

Final Project 1 Report – DevOps Internship

Internship Studio

Intern Details

- **Name:** [Ather Wani]
 - **Project Title:** Automating Build Process with Jenkins, GitHub, Maven & Java
 - **Platform:** Amazon EC2 (Amazon Linux 2) accessed via MobaXterm
 - **Duration:** 4 Months
 - **Organization:** Internship Studio
-

Project Overview

During my DevOps internship at **Internship Studio**, I worked on setting up and automating a build pipeline using **Jenkins**. The goal was to automate the process of pulling code from **GitHub**, building it using **Maven**, and managing everything on a cloud-based **EC2 instance** running **Amazon Linux 2**.

I used **MobaXterm** to connect securely to the EC2 server and installed Jenkins, Maven, Git, and Java. Then, I configured Jenkins to automatically pull code from GitHub and build the Java application whenever changes were pushed — creating a smooth and automated **CI (Continuous Integration)** workflow.

What I Did (Step-by-Step)

1. Set up EC2 and Access It

- I launched an Amazon EC2 instance (Amazon Linux 2).
- Used **MobaXterm** to connect to it using my **.pem** key file.
- Opened ports **22** (for SSH) and **8080** (for Jenkins).

2. Installed Required Tools

On the EC2 instance, I installed:

- **Java 11** (for running Jenkins and building Java code)
- **Git** (to clone the project from GitHub)
- **Maven** (to build the project)
- **Jenkins** (the main automation server)

3. Started Jenkins

- After installing Jenkins, I opened it in a browser using the EC2's public IP on port 8080.
 - Did the initial setup and installed suggested plugins.
-

Configured Jenkins Job

Manual Job:

- I created a **Freestyle Job** in Jenkins.
- Connected it to my **GitHub repository** by adding the repo link.
- Set the build step to use Maven with the command: `clean install`.
- I could now click **“Build Now”** and it would pull my code and build it.

Automatic Job:

- I added a **webhook** to my GitHub repo.
- This meant whenever I pushed code to GitHub, Jenkins would get notified and run the build **automatically**.

- I tested it, and it worked! Code push → Jenkins builds the project → Success/Fail shown in the dashboard.

Tools I Used

Tool	Why I Used It
EC2	To host Jenkins in the cloud
Amazon Linux 2	Lightweight, secure server OS
MobaXterm	To access EC2 via SSH from my laptop
GitHub	To store and manage my code
Jenkins	To automate the build process
Maven	To compile and build the Java project
Java	For the actual project code

What I Learned

- How to **install and set up Jenkins** on a cloud server

- How to use **Maven** to build Java projects automatically
 - How to **connect GitHub and Jenkins** using webhooks
 - How to **trigger builds manually and automatically**
 - How a simple DevOps pipeline works in the real world
-

Final Result

By the end of this internship project:

- I had a full CI pipeline running on a cloud server.
 - Jenkins was pulling code from GitHub and building it with Maven.
 - The process was completely automated.
 - I gained confidence in setting up real-world DevOps workflows using cloud tools and open-source platforms.
-

Conclusion

This project taught me how different DevOps tools like Jenkins, GitHub, and Maven come together to make software delivery faster and easier. Hosting everything on a real EC2 instance gave me hands-on experience with cloud infrastructure, and now I feel much more prepared for real-world DevOps work.

Final Project 2 Report – DevOps Internship

Internship Studio

About Me

- **Name:** [Ather Wani]
 - **Project Title:** Automating Build & Deployment with GitHub, Maven, Java, Jenkins & Tomcat
 - **Platform Used:** Amazon EC2 (Amazon Linux 2) accessed via MobaXterm
 - **Internship Duration:** 4 Months
 - **Organization:** Internship Studio
-

What This Project Was About

During my DevOps internship at **Internship Studio**, I worked on a project to **automate the process of building and deploying a Java application**. I used tools like **GitHub**, **Maven**, **Jenkins**, and **Tomcat**, and ran everything on an **Amazon EC2 instance** (Linux-based server) which I accessed through **MobaXterm**.

The main goal was to make sure that whenever we update our code in GitHub, Jenkins automatically builds the project using Maven and then deploys it to Tomcat. This is a common setup in real-world DevOps workflows, and it was a great hands-on learning experience.

Tools I Worked With

- **GitHub:** Where my Java project code lived
 - **Maven:** To build and package the Java application
 - **Jenkins:** To automate the building and deployment
 - **Apache Tomcat:** Where the application gets deployed (like a mini server)
 - **EC2 (Amazon Linux 2):** My cloud server
 - **MobaXterm:** A tool I used to connect to the EC2 server from my laptop
-

What I Did (Step-by-Step)

1. Set Up the EC2 Server

- I created an EC2 instance using Amazon Linux 2 (free tier).
- Opened the necessary ports (22 for SSH, 8080 for Jenkins, 9090 for Tomcat).
- Used **MobaXterm** to log in to the server.

2. Installed Required Tools on the Server

I installed everything using command line:

- **Java 11** (required for Jenkins and the Java app)
- **Git** (to pull code from GitHub)
- **Maven** (to build the project)
- **Jenkins** (to manage the automation process)
- **Apache Tomcat** (to host the deployed app)

3. Configured Jenkins

- Set up a **Freestyle job** in Jenkins.
- Connected the job to my GitHub repo.
- Told Jenkins to use Maven and run the command `clean install` to build the app.

- Added a post-build script to move the `.war` file into Tomcat's deployment folder.

4. Connected Jenkins to GitHub

- I added a **webhook** in GitHub.
 - Now, whenever I push code to GitHub, Jenkins automatically starts the build and deploys it — no need to do it manually.
-



What I Learned

- How to set up a **real DevOps pipeline** from scratch
 - How Jenkins can be used to **automate repetitive tasks**
 - How to use Maven for building Java apps
 - How to deploy to **Tomcat automatically after build**
 - How GitHub and Jenkins work together using **webhooks**
-



Final Result

At the end of the project:

- I had a working pipeline where **code pushed to GitHub** would automatically get **built by Maven** and **deployed by Jenkins** to **Tomcat**.
- Everything was running smoothly on a cloud-hosted server (EC2).
- It saved time, avoided human error, and made the whole process super efficient.

Conclusion

This internship taught me how real companies manage and automate software deployment. I now understand how DevOps pipelines are built, how Jenkins works in real-world environments, and how cloud servers like EC2 are used to host applications. It was a great hands-on experience that gave me confidence to work on live DevOps projects in the future.

eu-west-3.console.aws.amazon.com/ec2/home?region=eu-west-3#Instances:instanceState=running

Search [Alt+S]

Europe (Paris) mbin11

EC2 > Instances

EC2

Dashboard

EC2 Global View

Events

Instances

- Instances
- Instance Types
- Launch Templates
- Spot Requests
- Savings Plans
- Reserved Instances
- Dedicated Hosts
- Capacity Reservations

Images

- AMIs
- AMI Catalog

Elastic Block Store

- Volumes
- Snapshots
- Lifecycle Manager

Instances (1) Info

Last updated about 2 hours ago

Connect

Instance state

Actions

Launch instances

Find Instance by attribute or tag (case-sensitive)

All states

Instance state = running

Clear filters

1

	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS
<input type="checkbox"/>	jenkins instance	i-078d872bc67191f32	Running	t2.micro	2/2 checks passed	View alarms	eu-west-3a	ec2-35-180-51-238.eu

Select an instance

CloudShell Feedback

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14°C

23:06

13-04-2025

eu-west-3.console.aws.amazon.com/ec2/home?region=eu-west-3#SecurityGroups:securityGroupId=sg-05a3a0aa4c2b43822

AppsGmailMapsgrammerlyYouTubeAndroid - Overview...www.tinkercad.comvprofile-project/ans...iam-veeramalla/Jen...Terraform repo - ia...All Bookmarks

awsSearch[Alt+S]

Europe (Paris)mbin11

EC2 > Security Groups > sg-05a3a0aa4c2b43822 - launch-wizard-5

EC2<div>DashboardEC2 Global ViewEvents▼ InstancesInstancesInstance TypesLaunch TemplatesSpot RequestsSavings PlansReserved InstancesDedicated HostsCapacity Reservations▼ ImagesAMIsAMI Catalog▼ Elastic Block StoreVolumesSnapshotsLifecycle Manager

sg-05a3a0aa4c2b43822 - launch-wizard-5

Details

Security group name
launch-wizard-5

Security group ID
sg-05a3a0aa4c2b43822

Description
launch-wizard-5 created 2025-04-10T09:39:50.381Z

VPC ID
vpc-066b2c73012430bde

Owner
941377113621

Inbound rules count
3 Permission entries

Outbound rules count
1 Permission entry

Inbound rules

Outbound rules

Sharing - new

VPC associations - new

Tags

Inbound rules (3)

Manage tagsEdit inbound rules

Search

< 1 > ⚙

<input type="checkbox"/>	Name	Security group rule ID	IP version	Type	Protocol	Port range
<input type="checkbox"/>	-	sgr-01c31b38bcd79f4bd	IPv4	Custom TCP	TCP	8080
<input type="checkbox"/>	-	sgr-07c010ec34c0ae4d3	IPv4	Custom TCP	TCP	9090
<input type="checkbox"/>	-	sgr-00710350e4655a448	IPv4	SSH	TCP	22

CloudShellFeedback

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Type here to search

15°C23:1813-04-2025

Authenticating with public key "Imported-OpenSSH-Key"

• MobaXterm Personal Edition v24.4 •
(SSH client, X server and network tools)

- ▶ SSH session to **ec2-user@35.180.51.238**
 - Direct SSH : ✓
 - SSH compression : ✓
 - SSH-browser : ✓
 - X11-forwarding : ✗ (disabled or not supported by server)
- ▶ For more info, ctrl+click on [help](#) or visit our [website](#).

Last login: Sun Apr 13 16:26:53 2025 from 152.58.83.6

```
#####
#               Amazon Linux 2
#####
#               AL2 End of Life is 2026-06-30.
#####
#               A newer version of Amazon Linux is available!
#####
#               Amazon Linux 2023, GA and supported until 2028-03-15.
#               https://aws.amazon.com/linux/amazon-linux-2023/
```

```
[ec2-user@ip-172-31-3-158 ~]$ sudo su
[root@ip-172-31-3-158 ec2-user]# sudo rpm --import https://pkg.jenkins.io/redhat-stable/jenkins.io-2023.key
[root@ip-172-31-3-158 ec2-user]# sudo amazon-linux-extras install java-openjdk11 -y
```

Installing java-11-openjdk

Loaded plugins: extras_suggestions, langpacks, priorities, update-motd

Cleaning repos: amzn2-core amzn2extra-docker amzn2extra-java-openjdk11 amzn2extra-kernel-5.10 jenkins

24 metadata files removed

10 sqlite files removed

0 metadata files removed

Loaded plugins: extras_suggestions, langpacks, priorities, update-motd

amzn2-core

amzn2extra-docker

amzn2extra-java-openjdk11

amzn2extra-kernel-5.10

jenkins

(1/10): amzn2-core/2/x86_64/group_gz

(2/10): amzn2-core/2/x86_64/updateinfo

(3/10): amzn2extra-java-openjdk11/2/x86_64/primary_db

(4/10): amzn2extra-kernel-5.10/2/x86_64/updateinfo

(5/10): amzn2extra-docker/2/x86_64/updateinfo

(6/10): amzn2extra-java-openjdk11/2/x86_64/updateinfo

(7/10): amzn2extra-docker/2/x86_64/primary_db

(8/10): jenkins/primary_db

(9/10): amzn2extra-kernel-5.10/2/x86_64/primary_db

(10/10): amzn2-core/2/x86_64/primary_db

Package 1:java-11-openjdk-11.0.25.0.9-1.amzn2.0.2.x86_64 already installed and latest version

Nothing to do

2 httpd_modules available [=1.0 =stable]

3 memcached1.5 available \

[=1.5.1 =1.5.16 =1.5.17]

9 R3.4 available [=3.4.3 =stable]

10 rust1 available \

[=1.22.1 =1.26.0 =1.26.1 =1.27.2 =1.31.0 =1.38.0]


amzn2-core	3.6 kB	00:00:00
amzn2extra-docker	2.9 kB	00:00:00
amzn2extra-java-openjdk11	3.0 kB	00:00:00
amzn2extra-kernel-5.10	3.0 kB	00:00:00
jenkins	2.9 kB	00:00:00
(1/10): amzn2-core/2/x86_64/group_gz	2.7 kB	00:00:00
(2/10): amzn2-core/2/x86_64/updateinfo	1.0 MB	00:00:00
(3/10): amzn2extra-java-openjdk11/2/x86_64/primary_db	193 kB	00:00:00
(4/10): amzn2extra-kernel-5.10/2/x86_64/updateinfo	121 kB	00:00:00
(5/10): amzn2extra-docker/2/x86_64/updateinfo	23 kB	00:00:00
(6/10): amzn2extra-java-openjdk11/2/x86_64/updateinfo	8.7 kB	00:00:00
(7/10): amzn2extra-docker/2/x86_64/primary_db	124 kB	00:00:00
(8/10): jenkins/primary_db	53 kB	00:00:00
(9/10): amzn2extra-kernel-5.10/2/x86_64/primary_db	35 MB	00:00:00
(10/10): amzn2-core/2/x86_64/primary_db	75 MB	00:00:01

```
<?xml version="1.0" encoding="UTF-8"?>
<project xmlns="http://maven.apache.org/POM/4.0.0" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://maven.apache.org/POM/4.0.0 http://maven.apache.org/maven-v4_0_0.xsd">
  <modelVersion>4.0.0</modelVersion>
  <groupId>in.kastro</groupId>
  <artifactId>01-maven-web-app</artifactId>
  <packaging>war</packaging>
  <version>3.0-RELEASE</version>
  <name>01-maven-web-app</name>
  <url>http://maven.apache.org</url>

  <dependencies>
    <dependency>
      <groupId>junit</groupId>
      <artifactId>junit</artifactId>
      <version>3.8.1</version>
    </dependency>
  </dependencies>

  <build>
    <finalName>maven-web-app</finalName>
    <plugins>
      <plugin>
        <groupId>org.apache.maven.plugins</groupId>
        <artifactId>maven-war-plugin</artifactId>
        <version>3.3.1</version>
      </plugin>
    </plugins>
  </build>
</project>
```

- ▶ SSH session to **ec2-user@35.180.51.238**
 - Direct SSH :
 - SSH compression :
 - SSH-browser :
 - X11-forwarding : (disabled or not supported by server)
- ▶ For more [info](#), ctrl+click on [help](#) or visit our [website](#).



Amazon Linux 2

AL2 End of Life is 2026-06-30.

A newer version of Amazon Linux is available!

Amazon Linux 2023, GA and supported until 2028-03-15.
<https://aws.amazon.com/linux/amazon-linux-2023/>

```
[ec2-user@ip-172-31-3-158 ~]$ cd apache-tomcat-9.0.104
[ec2-user@ip-172-31-3-158 apache-tomcat-9.0.104]$ ls
bin BUILDING.txt conf CONTRIBUTING.md lib LICENSE logs NOTICE README.md RELEASE-NOTES RUNNING.txt temp webapps work
[ec2-user@ip-172-31-3-158 apache-tomcat-9.0.104]$ cd bin
[ec2-user@ip-172-31-3-158 bin]$ ls
bootstrap.jar ciphers.bat configtest.bat digest.sh setclasspath.sh startup.sh tool-wrapper.sh
catalina.bat ciphers.sh configtest.sh makebase.bat shutdown.bat tomcat-juli.jar version.bat
catalina.sh commons-daemon.jar daemon.sh makebase.sh shutdown.sh tomcat-native.tar.gz version.sh
catalina-tasks.xml commons-daemon-native.tar.gz digest.bat setclasspath.bat startup.bat tool-wrapper.bat
[ec2-user@ip-172-31-3-158 bin]$ cd ..
[ec2-user@ip-172-31-3-158 apache-tomcat-9.0.104]$ cd ..
[ec2-user@ip-172-31-3-158 ~]$ cat /var/lib/jenkins/workspace/build-bob
cat: /var/lib/jenkins/workspace/build-bob: Is a directory
[ec2-user@ip-172-31-3-158 ~]$ ls
apache-tomcat-9.0.104 apache-tomcat-9.0.104.tar.gz.asc apache-tomcat-9.0.104.tar.gz.sha512.1 apache-tomcat-9.0.104-windows-x64.zip.sha512
apache-tomcat-9.0.104.tar.gz apache-tomcat-9.0.104.tar.gz.sha512 apache-tomcat-9.0.104.tar.gz.sha512.2
[ec2-user@ip-172-31-3-158 ~]$ cat apache-tomcat-9.0.104
cat: apache-tomcat-9.0.104: Is a directory
[ec2-user@ip-172-31-3-158 ~]$ ls
apache-tomcat-9.0.104 apache-tomcat-9.0.104.tar.gz.asc apache-tomcat-9.0.104.tar.gz.sha512.1 apache-tomcat-9.0.104-windows-x64.zip.sha512
apache-tomcat-9.0.104.tar.gz apache-tomcat-9.0.104.tar.gz.sha512 apache-tomcat-9.0.104.tar.gz.sha512.2
[ec2-user@ip-172-31-3-158 ~]$ cat /var/lib/jenkins/workspace/build-bob
cat: /var/lib/jenkins/workspace/build-bob: Is a directory
[ec2-user@ip-172-31-3-158 ~]$ cd /var/lib/jenkins/workspace/build-bob
[ec2-user@ip-172-31-3-158 build-bob]$ ls
Dockerfile pom.xml src target
[ec2-user@ip-172-31-3-158 build-bob]$ vi pom.xml

[1]+  Stopped                  vi pom.xml
[ec2-user@ip-172-31-3-158 build-bob]$
```

+

New Item

Build History

Project Relationship

Check File Fingerprint

Manage Jenkins

My Views

Build Queue

No builds in the queue.

Build Executor Status

(0 of 2 executors busy)

All

+

S	W	Name	Last Success	Last Failure	Last Duration
		ather-wani	1 hr 19 min #1	N/A	4.1 sec
		build and deployment job	12 hr #2	N/A	6.6 sec
		build-bob	2 days 23 hr #4	2 days 23 hr #2	6.1 sec
		build-job	N/A	N/A	N/A
		deployment	N/A	N/A	N/A
		my-first-job	3 days 1 hr #4	N/A	21 ms

Icon:

S

M

L

Add description

23:14

13-04-2025

Dashboard > build-bob > #4 > Console Output

```
[WARNING] Using platform encoding (UTF-8 actually) to copy filtered resources, i.e. build is platform dependent!
[INFO] skip non existing resourceDirectory /var/lib/jenkins/workspace/build-bob/src/main/resources
[INFO]
[INFO] --- compiler:3.13.0:compile (default-compile) @ 01-maven-web-app ---
[INFO] No sources to compile
[INFO]
[INFO] --- resources:3.3.1:testResources (default-testResources) @ 01-maven-web-app ---
[WARNING] Using platform encoding (UTF-8 actually) to copy filtered resources, i.e. build is platform dependent!
[INFO] skip non existing resourceDirectory /var/lib/jenkins/workspace/build-bob/src/test/resources
[INFO]
[INFO] --- compiler:3.13.0:testCompile (default-testCompile) @ 01-maven-web-app ---
[INFO] No sources to compile
[INFO]
[INFO] --- surefire:3.2.5:test (default-test) @ 01-maven-web-app ---
[INFO] No tests to run.
[INFO]
[INFO] --- war:3.3.1:war (default-war) @ 01-maven-web-app ---
[INFO] Packaging webapp
[INFO] Assembling webapp [01-maven-web-app] in [/var/lib/jenkins/workspace/build-bob/target/maven-web-app]
[INFO] Processing war project
[INFO] Copying webapp resources [/var/lib/jenkins/workspace/build-bob/src/main/webapp]
[INFO] Building war: /var/lib/jenkins/workspace/build-bob/target/maven-web-app.war
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 3.167 s
[INFO] Finished at: 2025-04-10T18:08:16Z
[INFO] -----
Finished: SUCCESS
```

Type here to search

00:10
14-04-2025

Dashboard > build and deployment job > #2 > Console Output

```
[INFO] --- resources:3.3.1:testResources (default-testResources) @ 01-maven-web-app ---
[WARNING] Using platform encoding (UTF-8 actually) to copy filtered resources, i.e. build is platform dependent!
[INFO] skip non existing resourceDirectory /var/lib/jenkins/workspace/build and deployment job/src/test/resources
[INFO]
[INFO] --- compiler:3.13.0:testCompile (default-testCompile) @ 01-maven-web-app ---
[INFO] No sources to compile
[INFO]
[INFO] --- surefire:3.2.5:test (default-test) @ 01-maven-web-app ---
[INFO] No tests to run.
[INFO]
[INFO] --- war:3.3.1:war (default-war) @ 01-maven-web-app ---
[INFO] Packaging webapp
[INFO] Assembling webapp [01-maven-web-app] in [/var/lib/jenkins/workspace/build and deployment job/target/maven-web-app]
[INFO] Processing war project
[INFO] Copying webapp resources [/var/lib/jenkins/workspace/build and deployment job/src/main/webapp]
[INFO] Building war: /var/lib/jenkins/workspace/build and deployment job/target/maven-web-app.war
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 3.081 s
[INFO] Finished at: 2025-04-13T05:30:30Z
[INFO] -----
[DeployPublisher][INFO] Attempting to deploy 1 war file(s)
[DeployPublisher][INFO] Deploying /var/lib/jenkins/workspace/build and deployment job/target/maven-web-app.war to container Tomcat 9.x Remote with
context b&d-job
  Redeploying [/var/lib/jenkins/workspace/build and deployment job/target/maven-web-app.war]
  Undeploying [/var/lib/jenkins/workspace/build and deployment job/target/maven-web-app.war]
  Deploying [/var/lib/jenkins/workspace/build and deployment job/target/maven-web-app.war]
Finished: SUCCESS
```

Windows taskbar: Type here to search, 23:56, 13-04-2025

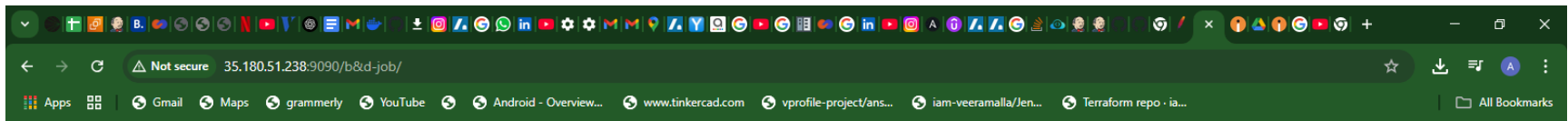


Tomcat Web Application Manager

Message: OK

Manager			
List Applications	HTML Manager Help	Manager Help	Server Status

Applications					
Path	Version	Display Name	Running	Sessions	Commands
/	None specified	Welcome to Tomcat	true	0	Start Stop Reload Undeploy Expire sessions with idle ≥ 30 minutes
/b&d-job	None specified	Archetype Created Web Application	true	0	Start Stop Reload Undeploy Expire sessions with idle ≥ 30 minutes
/docs	None specified	Tomcat Documentation	true	0	Start Stop Reload Undeploy Expire sessions with idle ≥ 30 minutes
/examples	None specified	Servlet and JSP Examples	true	0	Start Stop Reload Undeploy Expire sessions with idle ≥ 30 minutes
/host-manager	None specified	Tomcat Host Manager Application	true	0	Start Stop Reload Undeploy Expire sessions with idle ≥ 30 minutes
/manager	None specified	Tomcat Manager Application	true	1	Start Stop Reload Undeploy Expire sessions with idle ≥ 30 minutes



Congratualtions! Successfully Deployed JAVA Project

[Click Here To See My YouTube Channel](#)

Thank you

Happy Learning!!!

