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DevOps Foundations: Version Control and CI/CD with Jenkins

Course-End Project 1: Insured Assurance

Objective

To create a GitHub Actions CI/CD pipeline workflow for invoking the deployment of a Java application as a Jenkins job using Tomcat Apache

Real-time scenario:

Insured Assurance, a leading global insurance provider based in the US, offers a range of products including home, health, car, and life insurance. The company is transitioning to a DevOps architecture and aims to automate code builds and deployments across various environments. To meet this need, it has adopted GitHub Actions for code checkout, building, and testing automation and Jenkins for continuous deployment. As a DevOps engineer at Insured Assurance, you are tasked with implementing a CI/CD pipeline using GitHub Actions and Jenkins.

Tasks

The following tasks outline the process of implementing CI/CD using GitHub Actions and Jenkins:

1. Create a code repository on GitHub
2. Create a GitHub Actions pipeline to perform continuous integration
3. Configure Tomcat Apache for automated code deployment
4. Integrate the GitHub Actions pipeline to invoke the Jenkins pipeline
5. Invoke pipeline to validate automated deployment

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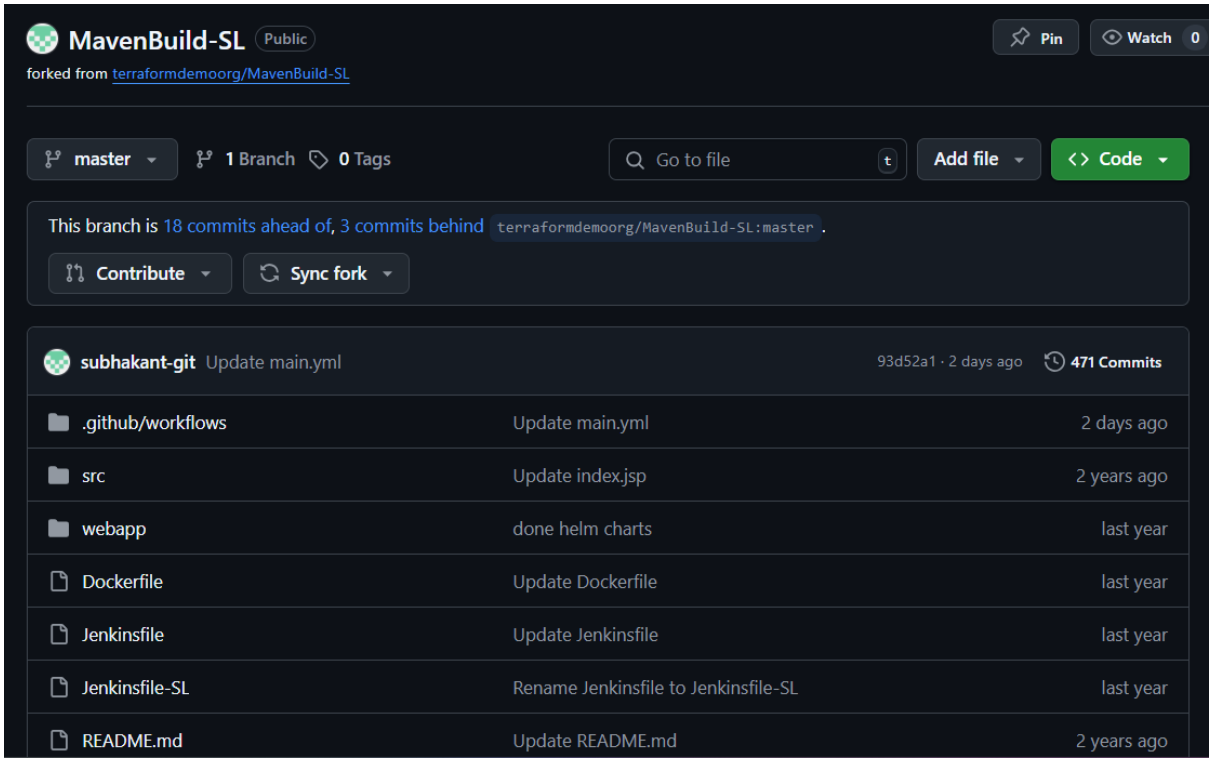
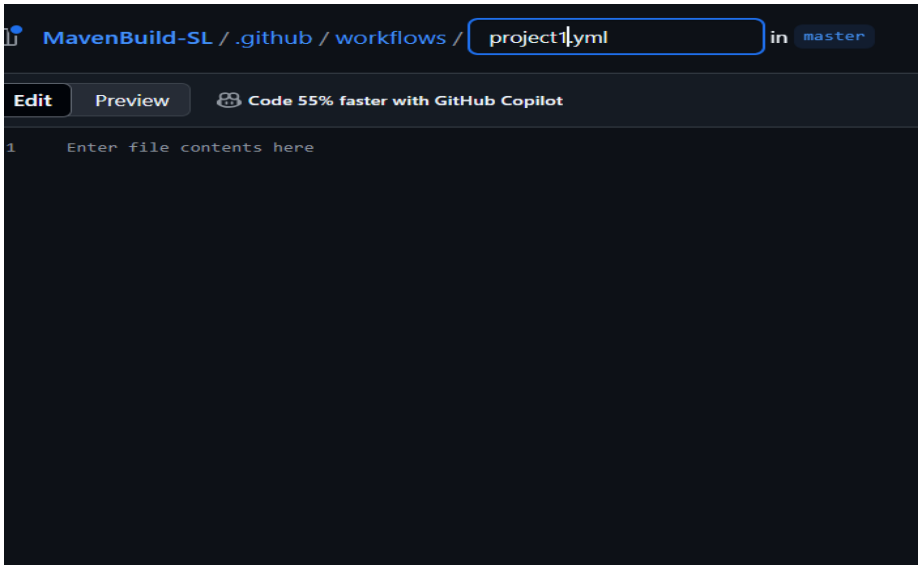
Solution

Task 1: Create a code repository on GitHub Forking repository from

https://github.com/demo1orgtoday/MavenBuild-SL.git



Task 2: Create a GitHub Actions workflow to perform continuous integration



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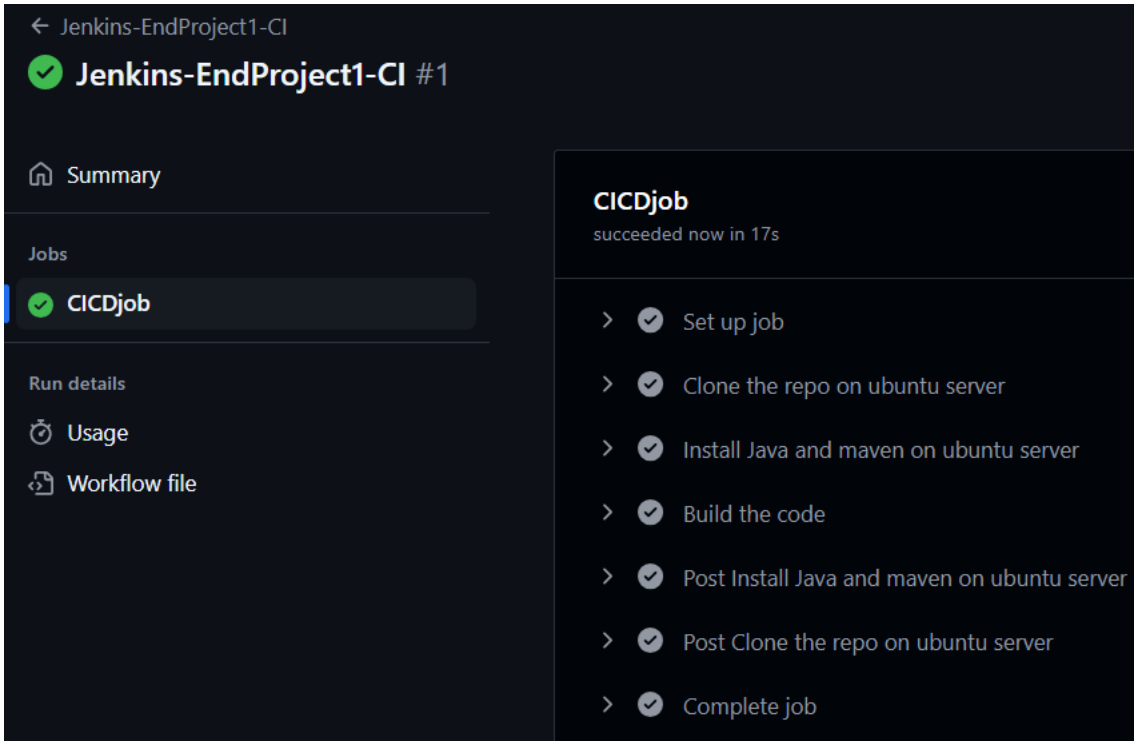
Initial GitHub Action Code:

Edit | Preview | Code 55% faster with GitHub Copilot

```yaml
name: Jenkins-EndProject1-CI
on:
  #push: # run when there is commit to repo
  workflow_dispatch: # run manually
jobs:
  CICDjob:
    runs-on: ubuntu-latest
    steps:
      - name: Clone the repo on ubuntu server
        uses: actions/checkout@v4
      - name: Install Java and maven on ubuntu server
        uses: actions/setup-java@v4
        with:
          distribution: 'temurin'
          java-version: '11'
          cache: 'maven'
      - name: Build the code
        run: mvn package
```



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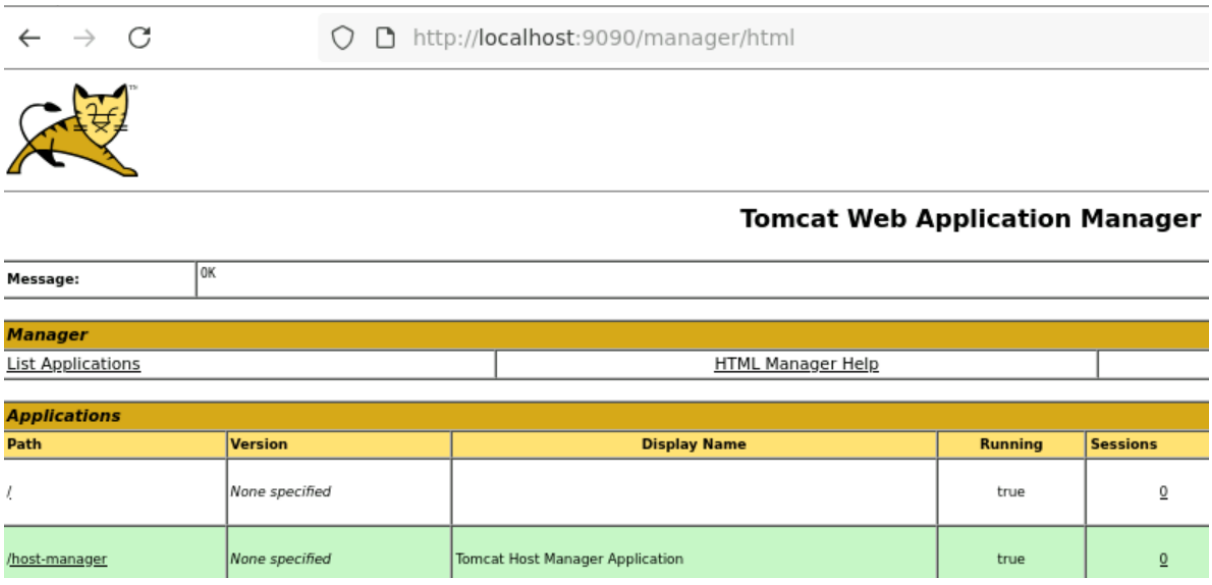
Task 3: Configure Tomcat Apache for automated code deployment

```
root@ip-172-31-43-138:~# apt install tomcat9 tomcat9-admin -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  libapr1 libeclipse-jdt-core-java libtcnative-1 libtomcat9-java tomcat9-common
Suggested packages:
  tomcat9-docs tomcat9-examples tomcat9-user
The following NEW packages will be installed:
  libapr1 libeclipse-jdt-core-java libtcnative-1 libtomcat9-java tomcat9 tomcat9-admin tomcat9-common
0 upgraded, 7 newly installed, 0 to remove and 261 not upgraded.
Need to get 12.7 MB of archives.
After this operation, 16.5 MB of additional disk space will be used.
Get:1 http://ap-south-1a.clouds.ports.ubuntu.com/ubuntu-ports jammy-updates/main arm64 libapr1 arm64
Get:2 http://ap-south-1a.clouds.ports.ubuntu.com/ubuntu-ports jammy/universe arm64 libeclipse-jdt-cor
B]
Get:3 http://ap-south-1a.clouds.ports.ubuntu.com/ubuntu-ports jammy-updates/universe arm64 libtomcat9
Get:4 http://ap-south-1a.clouds.ports.ubuntu.com/ubuntu-ports jammy-updates/universe arm64 tomcat9-co
Get:5 http://ap-south-1a.clouds.ports.ubuntu.com/ubuntu-ports jammy-updates/universe arm64 tomcat9 al
Get:6 http://ap-south-1a.clouds.ports.ubuntu.com/ubuntu-ports jammy-updates/universe arm64 tomcat9-ad
Get:7 http://ap-south-1a.clouds.ports.ubuntu.com/ubuntu-ports jammy/universe arm64 libtcnative-1 arm6
Fetched 12.7 MB in 2s (5651 kB/s)
Selecting previously unselected package libapr1:arm64.
(Reading database ... 331510 files and directories [illegible]ntly installed.)
Preparing to unpack .../0-libapr1_1.7.0-8ubuntu0.22.[illegible]_arm64.deb ...
```



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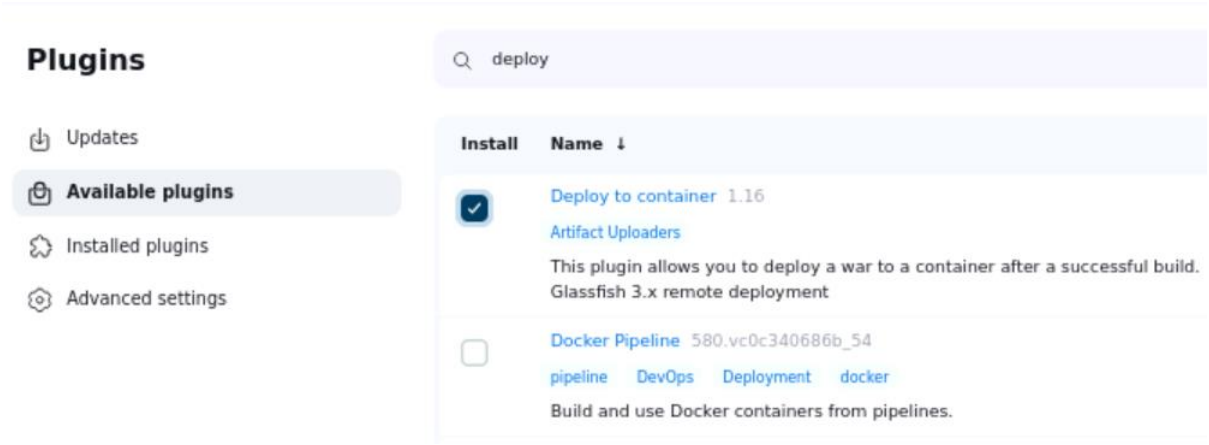
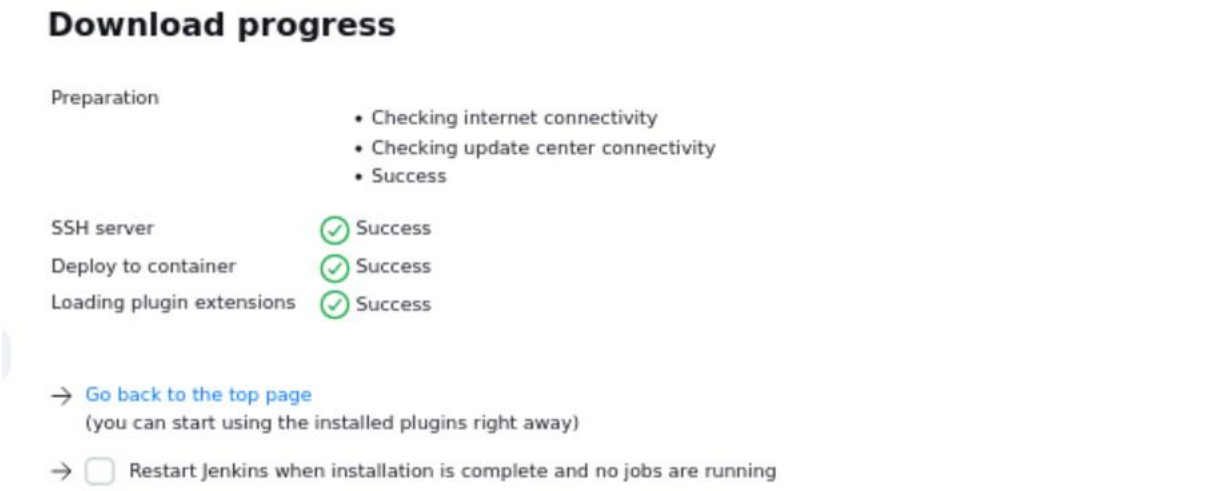
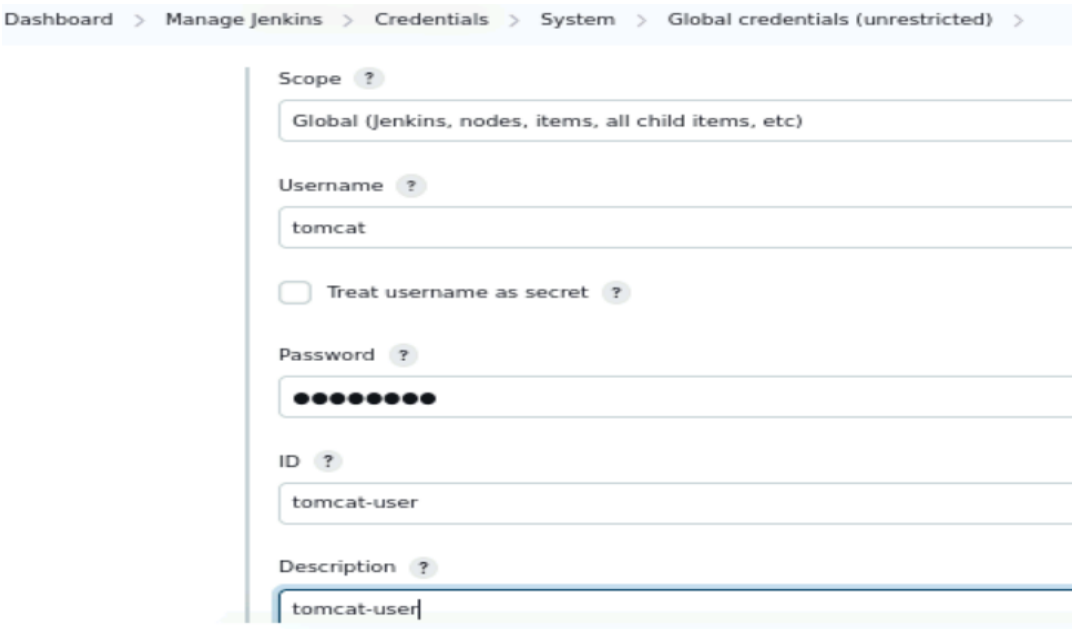
Added Deploy to container Jenkins plugin





Added tomcat user



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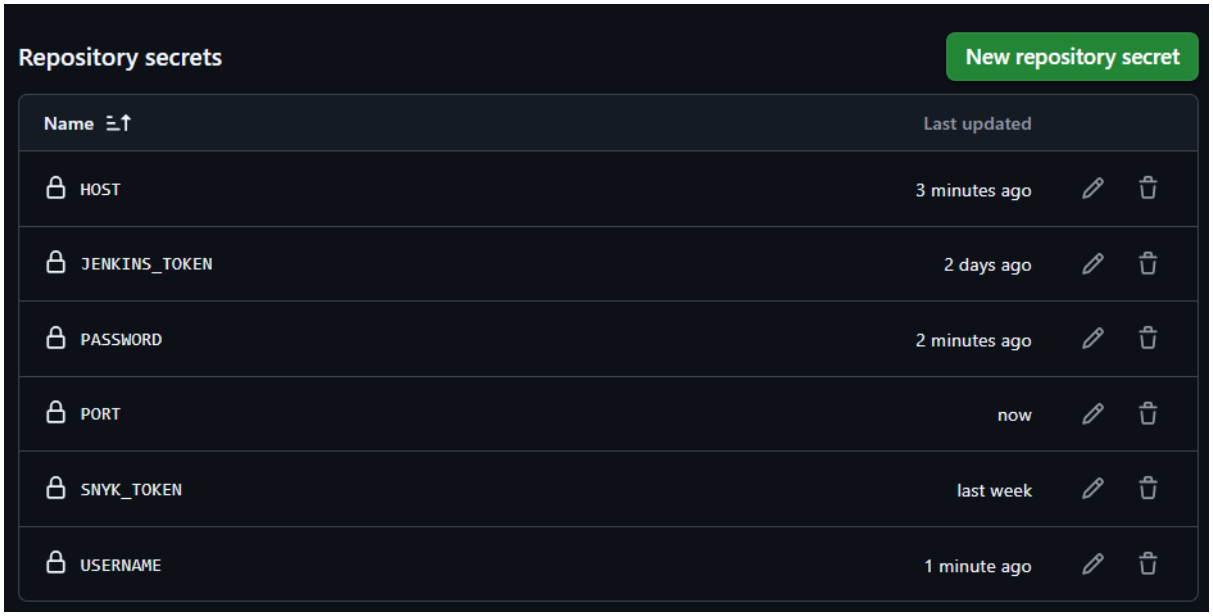
Task 4: Integrate the GitHub Actions pipeline to invoke the Jenkins pipeline

Added secrets for lab connection



Updated action with .war copy and trigger for Jenkins job

```
name: Jenkins-EndProject1-CICD
on:
  push: # run when there is commit to repo
  workflow_dispatch: # run manually
jobs:
  CICDjob:
    runs-on: ubuntu-latest
    steps:
      - name: Clone the repo on ubuntu server
        uses: actions/checkout@v4
      - name: Install Java and maven on ubuntu server
        uses: actions/setup-java@v4
        with:
          distribution: 'temurin'
          java-version: '11'
          cache: 'maven'
      - name: Build the code
        run: mvn package
      - name: connect to LAb and deploy code on tomcat9
        uses: cross-the-world/ssh-scp-ssh-pipelines@latest
        with:
          host: ${{secrets.HOST}}
          user: ${{secrets.USERNAME}}
          pass: ${{secrets.PASSWORD}}
          port: ${{secrets.PORT}}
          connect_timeout: 10s
          first_ssh: |
           sudo chmod 777 /var/lib/tomcat9/webapps
          scp: |
           './target/*war' => /var/lib/tomcat9/webapps
          last_ssh: |
           sudo systemctl restart tomcat9
      - name: Connect to Lab machine and trigger a Jenkins job
        uses: cross-the-world/ssh-scp-ssh-pipelines@latest
        with:
          host: ${{secrets.HOST}}
          user: ${{secrets.USERNAME}}
          pass: ${{secrets.PASSWORD}}
          port: ${{secrets.PORT}}
          connect_timeout: 10s
          first_ssh: |
           curl -l -u admin:Root123$ http://localhost:8080/job/JenkinsEndProject2/build?token=tomcatDeploy
```

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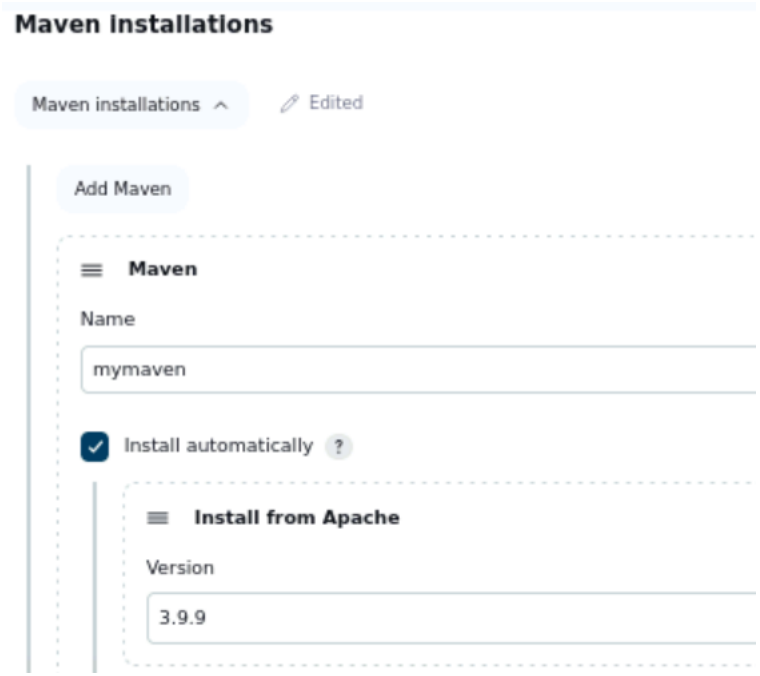
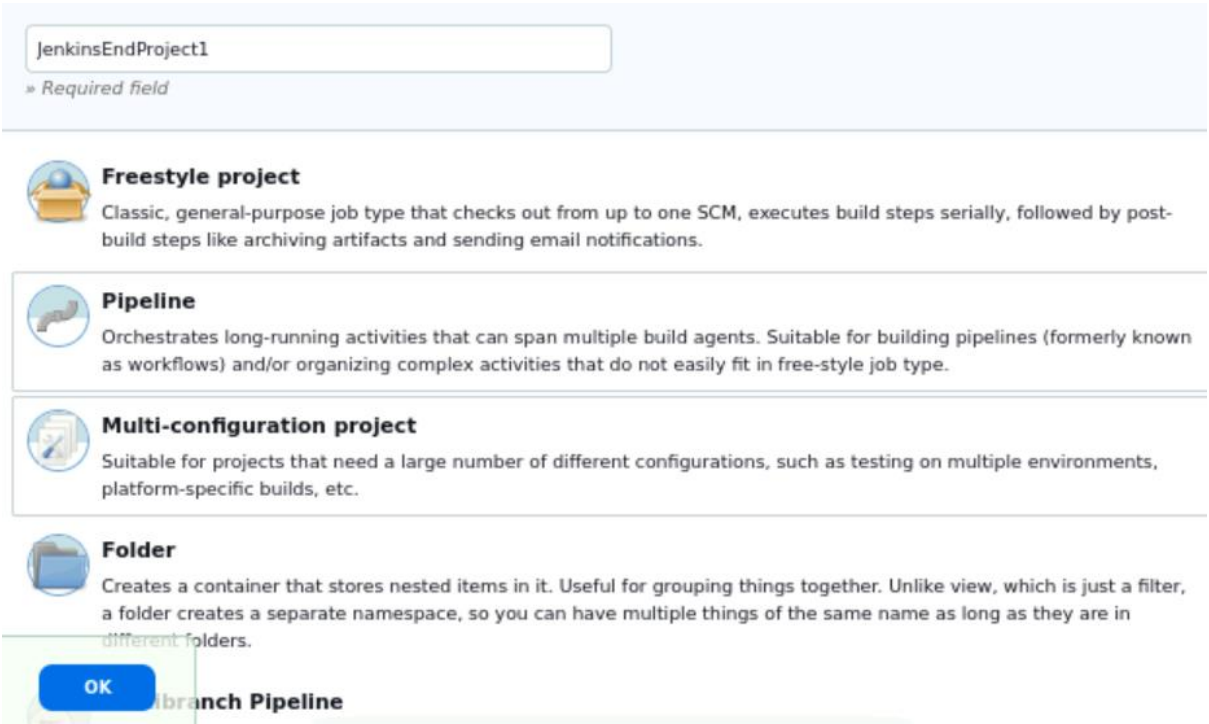
Added maven tool in Jenkins



Creating Jenkins pipeline job



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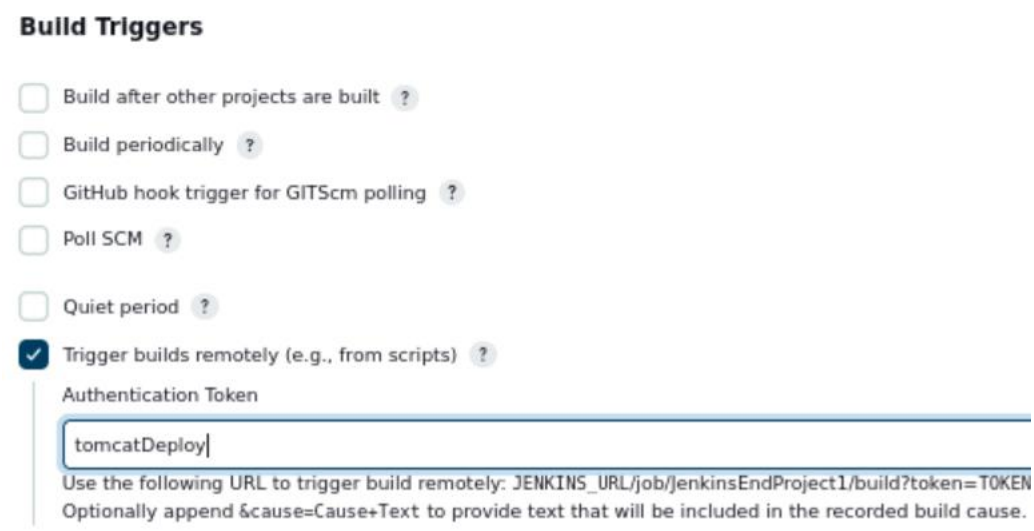


```
pipeline{
    agent any
    tools{
        maven 'mymaven'
        }
    stages{
        stage('checkout code')
        {
        steps{
            git
         }
        }
        'https://github.com/Sonal0409/DevOpsCodeDemo.git'
        stage('Build and Deploy the Code')
        {
        steps{
            sh 'mvn package'
            }
        post{
        success{
            deploy adapters: [tomcat9(credentialsId: 'tomcat-user', path: '', url:
            'http://localhost:9090')], contextPath: null, war: '**/*.war'
            }
        }
        }
    }
}
```

Task 5: Invoke pipeline to validate automated deployment

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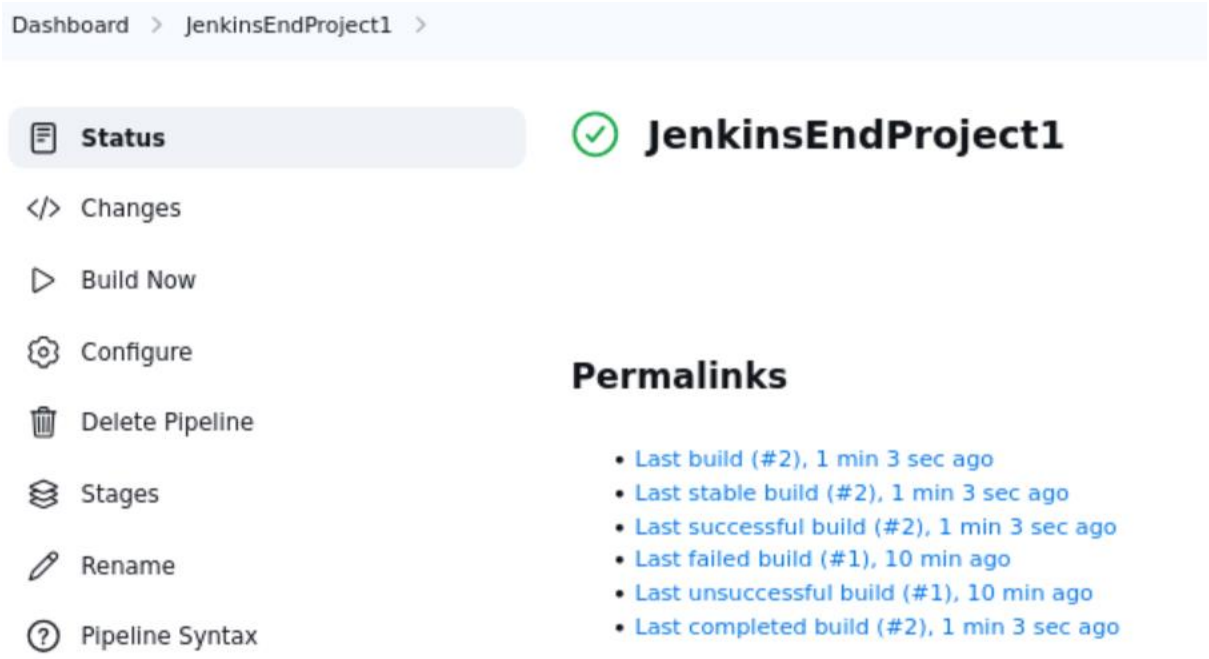

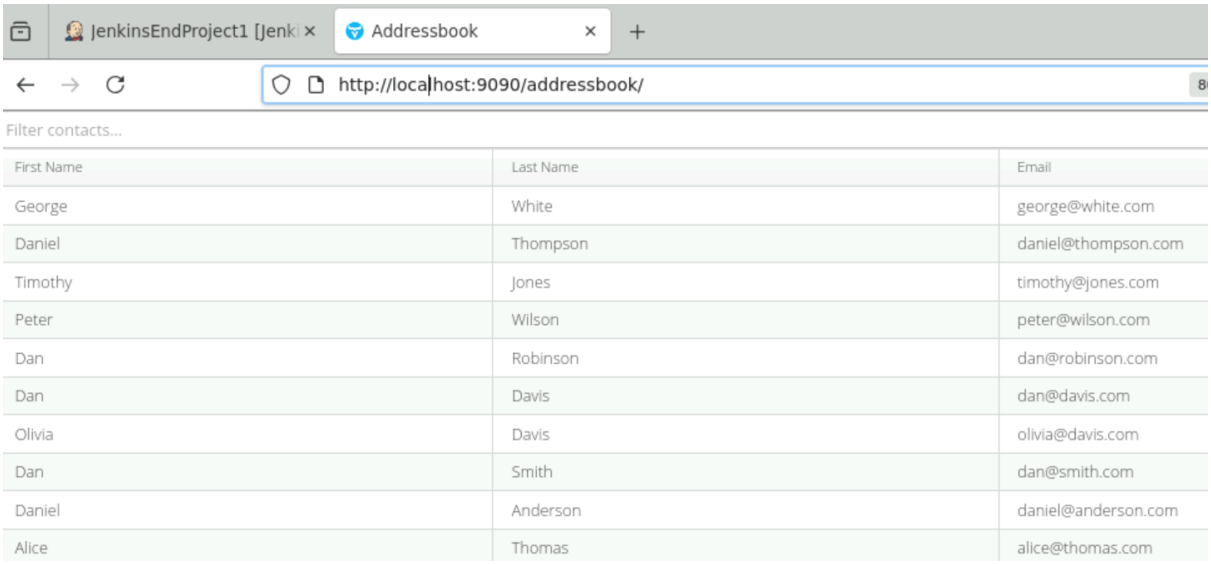

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