



Shri Vile Parle Kelavani Mandal's

DWARKADAS J. SANGHVI COLLEGE OF ENGINEERING

(Autonomous College Affiliated to the University of Mumbai)

NAAC Accredited with "A" Grade (CGPA : 3.18)



DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CODE: DJS22ITHN1L1

DATE: 31-01-2025

COURSE NAME: DevOps Laboratory

CLASS: TY BTech

NAME: Anish Sharma

ROLL: I011

DIV: IT1-1

EXPERIMENT NO. 4

CO/LO: Apply DevOps principles to meet software development requirements.

AIM / OBJECTIVE: To implement the pipeline of jobs using Maven in Jenkins, create a pipeline script to Test and deploy an application.

THEORY:

Implementing a Continuous Integration/Continuous Deployment (CI/CD) pipeline in Jenkins for a Maven-based Java application involves several key steps:

1. Setting Up Jenkins and Required Tools:

- **Jenkins Installation:** Ensure Jenkins is installed and running.
- **Maven Integration:** Configure Maven in Jenkins by navigating to "Manage Jenkins" > "Global Tool Configuration" and adding a Maven installation.
- **Version Control:** Integrate your source code repository (e.g., GitHub) with Jenkins.

2. Creating the Jenkins Pipeline:

- **Pipeline Script (Jenkinsfile):** Define your build, test, and deployment stages in a Jenkinsfile stored in your repository.
- **Declarative Pipeline Syntax:** Utilize Jenkins' declarative pipeline syntax for clarity and maintainability.

3. Defining Pipeline Stages:

- **Build Stage:** Compile the code and package it using Maven.
- **Test Stage:** Execute unit tests to ensure code quality.
- **Deploy Stage:** Deploy the application to the desired environment, such as a web server like Apache Tomcat.



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4. Sample Jenkinsfile: Below is an example of a declarative Jenkins Pipeline script for a Maven project:

```
groovy
```

```
CopyEdit
```

```
pipeline {
```

```
agent any
```

```
tools {
```

```
    maven 'Maven' // Assumes 'Maven' is configured in Global Tool Configuration
```

```
    } stages {
```

```
stage('Checkout') {
```

```
    steps {          git 'https://github.com/your-
```

```
repo/your-project.git'
```

```
    }
```

```
}
```

```
stage('Build') {    steps {
```

```
sh 'mvn clean package -DskipTests'
```

```
    }
```

```
}
```

```
stage('Test') {
```

```
steps {            sh
```

```
'mvn test'
```

```
    }
```

```
    post {          always {
```

```
junit 'target/surefire-reports/*.xml'
```

```
    }
```

```
}
```



```

}

stage('Deploy') {
steps {
    // Deployment steps, e.g., copying files to a server
    sh 'scp target/your-app.war user@server:/path/to/deploy/'
    }
} } post
{ cleanup {
cleanWs()
    }
}
}

```

Explanation:

- **tools:** Specifies the Maven installation to use.
- **stages:** Defines the sequence of stages: Checkout, Build, Test, and Deploy.
- **post:** Contains actions to perform after each stage or the entire pipeline, such as archiving test results or cleaning up the workspace.

5. Enhancing the Pipeline:

- **Parallel Testing:** Run tests in parallel to reduce execution time.
- **Environment-Specific Deployments:** Use parameters to deploy to different environments (development, staging, production).
- **Notifications:** Integrate with communication tools (e.g., email, Slack) to send build and deployment notifications.

OUTPUT:



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The screenshot displays the Jenkins web interface in a browser. The top navigation bar shows the Jenkins logo, a search icon, the user 'Abhinav Nair', and a 'log out' link. The main content area is titled 'devops_assg' and includes a sidebar with navigation links: Status, Changes, Build Now, Configure, Delete Pipeline, Stages, Rename, and Pipeline Syntax. The 'Status' tab is active, showing a green checkmark and the job name 'devops_assg'. Below this, a 'Permalinks' section lists various build links. A 'Builds' list on the left shows build #8 as the most recent. The main view for build #8 (Feb 21, 2025, 9:51:11 AM) is shown, indicating it is successful. It includes details such as 'Started by user Abhinav Nair', 'This run spent' (10 ms waiting, 2 min 43 sec build duration, 2 min 43 sec total), 'Revision: e4f50159443c335bdd2b7ac7376e74a46dd8401a', 'Repository: https://github.com/Nair-Abhinav/simple-java-maven-app.git', and 'Changes' (1. add Maven tool configuration to Jenkinsfile). The bottom of the image shows a Windows taskbar with various application icons and a system clock indicating 09:33 on 28-02-2025.

devops_assg [Jenkins] Selenium WebDriver Setup localhost:5000/job/devops_assg/ Jenkins Abhinav Nair log out

Dashboard > devops_assg

Status devops_assg Add description

Changes Build Now Configure Delete Pipeline Stages Rename Pipeline Syntax

Builds

February 21, 2025

- #8 9:51 AM
- #7 9:47 AM

Permalinks

- Last build (#8), 6 days 23 hr ago
- Last stable build (#8), 6 days 23 hr ago
- Last successful build (#8), 6 days 23 hr ago
- Last failed build (#7), 6 days 23 hr ago
- Last unsuccessful build (#7), 6 days 23 hr ago
- Last completed build (#8), 6 days 23 hr ago

devops_assg #8 [Jenkins] localhost:5000/job/devops_assg/lastBuild/ Jenkins Abhinav Nair log out

Dashboard > devops_assg > #8

Status #8 (Feb 21, 2025, 9:51:11 AM) Add description Keep this build forever

Changes Console Output Edit Build Information Delete build #8 Timings Git Build Data Pipeline Overview Pipeline Console Restart from Stage Replay Pipeline Steps Workspaces

Started by user Abhinav Nair Started 6 days 23 hr ago Took 2 min 43 sec

This run spent:

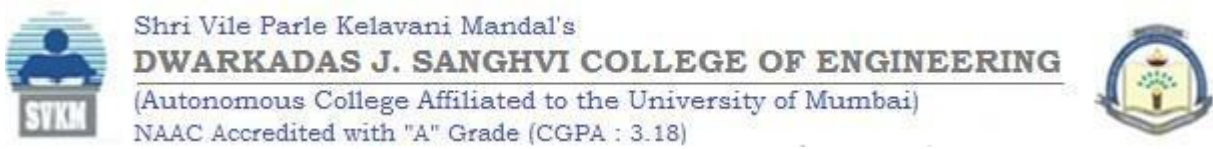
- 10 ms waiting;
- 2 min 43 sec build duration;
- 2 min 43 sec total from scheduled to completion.

git Revision: e4f50159443c335bdd2b7ac7376e74a46dd8401a Repository: https://github.com/Nair-Abhinav/simple-java-maven-app.git refs/remotes/origin/main

Changes

1. add Maven tool configuration to Jenkinsfile (details / githubweb)

09:33 28-02-2025



Graph [devops_assg #8] [Jenkin] Selenium WebDriver Setup

localhost:5000/job/devops_assg/lastBuild/pipeline-graph/

Jenkins

Abhinav Nair log out

Dashboard > devops_assg > #8 > Pipeline Overview

Build #8

Rebuild Console Configure

Pipeline

Start Checkout SCM Tool Install Checkout Build End

Details

Manually run by Abhinav Nair

Started 6 days 23 hr ago

Queued 2 ms

Took 2 min 43 sec

Jenkins 2.492.1

devops_assg #8 Console [Jenkin] Selenium WebDriver Setup

localhost:5000/job/devops_assg/lastBuild/console

Dashboard > devops_assg > #8

Progress (1): 6.8/6.8 MB

Progress (1): 6.8 MB

Downloaded from central: https://repo.maven.apache.org/maven2/com/github/luben/zstd-jni/1.5.5-11/zstd-jni-1.5.5-11.jar (6.8 MB at 170 kB/s)

[INFO] Building jar: C:\ProgramData\Jenkins\jenkins\workspace\devops_assg\target\my-app-1.0-SNAPSHOT.jar

[INFO] BUILD SUCCESS

[INFO] Total time: 01:46 min

[INFO] Finished at: 2025-02-21T09:53:54+05:30

[INFO]

[Pipeline]

[Pipeline] // withEnv

[Pipeline]

[Pipeline] // stage

[Pipeline]

[Pipeline] // withEnv

[Pipeline]

[Pipeline] // withEnv

[Pipeline]

[Pipeline] // node

[Pipeline] End of Pipeline

Finished: SUCCESS

REST API Jenkins 2.492.1



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The screenshot shows the Jenkins web interface at localhost:5000. The 'Pipeline Steps' page for job 'devops_assg' is displayed, showing a successful build with 10 steps. The steps are listed in a table with columns for Step, Arguments, and Status.

Step	Arguments	Status
Start of Pipeline - (2 min 41 sec in block)		✓
node - (2 min 40 sec in block)		✓
node block - (2 min 40 sec in block)		✓
stage - (2.1 sec in block)	Declarative: Checkout SCM	✓
stage block (Declarative: Checkout SCM) - (2 sec in block)	ID: 7	✓
checkout - (2 sec in self)		✓
withEnv - (2 min 38 sec in block)	GIT_BRANCH, GIT_COMMIT, GIT_PREVIOUS_COMMIT, GIT_URL	✓
withEnv block - (2 min 38 sec in block)		✓
stage - (46 sec in block)	Declarative: Tool Install	✓
stage block (Declarative: Tool Install) - (46 sec in block)		✓

Conclusion:

In this experiment, we implemented the pipeline of jobs using Maven in Jenkins, create a pipeline script to Test and deploy an application.

References:

1. How to Use Git and GitHub – Version Control Basics for Beginners (freecodecamp.org)
2. Version Control Systems - GeeksforGeeks
3. VCS Program Details - Verra