jenkins**.

Re login every time using the local host with the port no. http://localhost:8080/



Google Cloud Platform (GCP):

- Ensure you have a Google Cloud account. If not, you can create one.
- Follow the tutorial on Jenkins on Google Cloud to set up Jenkins on Google Compute Engine. This guide assumes familiarity with Packer (for creating images) and Jenkins itself.

Amazon Web Services (AWS) EC2:

- Launch an EC2 instance.
- In the security group of the instance, open port 8080.
- SSH into the EC2 instance using EC2 Instance Connect.
- Install Jenkins on the EC2 instance. You can follow the steps outlined in this tutorial2.

Running CloudFormation from GitHub using Jenkins on EC2:

- Install the CloudFormation plugin in Jenkins.
- Run a CloudFormation template from a GitHub repository using the plugin.
- Optionally, you can also install the AWS CLI without using keys by leveraging SSM Session Manager

Note that the warning "Directory '/home/vsts/work/1/a' is empty" means that no files were found to include in the artifact. Make sure your build generates the necessary output files.

Azure

Configure Your Environment:

- Ensure you have an Azure subscription. If not, create a free account.
- Open Azure Cloud Shell (you can skip this step if you already have a session open).

Create a Virtual Machine:

- In Cloud Shell, create a test directory (let's call it jenkins-get-started).
- Switch to the test directory.
- Create a file named cloud-init-jenkins.txt.

Paste the following code into the new file:

```
#cloud-config
package_upgrade: true
```

runcmd:
  - sudo apt install openjdk-11-jre -y
  - curl -fsSL [^1^][5] | sudo tee /usr/share/keyrings/jenkins-keyring.asc > /dev/null
  - echo 'deb [signed-by=/usr/share/keyrings/jenkins-keyring.asc] [^2^][6] binary/' | sudo tee /etc/apt/sources.list.d/jenkins.list > /dev/null
  - sudo apt-get update && sudo apt-get install jenkins -y
  - sudo service jenkins restart

Run the following commands:

```
az group create --name jenkins-get-started-rg --location eastus
az vm create \
    --resource-group jenkins-get-started-rg \
    --name jenkins-get-started-vm \
    --image UbuntuLTS \
    --admin-username "azureuser" \
    --generate-ssh-keys \
    --public-ip-sku Standard \
    --custom-data cloud-init-jenkins.txt
```

Verify the creation of the new virtual machine:

```
az vm list -d -o table --query "[?name=='jenkins-get-started-vm']"
```

Configure Jenkins:

Retrieve the public IP address of the virtual machine:

```
az vm show --resource-group jenkins-get-started-rg --name jenkins-get-started-vm -d --query "[publicIps]" --output tsv
```

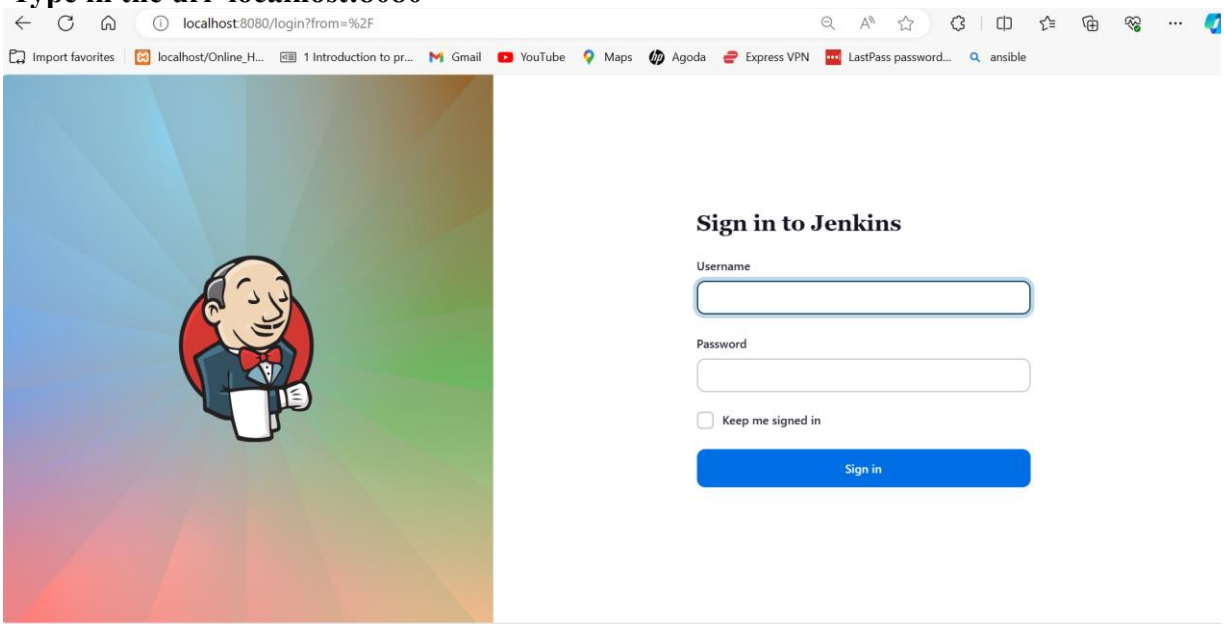
SSH into the virtual machine using the IP address:

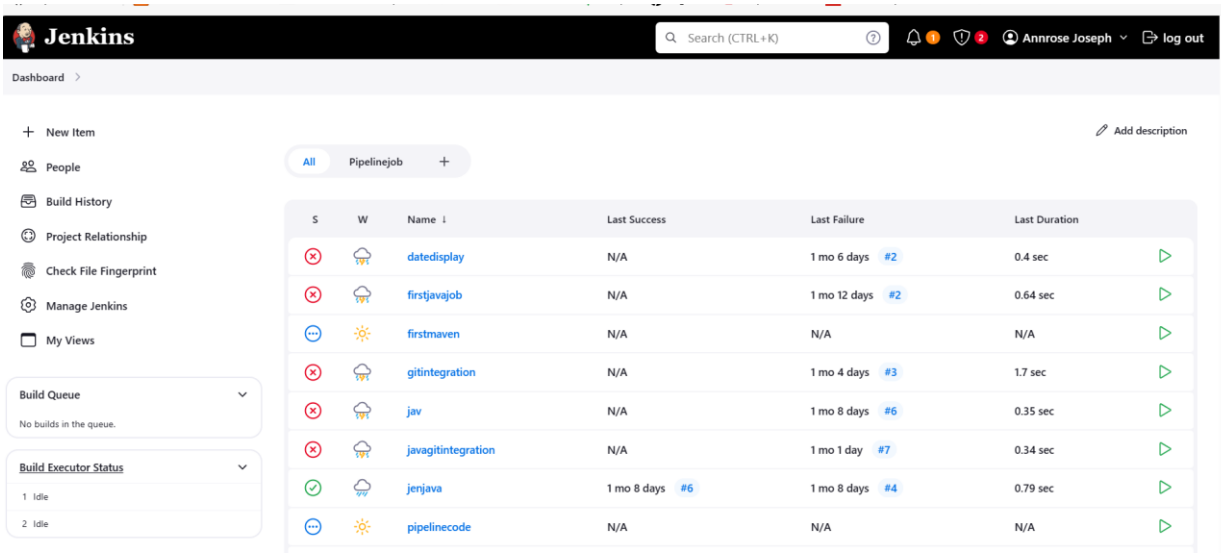
```
ssh azureuser@<ip_address>
```

Upon successful connection, you'll see the prompt: azureuser@jenkins-get-started-vm.

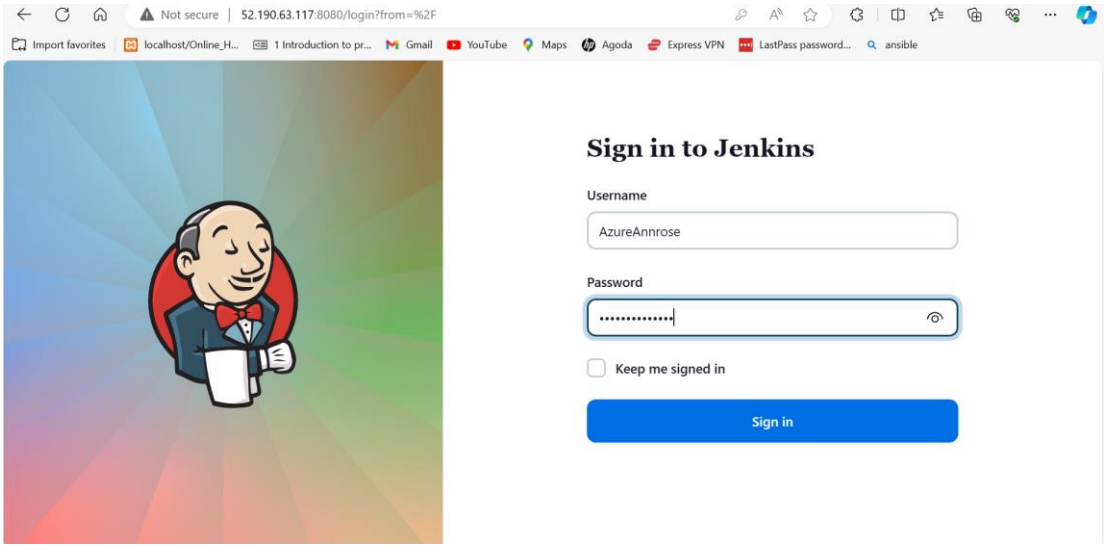
Output

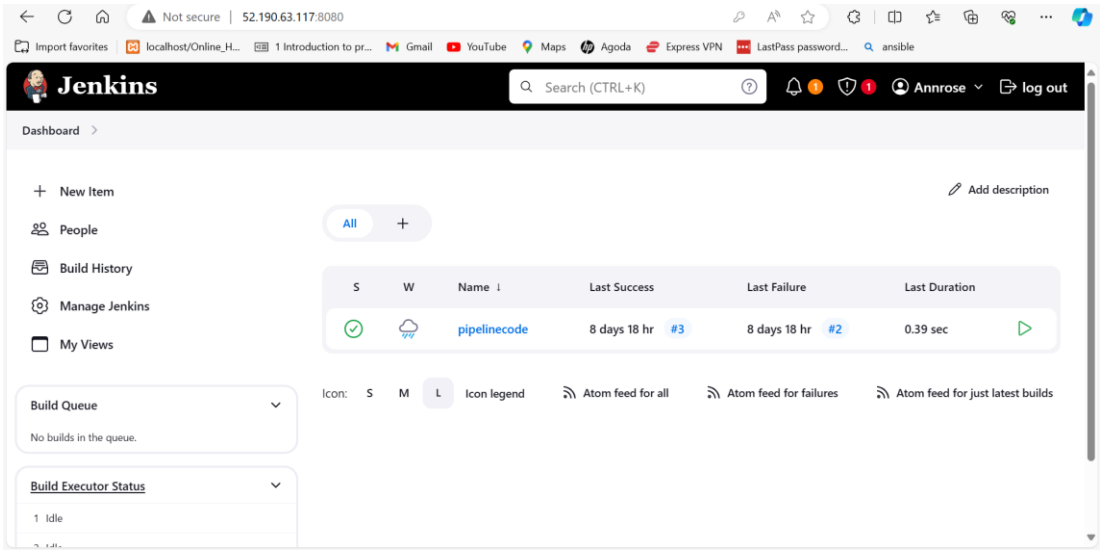
Type in the url localhost:8080





To use the installed Jenkins in Azure Cloud type the following link http://52.190.63.117:8080/





Conclusion

Thus, the Jenkins was successfully installed.

Date:

Ex No: 4

Create CI pipeline using Jenkins

Aim

To create CI pipeline using Jenkins

Procedure

Log in to Jenkins:

- Access your Jenkins account.
- If you haven't installed Jenkins yet, follow the Jenkins installation guide.

Create a New Jenkins Project:

- Once logged in, you'll be redirected to the Jenkins console.
- Click on "New Item" in the dashboard.
- Choose a suitable name for your pipeline project.
- Select the "Pipeline" option.

Configure Your Pipeline:

- In the pipeline configuration, you can define your stages. A typical CI/CD pipeline includes stages like:
- Test code: Run tests to ensure code quality.
- Build Application: Compile and package your application.
- Push to Repository: Store artifacts in a version control system (e.g., Git).
- Deploy to Server: Deploy your application to different environments (e.g., Dev, Test, Production).

Pipeline Script:

- In the pipeline configuration, you'll find a section to write your pipeline script.
- You can use either declarative syntax or scripted syntax.

Here's a simple example of a declarative pipeline script:

```
pipeline {
  agent any
  stages {
    stage('Test code') {
      steps {
        // Run tests here
      }
    }
    stage('Build Application') {
      steps {
        // Compile and package your app
      }
    }
    stage('Push to Repository') {
      steps {
        // Push artifacts to Git
      }
    }
    stage('Deploy to Server') {
      steps {
        // Deploy to different environments
      }
    }
  }
}
```

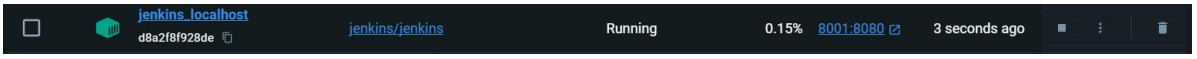
Save and Run:

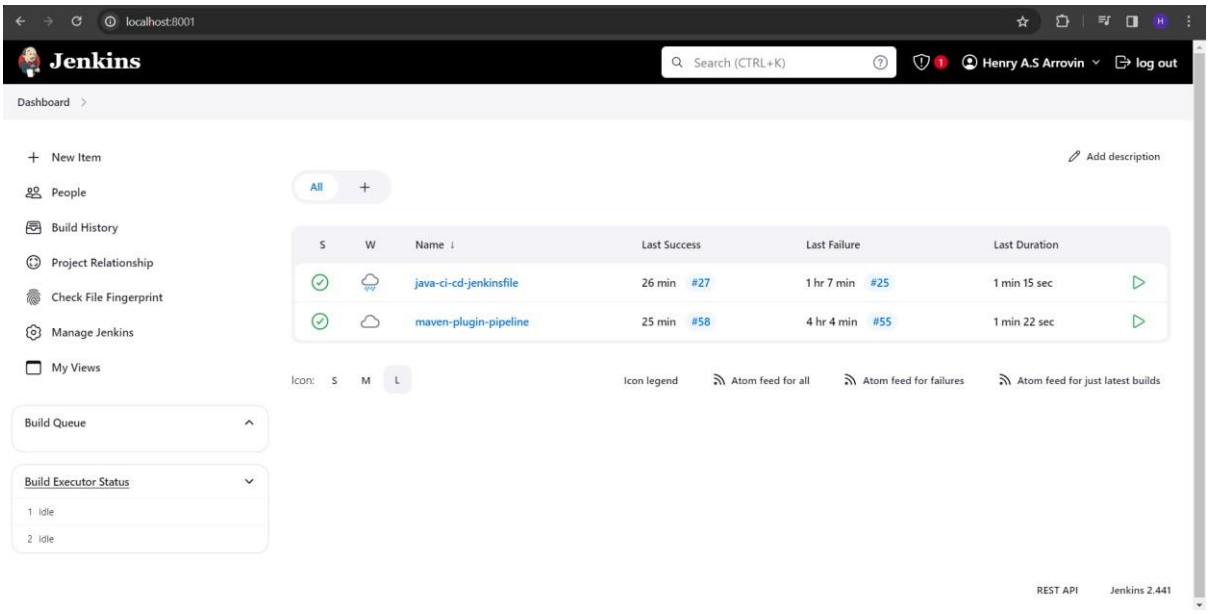
- Save your pipeline configuration.
- Click “Build Now” to trigger the pipeline execution.
- Jenkins will execute each stage sequentially.

Output

Step 1

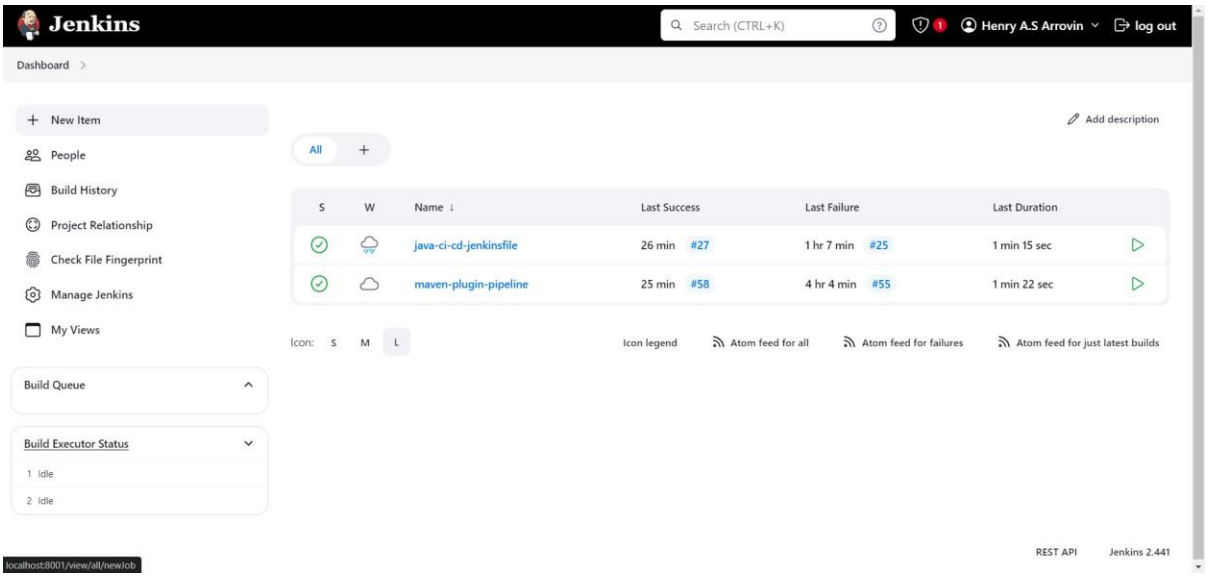
Since I am using Docker to host Jenkins, I will start the Jenkins container by pulling it. Alternatively, Jenkins can also be hosted by installing it directly on aserver or virtual machine, configuring it, and then starting the Jenkins service.

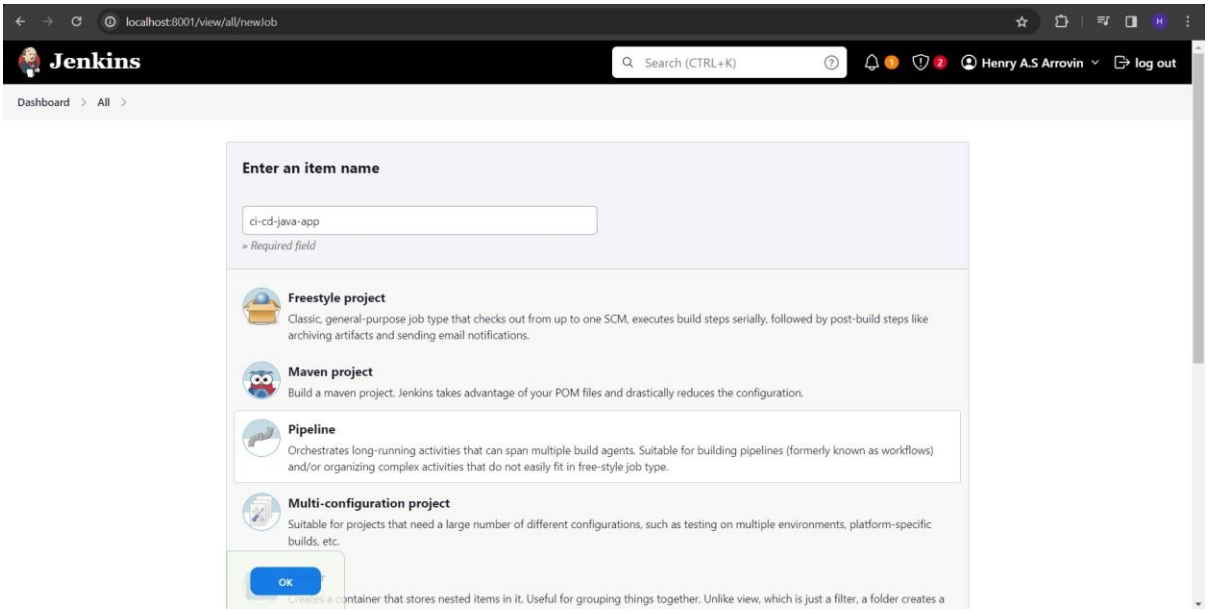




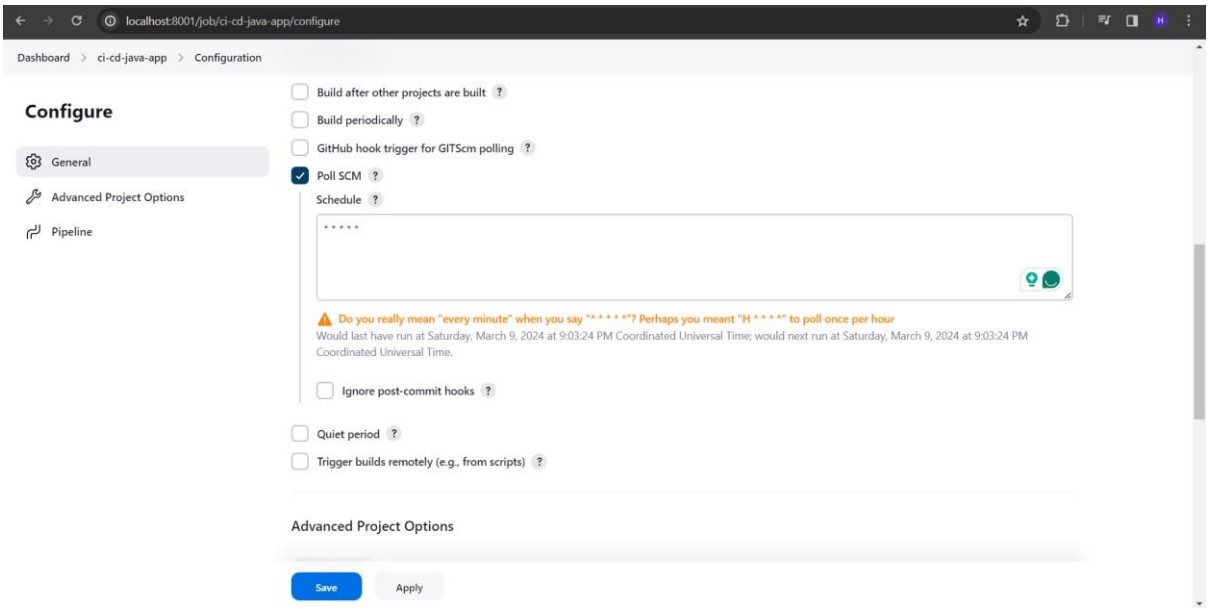
Step 2

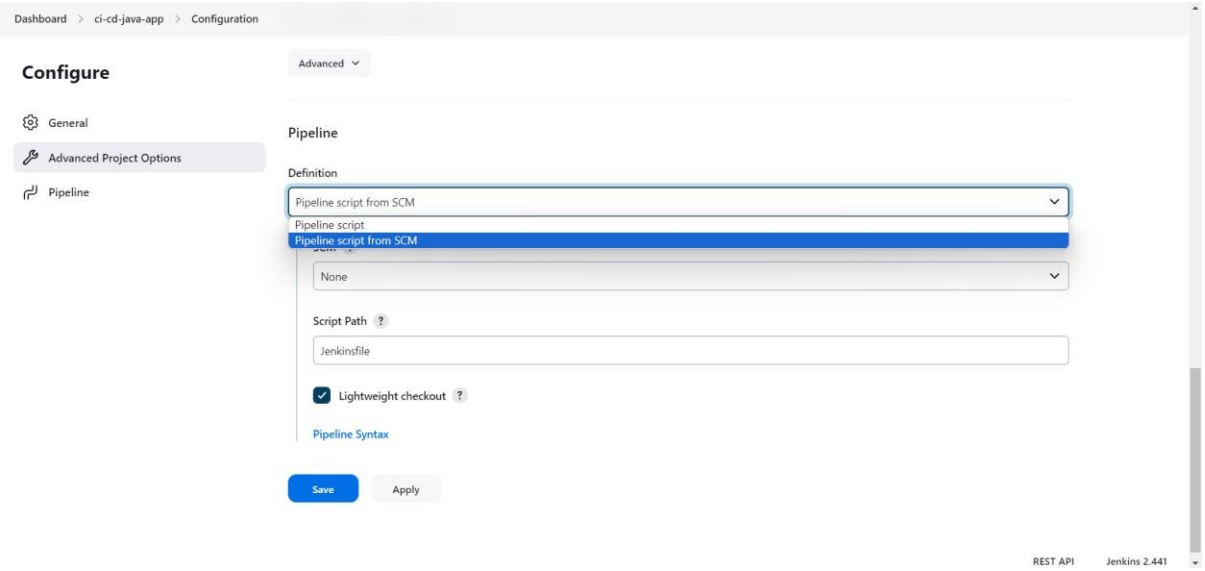
Click on new Item to create a new Pipeline project.

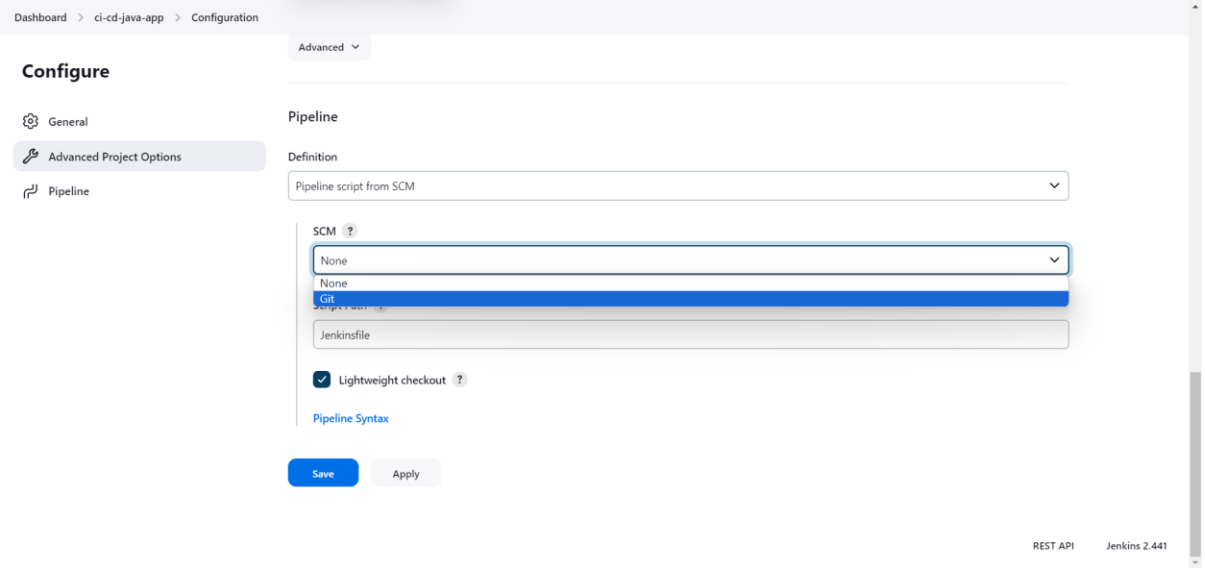


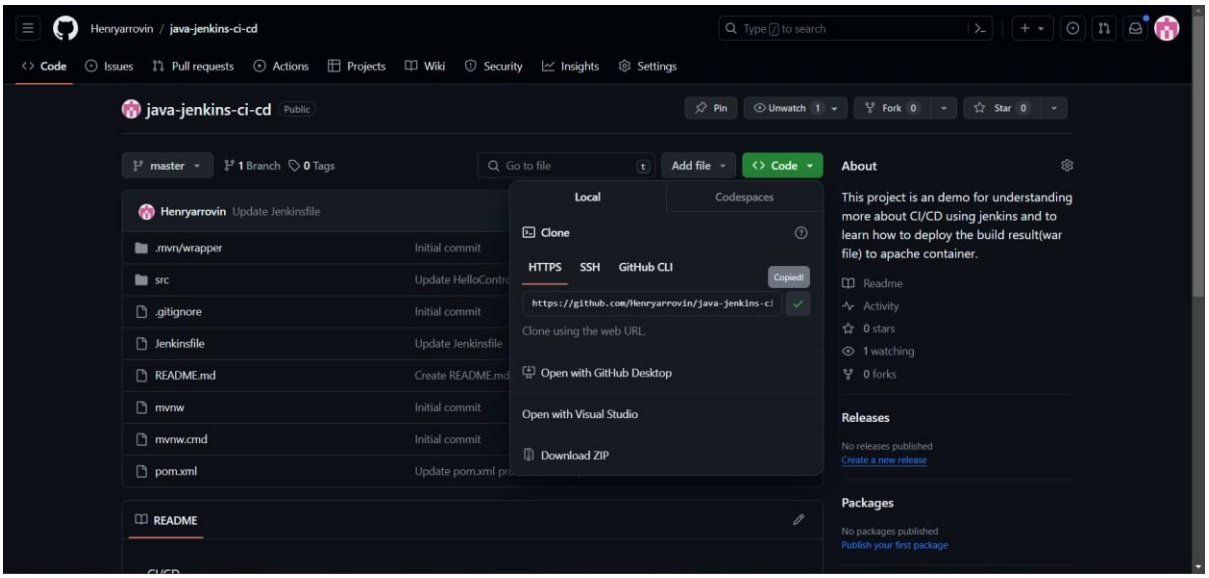


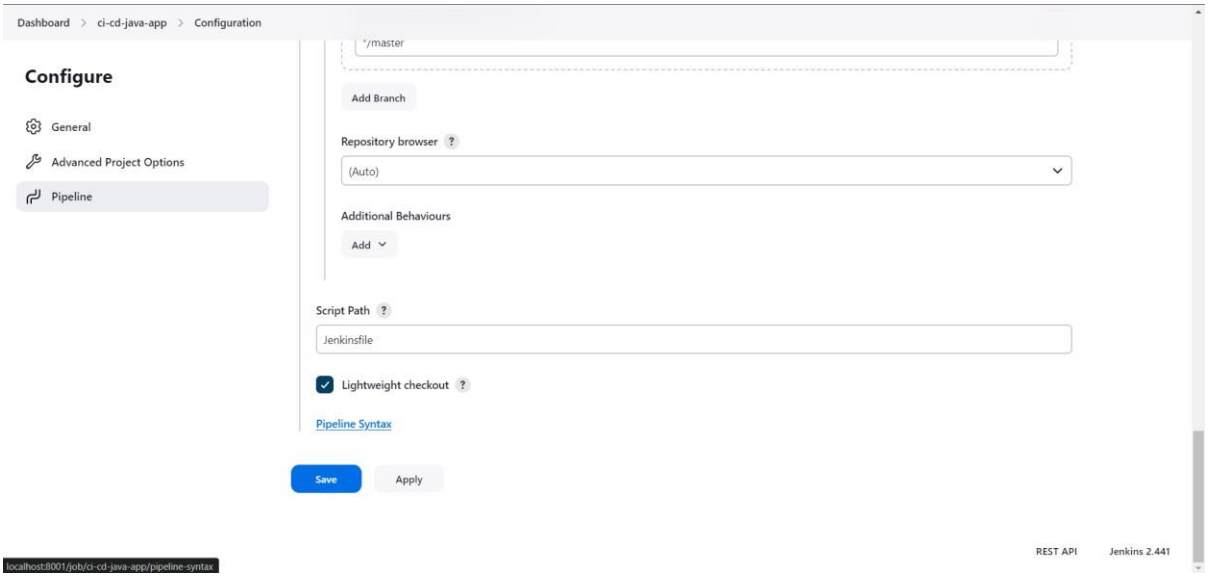
Configure the pipeline to run a job every minute using the cron syntax '* * * * *'and trigger the pipeline whenever a commit is made in GitHub.



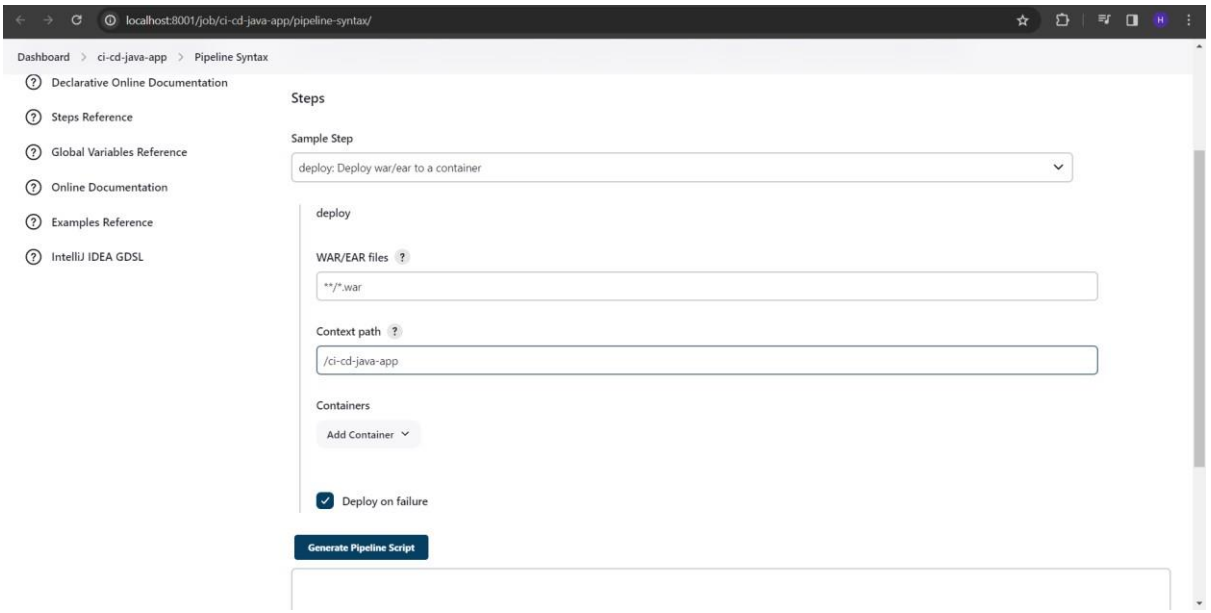

Dashboard > ci-cd-java-app > Configuration
Configure
General
Advanced Project Options
Pipeline
Advanced
Pipeline
Definition
Pipeline script from SCM
Pipeline script
Pipeline script from SCM
None
Script Path
Jenkinsfile
Lightweight checkout
Pipeline Syntax
Save
Apply
REST API
Jenkins 2.441


Dashboard > ci-cd-java-app > Configuration
Configure
General
Advanced Project Options
Pipeline
Advanced
Pipeline
Definition
Pipeline script from SCM
SCM
None
None
Git
Jenkinsfile
Lightweight checkout
Pipeline Syntax
Save
Apply
REST API
Jenkins 2.441


Henryarrovin / java-jenkins-ci-cd
Code
Issues
Pull requests
Actions
Projects
Wiki
Security
Insights
Settings
java-jenkins-ci-cd
Public
Pin
Unwatch 1
Fork 0
Star 0
master
1 Branch
0 Tags
Go to file
Add file
Code
Henryarrovin Update Jenkinsfile
.mvn/wrapper
Initial commit
src
.gitignore
Initial commit
Jenkinsfile
Update Jenkinsfile
README.md
mvnw
Initial commit
mvnw.cmd
Initial commit
pom.xml
Local
Codespaces
Clone
HTTPS
SSH
GitHub CLI
Copied!
https://github.com/Henryarrovin/java-jenkins-c
Clone using the web URL.
Open with GitHub Desktop
Open with Visual Studio
Download ZIP
About
This project is an demo for understanding more about CI/CD using jenkins and to learn how to deploy the build result(war file) to apache container.
Readme
Activity
0 stars
1 watching
0 forks
Releases
No releases published
Create a new release
Packages
No packages published
Publish your first package
README



Generate the pipeline syntax for deploying the application's artifact to the Tomcatserver, specifying the context path as '/your-context-path'. This will automate thedeployment process as part of your continuous integration pipeline.



Choose the installed Tomcat version on your system and provide the credentialsfor the Tomcat Manager application. Additionally, in the advanced manager context path, specify '/manager/text' as it is crucial for receiving an 'OK' message, ensuring the success of the deployment process.
Follow the steps below for guidance.

Context path ?

/ci-cd-java-app

Containers

Add Container

Filter

GlassFish 2.x
GlassFish 3.x
GlassFish 4.x
JBoss AS 3.x
JBoss AS 4.x
JBoss AS 5.x
JBoss AS 6.x
JBoss AS 7.x
Tomcat 4.x Remote
Tomcat 5.x Remote
Tomcat 6.x Remote
Tomcat 7.x Remote
Tomcat 8.x Remote
Tomcat 9.x Remote

Glob

There hat are not steps. These are often exposed via global variables, which are not supported by
Refer

Jenkins Credentials Provider: Jenkins

Scope ?

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

Username ?

admin

Treat username as secret ?

Password ?

•••••

ID ?

Description ?

Jenkins Credentials Provider: Jenkins

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

Username ?

admin

Treat username as secret ?

Password ?

•••••

ID ?

Description ?

Cancel Add

localhost:8001/job/ci-cd-java-app/pipeline-syntax/

Dashboard > ci-cd-java-app > Pipeline Syntax

Tomcat 9.x Remote

Credentials

5d741c1c-b993-425b-a724-4f42d2defe28

+ Add

Tomcat URL ?

http://192.168.0.108:8082/

Advanced Edited

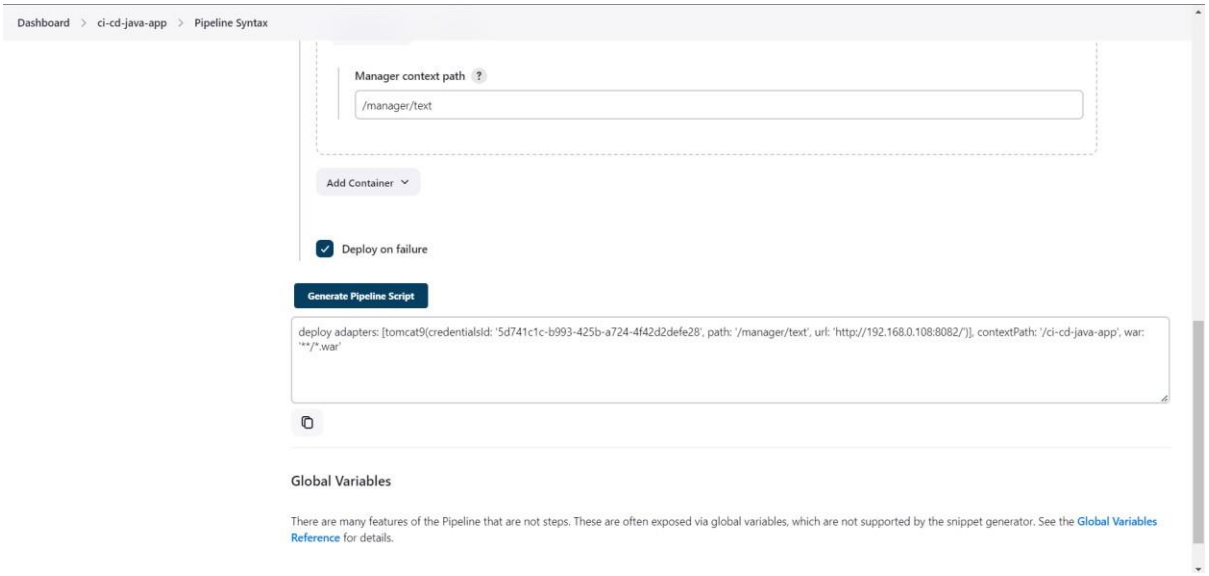
Manager context path ?

/manager/text

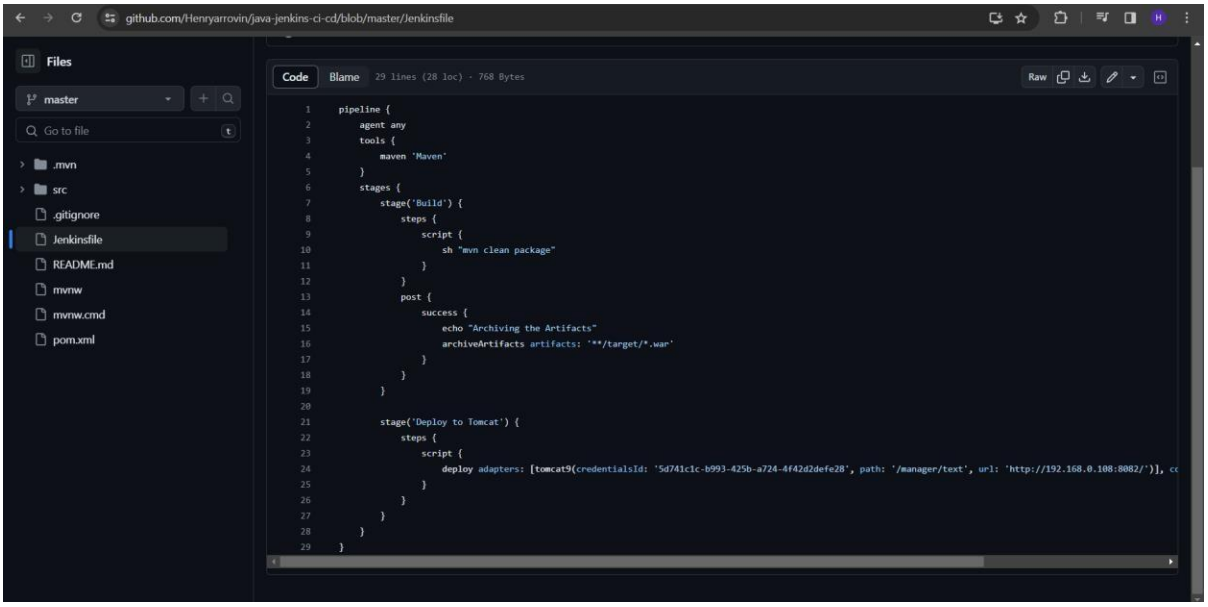
Add Container

Deploy on failure

Generate Pipeline Script



Now paste the syntax generated in the deploy stage of the pipeline code(Jenkinsfile)



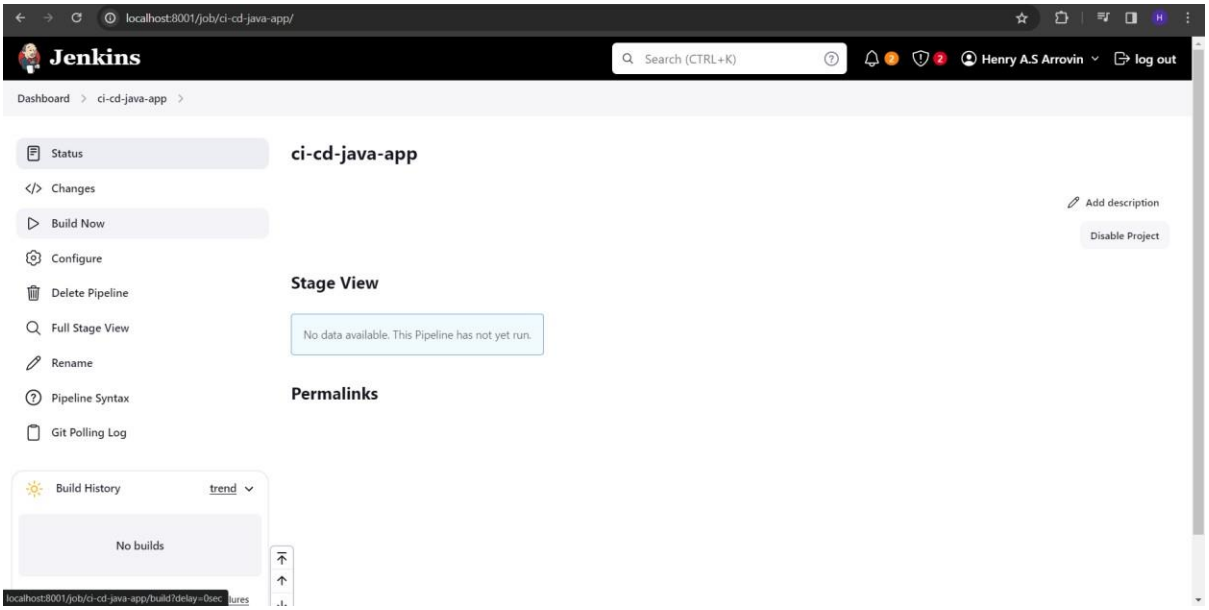
Code: pipeline {
  agent any
  tools {
    maven 'Maven'

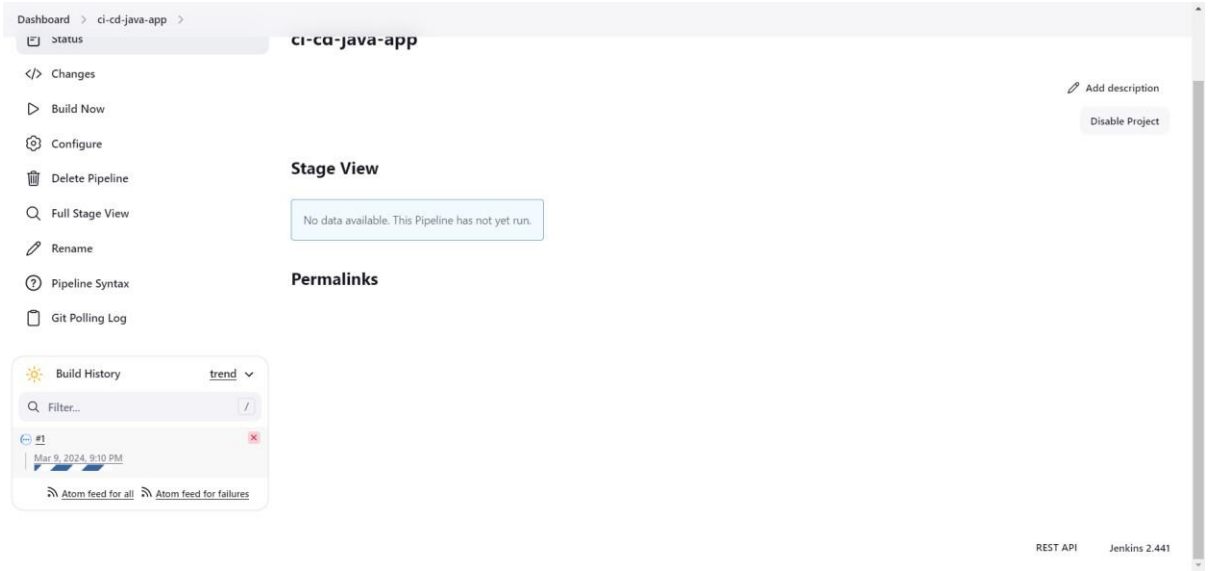
  }
  stages {

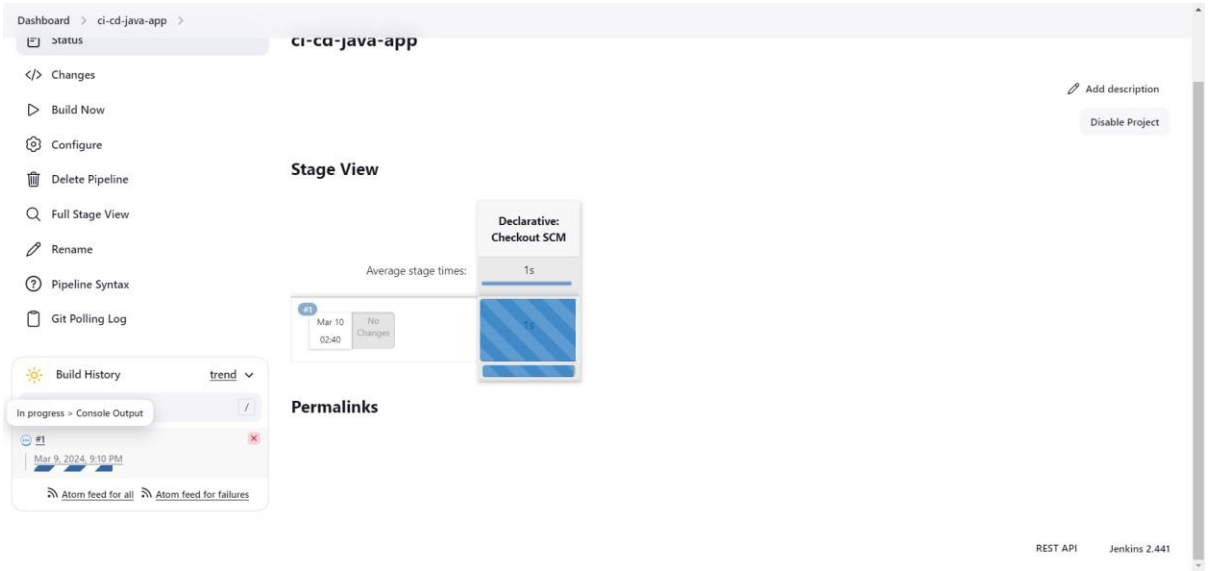
```
        stage('Build') {
            steps {
                script {
                    sh "mvn clean package"

                }
            }

            post {
                success {
                    echo "Archiving the Artifacts" archiveArtifacts
                    artifacts: '**/target/*.war'
                }
            }
        }


        stage('Deploy to Tomcat') {
            steps {
                script {
                    // Paste the code generated.

                }
            }
        }
    }
}
```

Step 3

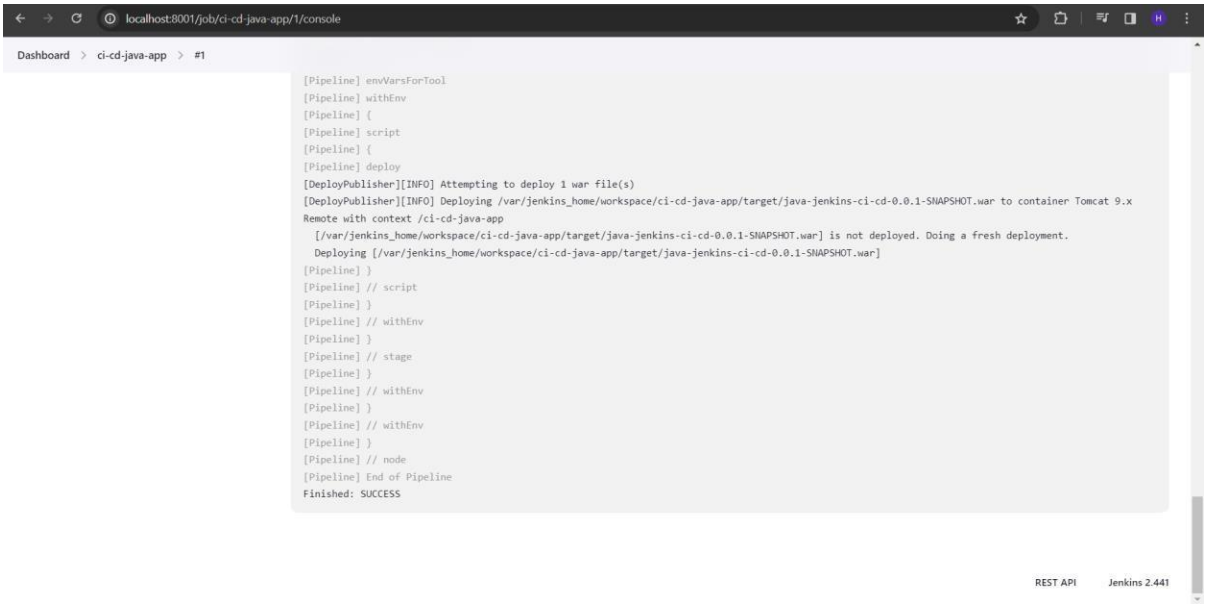
If we build the pipeline or commit changes, it will be triggered.

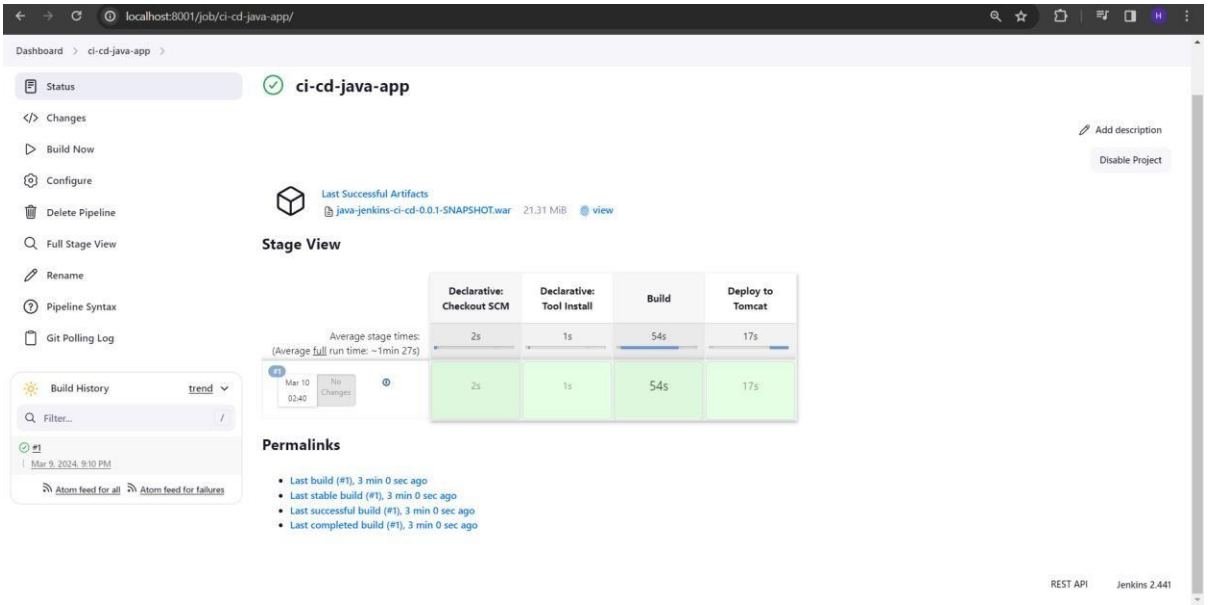

localhost:8001/job/ci-cd-java-app/
Jenkins
Search (CTRL+K)
Henry A.S Arrovin
log out
Dashboard > ci-cd-java-app >
Status
Changes
Build Now
Configure
Delete Pipeline
Full Stage View
Rename
Pipeline Syntax
Git Polling Log
Build History
trend
No builds
ci-cd-java-app
Add description
Disable Project
Stage View
No data available. This Pipeline has not yet run.
Permalinks


Dashboard > ci-cd-java-app >
Status
Changes
Build Now
Configure
Delete Pipeline
Full Stage View
Rename
Pipeline Syntax
Git Polling Log
Build History
trend
Filter...
#1
Mar 9, 2024, 9:10 PM
Atom feed for all
Atom feed for failures
ci-cd-java-app
Add description
Disable Project
Stage View
No data available. This Pipeline has not yet run.
Permalinks
REST API
Jenkins 2.441


Dashboard > ci-cd-java-app >
Status
Changes
Build Now
Configure
Delete Pipeline
Full Stage View
Rename
Pipeline Syntax
Git Polling Log
Build History
trend
In progress > Console Output
#1
Mar 9, 2024, 9:10 PM
Atom feed for all
Atom feed for failures
ci-cd-java-app
Add description
Disable Project
Stage View
Declarative: Checkout SCM
Average stage times:
1s
#1
Mar 10
02:40
No Changes
1s
Permalinks
REST API
Jenkins 2.441

We can also check what is happening properly in the console.





Conclusion

Thus, CI pipeline was successfully created using Jenkins

Date:

Ex No: 5

Create a CD pipeline in Jenkins and deploy in Cloud

Aim

To create a CD pipeline in Jenkins and deploy in Cloud

Procedure

Install Jenkins:

- If you haven't already, install Jenkins on your preferred environment (local, cloud VM, or Docker container). Create a Jenkins Job:
- Log in to Jenkins.
- Click "New Item" to create a new job.
- Choose "Pipeline" as the job type.

Configure Your Pipeline:

- In the pipeline configuration, define your stages. A CD pipeline typically includes stages like:
- Checkout: Pull your code from the repository.
- Build: Compile, package, and create artifacts.
- Test: Run automated tests.
- Deploy: Deploy to the cloud.

Write Your Jenkinsfile:

- A Jenkinsfile defines your pipeline as code.
- Use either declarative syntax or scripted syntax.

Here's a simple example of a declarative Jenkinsfile:

```
pipeline {
  agent any
  stages {
    stage('Checkout') {
      steps {
        checkout scm
      }
    }
    stage('Build') {
      steps {
        sh 'mvn clean package'
      }
    }
    stage('Test') {
      steps {
        sh 'mvn test'
      }
    }
    stage('Deploy to Cloud') {
      steps {
        // Deploy to your cloud provider (e.g., AWS, Azure, GCP)
        // Use appropriate tools (e.g., Terraform, Ansible, CloudFormation)
      }
    }
  }
}
```

Configure Cloud Credentials:

- Add your cloud provider credentials (e.g., AWS access keys, Azure service principal) to Jenkins.
- Use the Credentials Plugin to securely manage secrets.

Deploy to Cloud:

In the “Deploy to Cloud” stage, use tools like:

- Terraform: Define infrastructure as code (IaC) and provision resources.
- Ansible: Configure servers and services.
- CloudFormation: Define AWS infrastructure.
- Kubernetes: Deploy containers to a cluster.

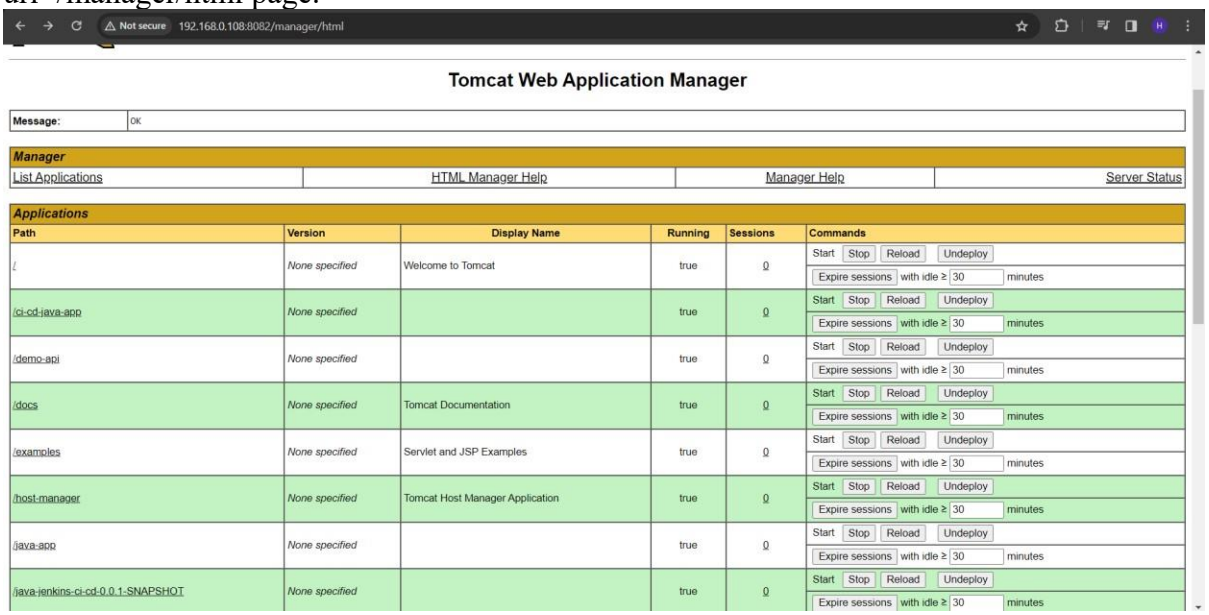
Post-Deployment Actions:

After successful deployment, consider additional steps:

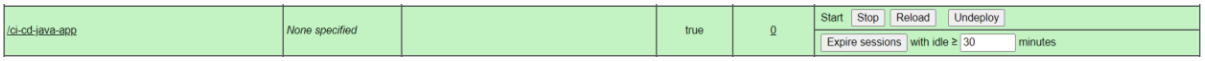
- Notifications: Send email notifications or Slack messages.
- Monitoring: Set up monitoring and alerts.
- Rollbacks: Implement rollback strategies.

Ouput

Now we can check whether our app is deployed in tomcat server in <tomcat-url>/manager/html page.



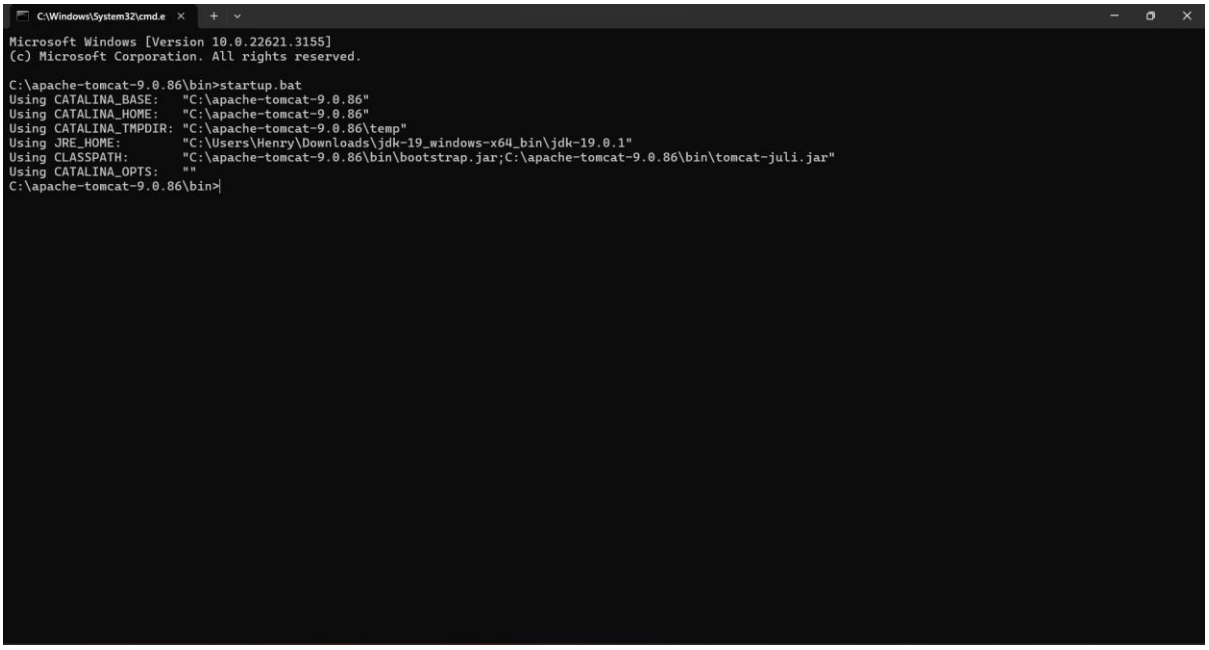
It’ll be in the name of our context path.



Prerequisite:

Before proceeding, ensure that Tomcat is installed on your system as aprerequisite for this setup.

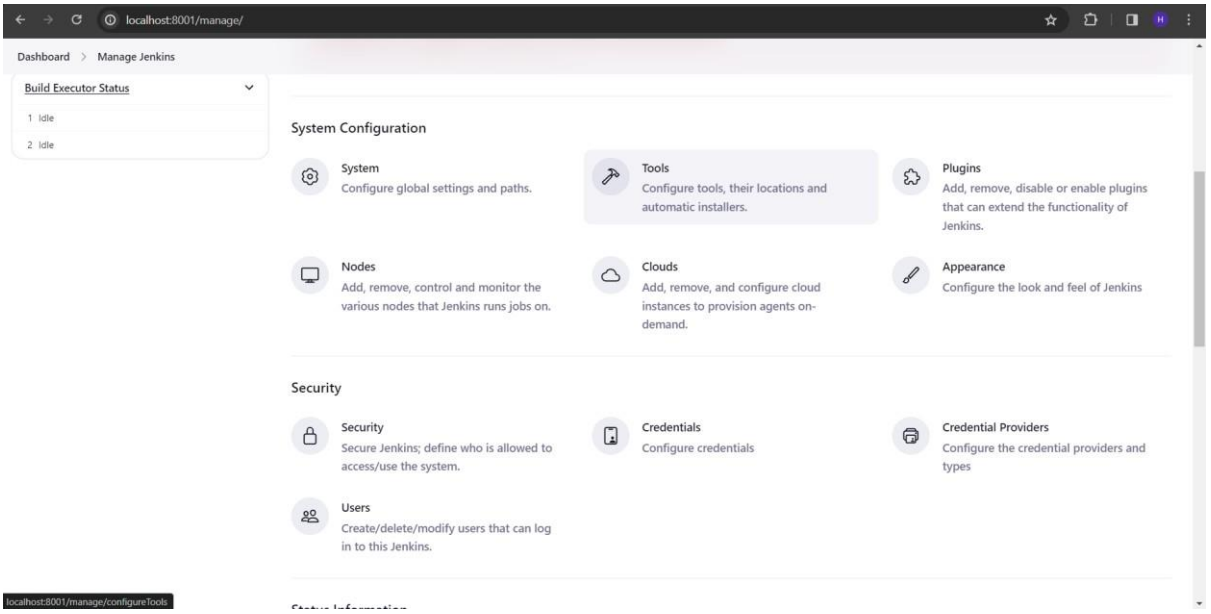
To start the Tomcat server, navigate to the 'bin' directory and run 'startup.bat' onWindows or './startup.sh' on Ubuntu. To stop the server, use 'shutdown.bat' on Windows or './shutdown.sh' on Ubuntu.

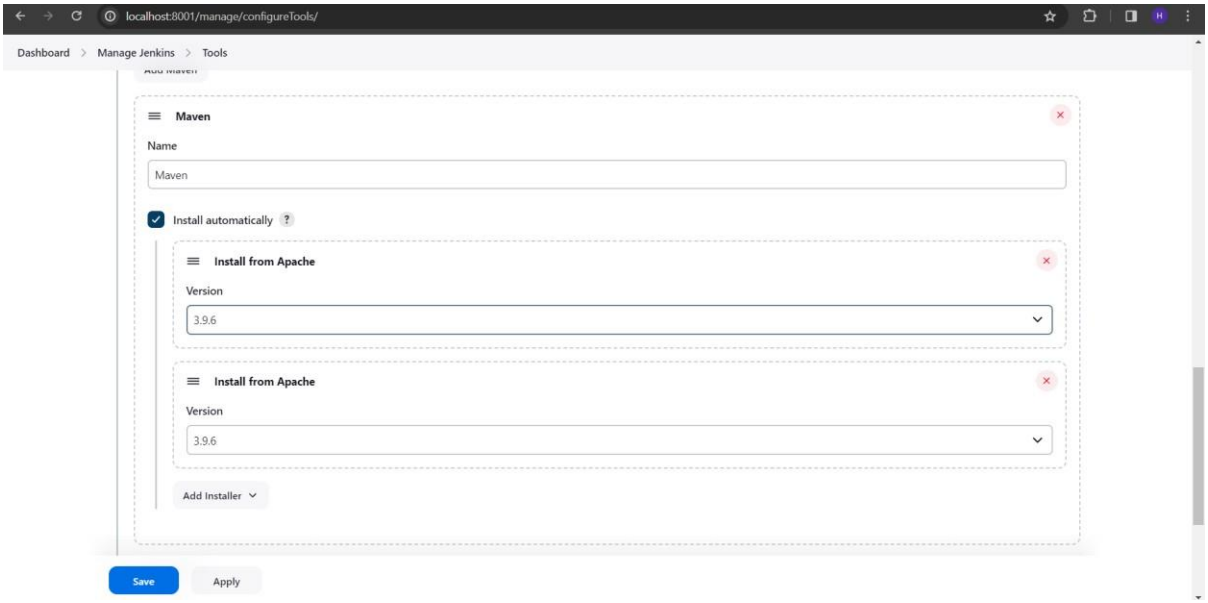


And make sure that maven is configured in Jenkins.

Dashboard >

- New Item
- People
- Build History
- Project Relationship
- Check File Fingerprint
- Manage Jenkins
- My Views





Conclusion

Thus, CD pipeline was successfully created using Jenkins

Date:

Ex No: 6

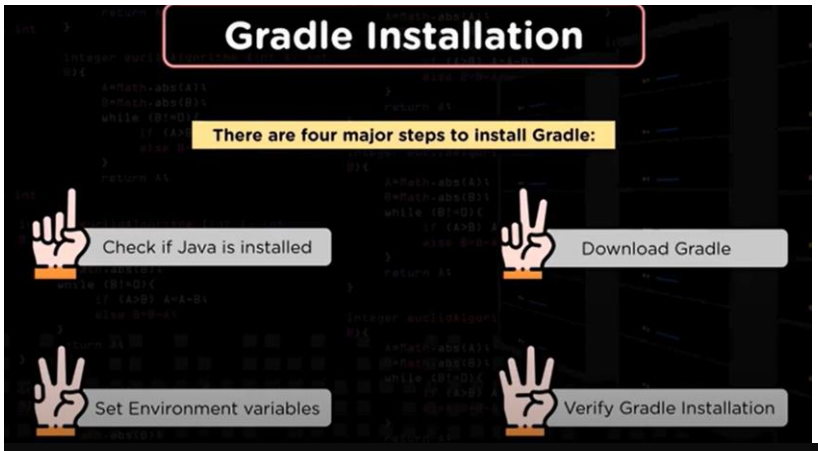
Build a simple application using Gradle

Aim

To build a simple application using Gradle

Procedure

1. Install Gradle (if not already done):
   - Make sure you have Gradle installed on your system. You can download it from the official Gradle website.




```
C:\Users\rosee>gradle -version

Welcome to Gradle 8.7!

Here are the highlights of this release:
 - Compiling and testing with Java 22
 - Cacheable Groovy script compilation
 - New methods in lazy collection properties

For more details see https://docs.gradle.org/8.7/release-notes.html


------------------------------------------------------------
Gradle 8.7
------------------------------------------------------------

Build time:   2024-03-22 15:52:46 UTC
Revision:     650af14d7653aa949fce5e886e685efc9cf97c10

Kotlin:       1.9.22
Groovy:       3.0.17
Ant:          Apache Ant(TM) version 1.10.13 compiled on January 4 2023
JVM:          1.8.0_144 (Oracle Corporation 25.144-b01)
OS:           Windows 10 10.0 amd64

C:\Users\rosee>
```

2. Create a Project Directory:
   - Open your terminal or command prompt and create a new directory for your project:

mkdir my-java-app

cd my-java-app

3. Create Java Classes:
   - Inside your project folder, create a simple Java class for an Employee:

Java

```
// Employee.java
public class Employee {
    private String name;
    private String emailAddress;
    private int yearOfBirth;

    // Constructors, getters, and setters (if needed)
}
```

Next, create a main class that prints employee data:

Java

```
// EmployeeApp.java
public class EmployeeApp {
    public static void main(String[] args) {
        Employee employee = new Employee();
        employee.setName("John");
        employee.setEmailAddress("john@example.com");
        employee.setYearOfBirth(1990);

        System.out.println("Name: " + employee.getName());
        System.out.println("Email Address: " + employee.getEmailAddress());
        System.out.println("Year of Birth: " + employee.getYearOfBirth());
    }
}
```

4. Create a Gradle Build Script:
   - In your project folder, create a build.gradle file with the following content:

```
plugins {
    id 'java'
}

repositories {
    jcenter()
}

dependencies {
    implementation 'org.slf4j:slf4j-api:1.7.32'
    testImplementation 'junit:junit:4.13.2'
```

}

5. Build Your Application:
   - Run the following command to build your Java application:

gradle build

Gradle will compile your code, run tests, and create a JAR file in the build/libs directory.

6. Run Your Application:
   - Execute the following command to run your application:

gradle run

You'll see the output

Output

```
C:\WINDOWS\system32\cmd.exe
Microsoft Windows [Version 10.0.22000.651]
(c) Microsoft Corporation. All rights reserved.

C:\Users\IT20>gradle -version

Welcome to Gradle 8.7!

Here are the highlights of this release:
 - Compiling and testing with Java 22
 - Cacheable Groovy script compilation
 - New methods in lazy collection properties

For more details see https://docs.gradle.org/8.7/release-notes.html


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Gradle 8.7
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Kotlin:       1.9.22
Groovy:       3.0.17
Ant:          Apache Ant(TM) version 1.10.13 compiled on January 4 2023
JVM:          21.0.2 (Oracle Corporation 21.0.2+13-LTS-58)
OS:           Windows 11 10.0 amd64

C:\Users\IT20>mkdir java_app

C:\Users\IT20>cd java_app

C:\Users\IT20\java_app>gradle init
Starting a Gradle Daemon (subsequent builds will be faster)

Select type of build to generate:
  1: Application
  2: Library
  3: Gradle plugin
  4: Basic (build structure only)
Enter selection (default: Application) [1..4] 1
```

```
Select implementation language:
  1: Java
  2: Kotlin
  3: Groovy
  4: Scala
  5: C++
  6: Swift
Enter selection (default: Java) [1..6] 1

Enter target Java version (min: 7, default: 21): 21

Project name (default: java_app): javagradle

Select application structure:
  1: Single application project
  2: Application and library project
Enter selection (default: Single application project) [1..2] 1

Select build script DSL:
  1: Kotlin
  2: Groovy
Enter selection (default: Kotlin) [1..2] 2

Select test framework:
  1: JUnit 4
  2: TestNG
  3: Spock
  4: JUnit Jupiter
Enter selection (default: JUnit Jupiter) [1..4] 1

Generate build using new APIs and behavior (some features may change in the next minor release)? (default: no) [yes, no]yes
```

```
> Task :init
To learn more about Gradle by exploring our Samples at https://docs.gradle.org/8.7/samples/sample_building_java_applications.html

BUILD SUCCESSFUL in 3m 51s
1 actionable task: 1 executed
C:\Users\IT20\java_app>gradlew build
Downloading https://services.gradle.org/distributions/gradle-8.7-bin.zip
...........10%.............20%.............30%.............40%............50%.............60%.............70%.............80%...........
..90%...........100%

BUILD SUCCESSFUL in 3m 44s
7 actionable tasks: 7 executed
C:\Users\IT20\java_app>gradlew tasks

> Task :tasks

------------------------------------------------------------
Tasks runnable from root project 'javagradle'
------------------------------------------------------------

Application tasks
-----------------
run - Runs this project as a JVM application

Build tasks
-----------
assemble - Assembles the outputs of this project.
build - Assembles and tests this project.
buildDependents - Assembles and tests this project and all projects that depend on it.
buildNeeded - Assembles and tests this project and all projects it depends on.
classes - Assembles main classes.
clean - Deletes the build directory.
```

```
jar - Assembles a jar archive containing the classes of the 'main' feature.
testClasses - Assembles test classes.

Build Setup tasks
-----------------
init - Initializes a new Gradle build.
wrapper - Generates Gradle wrapper files.

Distribution tasks
------------------
assembleDist - Assembles the main distributions
distTar - Bundles the project as a distribution.
distZip - Bundles the project as a distribution.
installDist - Installs the project as a distribution as-is.

Documentation tasks
-------------------
javadoc - Generates Javadoc API documentation for the 'main' feature.

Help tasks
----------
buildEnvironment - Displays all buildscript dependencies declared in root project 'javagradle'.
dependencies - Displays all dependencies declared in root project 'javagradle'.
dependencyInsight - Displays the insight into a specific dependency in root project 'javagradle'.
help - Displays a help message.
javaToolchains - Displays the detected java toolchains.
outgoingVariants - Displays the outgoing variants of root project 'javagradle'.
projects - Displays the sub-projects of root project 'javagradle'.
properties - Displays the properties of root project 'javagradle'.
resolvableConfigurations - Displays the configurations that can be resolved in root project 'javagradle'.
tasks - Displays the tasks runnable from root project 'javagradle' (some of the displayed tasks may belong to subprojects).

Verification tasks
------------------
check - Runs all checks.
test - Runs the test suite.

To see all tasks and more detail, run gradlew tasks --all

To see more detail about a task, run gradlew help --task <task>

BUILD SUCCESSFUL in 1s
1 actionable task: 1 executed
C:\Users\IT20\java_app>gradlew run

> Task :app:run
Hello World!

BUILD SUCCESSFUL in 2s
2 actionable tasks: 1 executed, 1 up-to-date
```

Conclusion

Thus, a simple Gradle application was successfully created and build.

Date:

Ex No: 7

Create an Ansible playbook for a simple web application infrastructure

Aim

To create an Ansible playbook for a simple web application infrastructure

Procedure

1. Install Ansible
2. Update the host file to add the managed host Ips
3. Create a playbook
4. Run the playbook using $ansible-playbook playbookname.yml

Output

To check the installation

```
root@it20:/home/student# ansible --version
ansible [core 2.12.10]
  config file = /etc/ansible/ansible.cfg
  configured module search path = ['/root/.ansible/plugins/modules', '/usr/share/ansible/plugins/modules']
  ansible python module location = /usr/lib/python3/dist-packages/ansible
  ansible collection location = /root/.ansible/collections:/usr/share/ansible/collections
  executable location = /usr/bin/ansible
  python version = 3.8.10 (default, Nov 22 2023, 10:22:35) [GCC 9.4.0]
  jinja version = 2.10.1
  libyaml = True
root@it20:/home/student#
```

Host file updation

$gedit /etc/ansible/hosts

```
root@it20: /etc/ansible
# Note that this file was always incomplete  and lagging changes to configuration settings

# for example, for 2.9: https://github.com/ansible/ansible/blob/stable-2.9/examples/ansible.cfg
root@it20:/etc/ansible# cat hosts
# This is the default ansible 'hosts' file.
#
# It should live in /etc/ansible/hosts
#
#   - Comments begin with the '#' character
#   - Blank lines are ignored
#   - Groups of hosts are delimited by [header] elements
#   - You can enter hostnames or ip addresses
#   - A hostname/ip can be a member of multiple groups
[windows]
192.168.8.130
192.168.8.140
[windows:vars]
ansible_user= IT20
ansible_password= 1
ansible_port= 5986
ansible_connection= winrm
ansible_winrm_server_cert_validation= ignore

# Ex 1: Ungrouped hosts, specify before any group headers:

## green.example.com
## blue.example.com
## 192.168.100.1
## 192.168.100.10

# Ex 2: A collection of hosts belonging to the 'webservers' group:

## [webservers]
## alpha.example.org
## beta.example.org
## 192.168.1.100
## 192.168.1.110
```

$ansible main.yml

```
Open   main.yml   Save
/etc/ansible/roles/mysql/tasks
---
# tasks file for mysql
- name: My first play
  hosts: all
  tasks:
    - name: Ping my hosts
      ansible.builtin.win_ping: null
    - name: Print message
      ansible.builtin.debug:
        msg: Hello world
    - name: Start the MySQL service
      ansible.builtin.service:
       name: mysql
       state: started
YAML   Tab Width: 8   Ln 14, Col 22   INS
```

Run the playbook
$ansible-playbook main.yml

```
root@it20:/etc/ansible/roles/mysql/tasks# ansible-playbook main.yml

PLAY [My first play] ***********************************************************************************************************

TASK [Gathering Facts] *********************************************************************************************************
ok: [192.168.8.140]
fatal: [192.168.8.130]: UNREACHABLE! => {"changed": false, "msg": "ssl: HTTPSConnectionPool(host='192.168.8.130', port=5986): Max retries exce
eded with url: /wsman (Caused by ConnectTimeoutError(<urllib3.connection.VerifiedHTTPSConnection object at 0x7fb5421b0d30>, 'Connection to 192
.168.8.130 timed out. (connect timeout=30)'))", "unreachable": true}

TASK [Ping my hosts] ***********************************************************************************************************
ok: [192.168.8.140]

TASK [Print message] ***********************************************************************************************************
ok: [192.168.8.140] => {
    "msg": "Hello world"
}

PLAY RECAP *********************************************************************************************************************
192.168.8.130              : ok=0    changed=0    unreachable=1    failed=0    skipped=0    rescued=0    ignored=0
192.168.8.140              : ok=3    changed=0    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
```

Conclusion

Thus, an Ansible playbook for a simple application infrastructure was created and tested the code on managed hosts

Date:

Ex No:8

Install Ansible and configure ansible roles and to write playbooks

Aim

To install Ansible and configure ansible roles and to write playbooks

Procedure

1. Install Ansible
2. Update the host file to add the managed hostIPs
3. Create new roles
4. Create a playbook under the roles
5. Run the playbook using $ansible-playbook playbookname.yml

Output

To check the installation

```
root@it20:/home/student# ansible --version
ansible [core 2.12.10]
  config file = /etc/ansible/ansible.cfg
  configured module search path = ['/root/.ansible/plugins/modules', '/usr/share/ansible/plugins/modules']
  ansible python module location = /usr/lib/python3/dist-packages/ansible
  ansible collection location = /root/.ansible/collections:/usr/share/ansible/collections
  executable location = /usr/bin/ansible
  python version = 3.8.10 (default, Nov 22 2023, 10:22:35) [GCC 9.4.0]
  jinja version = 2.10.1
  libyaml = True
root@it20:/home/student#
```

Host file updation

$gedit /etc/ansible/hosts

```
root@it20: /etc/ansible
# Note that this file was always incomplete  and lagging changes to configuration settings

# for example, for 2.9: https://github.com/ansible/ansible/blob/stable-2.9/examples/ansible.cfg
root@it20:/etc/ansible# cat hosts
# This is the default ansible 'hosts' file.
#
# It should live in /etc/ansible/hosts
#
#   - Comments begin with the '#' character
#   - Blank lines are ignored
#   - Groups of hosts are delimited by [header] elements
#   - You can enter hostnames or ip addresses
#   - A hostname/ip can be a member of multiple groups
[windows]
192.168.8.130
192.168.8.140
[windows:vars]
ansible_user= IT20
ansible_password= 1
ansible_port= 5986
ansible_connection= winrm
ansible_winrm_server_cert_validation= ignore

# Ex 1: Ungrouped hosts, specify before any group headers:

## green.example.com
## blue.example.com
## 192.168.100.1
## 192.168.100.10

# Ex 2: A collection of hosts belonging to the 'webservers' group:

## [webservers]
## alpha.example.org
## beta.example.org
## 192.168.1.100
## 192.168.1.110
```

To view the files in ansible

>> cd /etc/ansible

>>ls

hosts ansible.cfg roles

>>roles

>>$ ansible-galaxy init apache

>>ls

>>tree apache

$ansible main.yml

main.yml
/etc/ansible/roles/mysql/tasks

```yaml
---
# tasks file for mysql
- name: My first play
  hosts: all
  tasks:
    - name: Ping my hosts
      ansible.builtin.win_ping: null
    - name: Print message
      ansible.builtin.debug:
        msg: Hello world
    - name: Start the MySQL service
      ansible.builtin.service:
       name: mysql
       state: started
```

YAML Tab Width: 8 Ln 14, Col 22 INS

Run the playbook
$ansible-playbook wintest.yml

```
root@it20:/home/student# ansible-playbook wintest.yml

PLAY [My first play] ***********************************************************************************************

TASK [Gathering Facts] *********************************************************************************************
ok: [192.168.8.140]

TASK [Ping my hosts] ***********************************************************************************************
ok: [192.168.8.140]

TASK [Print message] ***********************************************************************************************
ok: [192.168.8.140] => {
    "msg": "Hello world"
}

PLAY RECAP *********************************************************************************************************
192.168.8.140              : ok=3    changed=0    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
```

Conclusion

Thus, an ansible roles are configured and new playbooks are created and executed successfully