DevOps Pipeline for Java Spring Boot using Jenkins, Docker, and AWS EC2

Overview

This project demonstrates setting up a Continuous Integration/Continuous Deployment (CI/CD) pipeline using Jenkins to automate building, testing, and deploying a Java Spring Boot application. Docker is used for containerization, and the final application is deployed on an AWS EC2 instance.

Tools and Technologies Used

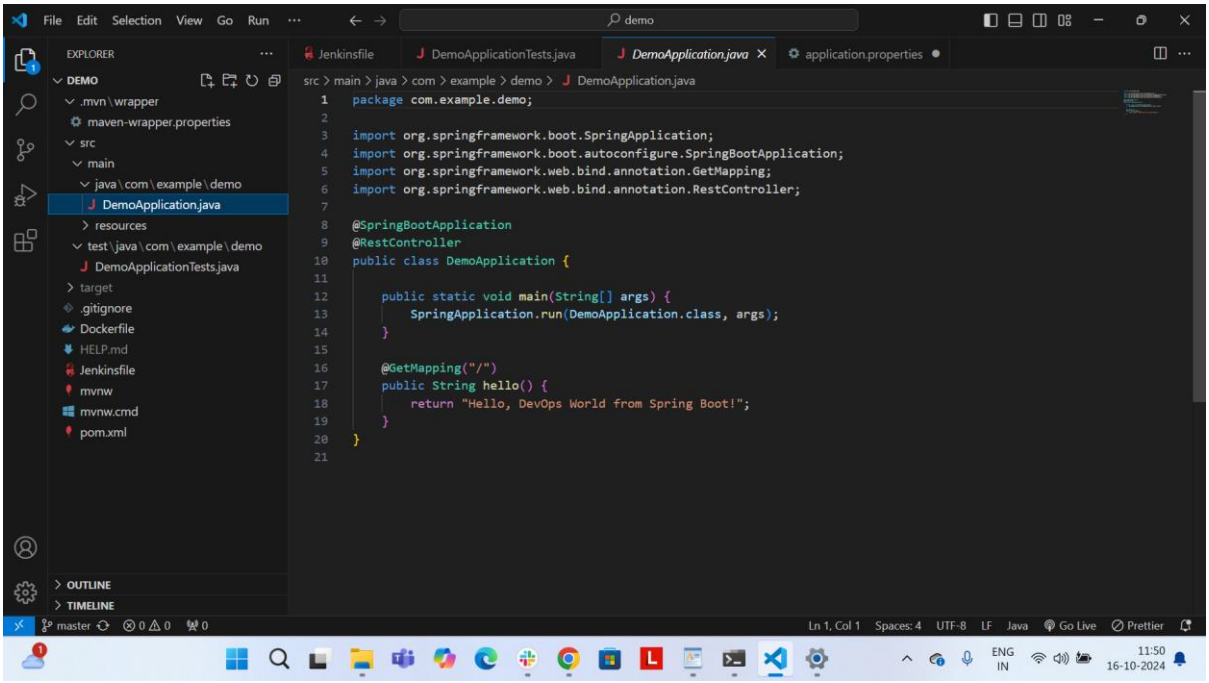
- **Java Spring Boot**: Web application framework.
- **Jenkins**: For automating the CI/CD process.
- **Docker**: Containerization tool.
- **GitHub**: For source code management.
- **AWS EC2**: Deployment platform for hosting the application.
- **Maven**: Build tool for the Java project.
- **YAML**: Optional for Jenkins pipeline configuration.
- **Git**: Version control system.

Step-by-Step Implementation

Step 1: Create a Simple Spring Boot Application

1. **Generate the Project**
    a. Use Spring Initializr with the following configuration:
        i. **Project**: Maven
        ii. **Language**: Java
        iii. **Spring Boot**: 2.7.x or latest
        iv. **Packaging**: Jar
        v. **Dependency**: Spring Web

2. **Create the Basic Application Code**

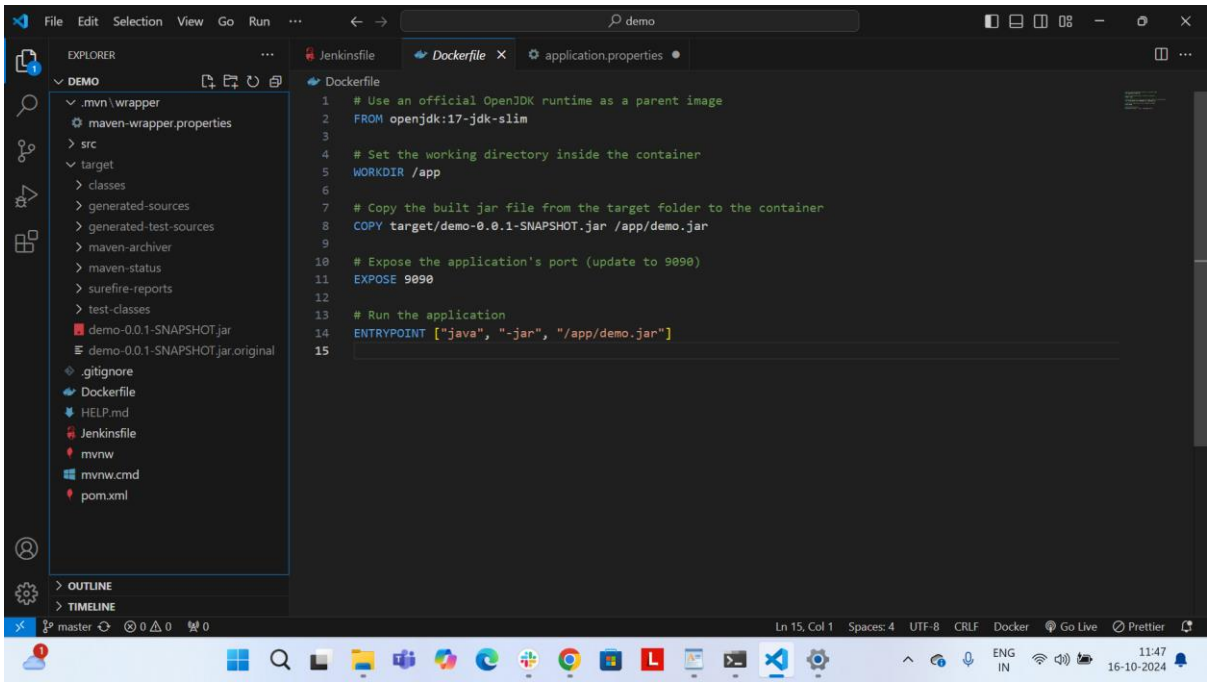


3. **Build the Project**
   In the project root, run:

   ./mvnw clean package

Step 2: Containerize the Spring Boot Application with Docker

1. **Create a Dockerfile**



2. Build and Test Docker Image

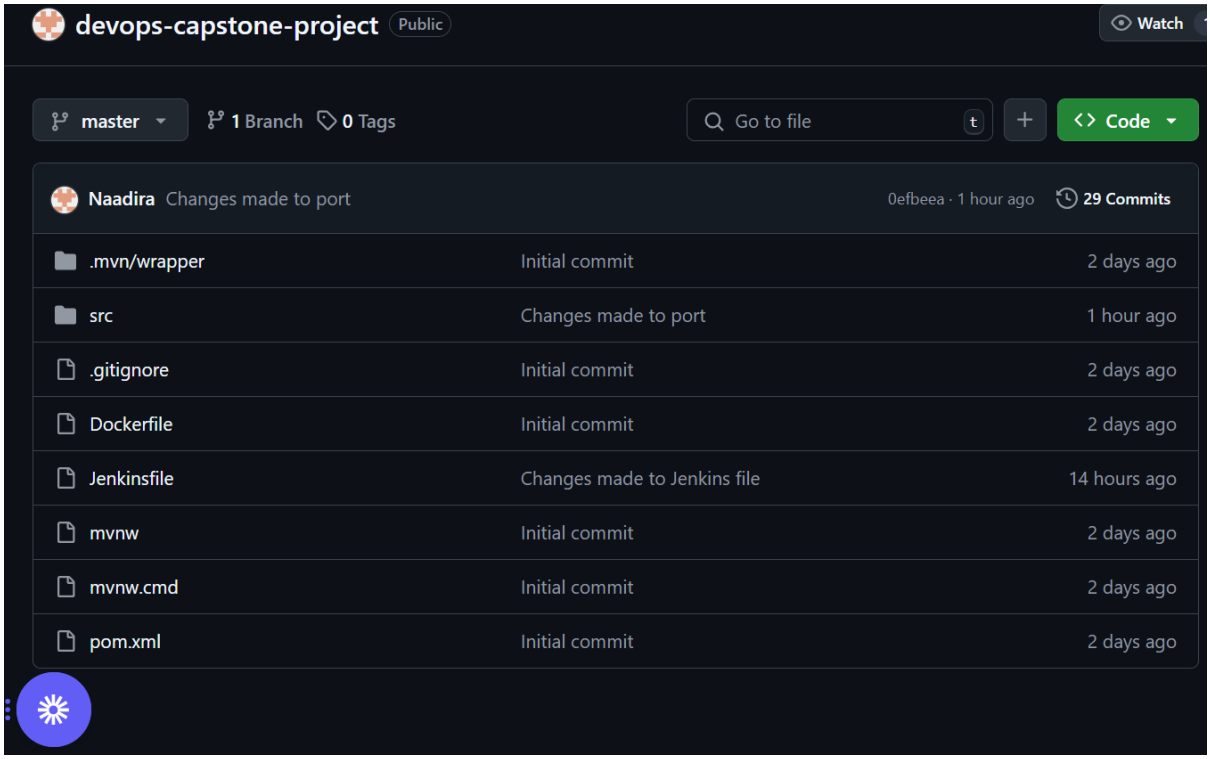
   docker build -t spring-boot-demo .
   docker run -p 8080:9090 spring-boot-demo

3. **Verify Application**
   Visit http://localhost:9090 to see:
   "Hello DevOps World!"

Step 3: Push Code to GitHub

1. Initialize Git and Push Code

```
git init
git add .
git commit -m "Initial commit"
git remote add origin GuviProject
git push -u origin master
```



Step 4: Set Up Jenkins for CI/CD

1. Install Jenkins

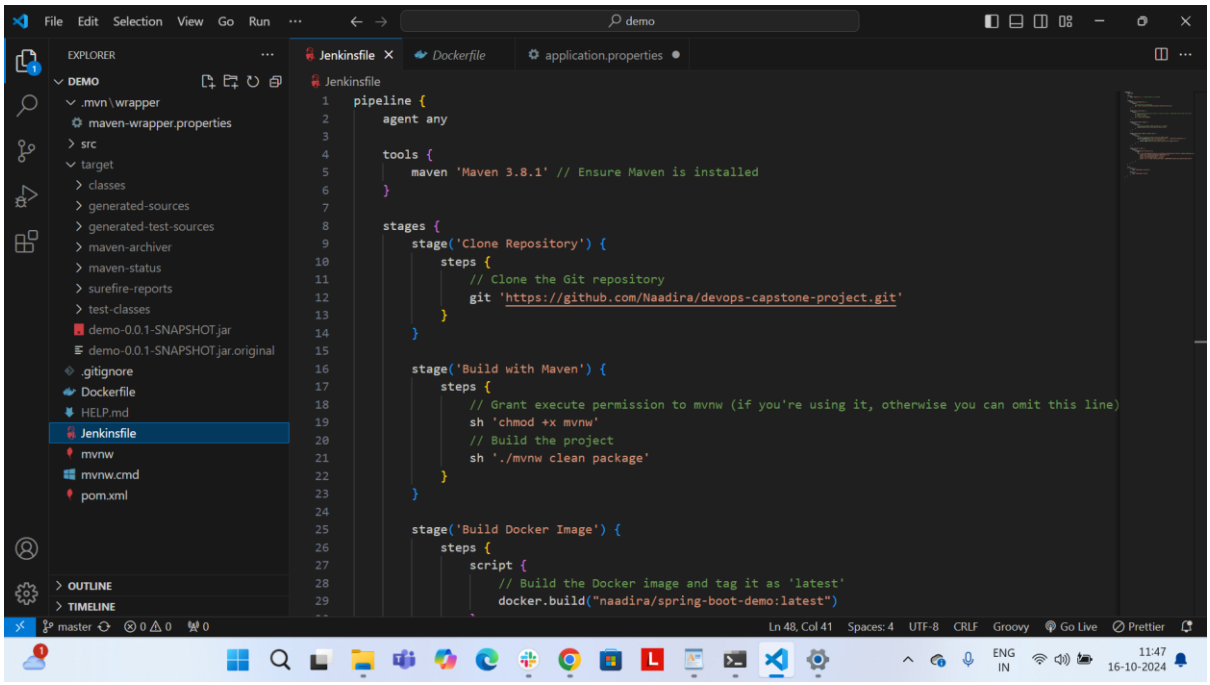
a. Install Jenkins on your local machine instance.

2. Configure Jenkins

a. Install Docker, Maven, and the following Jenkins plugins:

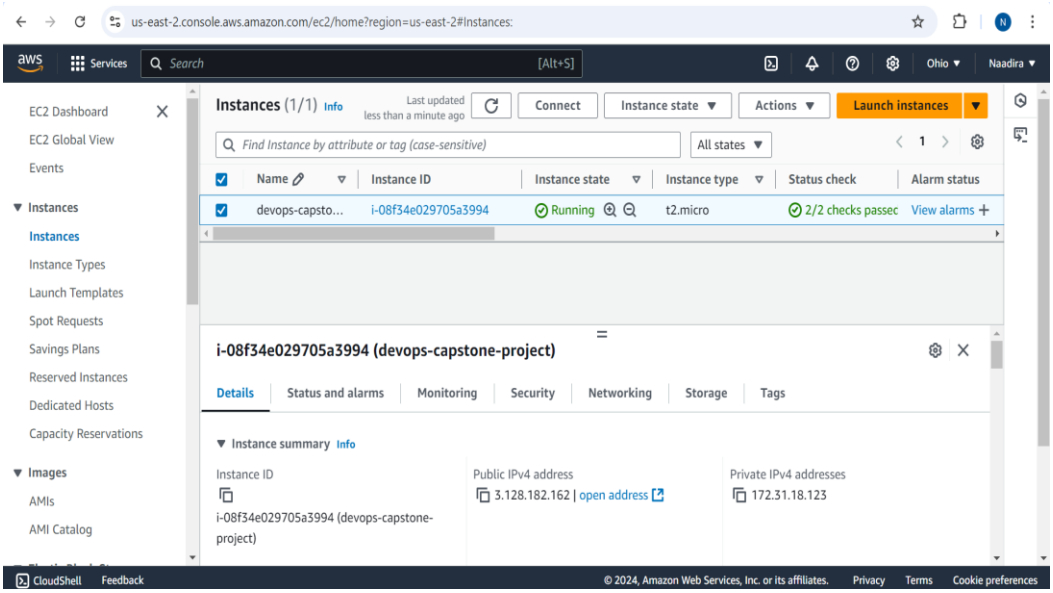
i. Git Plugin
ii. Maven Integration Plugin
iii. Docker Pipeline Plugin

3. Create a Jenkins Pipeline Job



Step 5: Deploy the Application on AWS EC2

1. Create an EC2 Instance
    a. Use Amazon Linux or Ubuntu for the instance.



2. Install Docker on EC2

SSH into the EC2 instance and run:

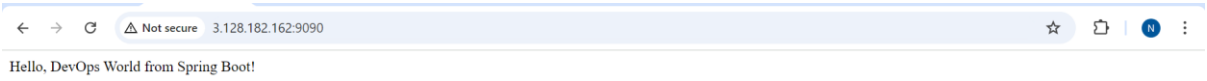
```
sudo yum update -y
sudo yum install docker -y
sudo service docker start
sudo usermod -aG docker ec2-user
```

3. **Configure SSH Access in Jenkins**

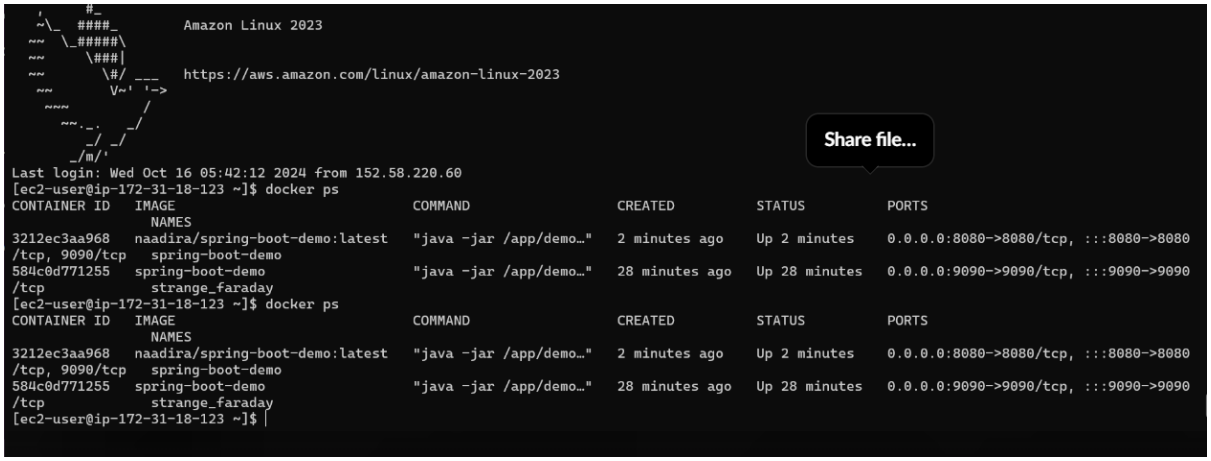
- Add your EC2 SSH key to Jenkins using the SSH Agent plugin.

Step 6: Monitor the Application

1. **Access the Deployed Application**
   a. Visit:
   b. http://<ec2-instance-ip>:9090



Step 7: Build the jenkins pipeline and check the container in EC2:



Project Recap

- **Java Spring Boot**: Developed a simple RESTful API.
- **Docker**: Used for containerization.
- **GitHub**: Managed source code.
- **Jenkins**: Automated build, test, and deployment.
- **AWS EC2**: Hosted the application in the cloud.