

Java Web Calculator Deployment Documentation

Prefix:

This documentation explains the deployment of a **Java Web Calculator** using a **three-server setup**: Build, Nexus, and Deploy servers. The project demonstrates versioned deployments of a simple calculator app (Add, Subtract, Multiply) built with **Java 17**, **Maven**, and **Tomcat**, with artifacts managed through **Nexus Repository Manager**.

Project: Java Web Calculator

Language: Java 17

Build Tool: Maven

Application Server: Apache Tomcat 9/10

Repository Manager: Nexus Repository (for WAR artifacts)

Architecture: 3-Server Setup — Build, Nexus, and Deploy

1. Overview

Objective:

To design and deploy a **Java Web Calculator** application that performs *Addition*, *Subtraction*, and *Product* operations. The project uses **three dedicated servers**:

- **Build Server:** To compile, test, and package the WAR file using Maven.
- **Nexus Repository Server:** To host versioned build artifacts (WAR files). Use t2 medium which has 2 cpu's with 4Gb RAM(minimum) and in SSH open port 8081 and port 22.

▼ Instance type [Info](#) | [Get advice](#)

Instance type

t2.medium
Family: t2 2 vCPU 4 GiB Memory Current generation: true
On-Demand Ubuntu Pro base pricing: 0.0499 USD per Hour On-Demand RHEL base pricing: 0.0752 USD per Hour
On-Demand Linux base pricing: 0.0464 USD per Hour On-Demand Windows base pricing: 0.0644 USD per Hour On-Demand SUSE base pricing: 0.1464 USD per Hour

All generations

[Compare instance types](#)

▼ Security group rule 2 (TCP, 8081, 0.0.0.0/0)

Type [Info](#)

Custom TCP ▼

Protocol [Info](#)

TCP

Port range [Info](#)

8081

Source type [Info](#)

Anywhere ▼

Source [Info](#)

Q Add CIDR, prefix list or security group

0.0.0.0/0 X

Description - optional [Info](#)

e.g. SSH for admin desktop

Remove

- **Deploy Server:** To fetch WAR files from Nexus and deploy them to [Tomcat](#). In this open port 22 and port 8080 for tomcat in Security group.

Goal:

Implement a **multi-server CI/CD-style deployment pipeline** with proper version control. Each function (*add*, *sub*, *prod*) represents a new version of the web app.

2. Server Details

Server Role	Purpose	Example Hostname/IP
Build Server	Code compilation & packaging	build-server
Nexus Server	Artifact storage (WAR files)	nexus-server
Deploy Server	Application deployment	deploy-server

3. Build Server Setup

3.1 Update Packages & Set Hostname

```
sudo apt update && sudo apt upgrade -y  
sudo hostnamectl set-hostname build-server
```

```
ubuntu@ip-172-31-20-47:~$ sudo apt -y upgrade  
Reading package lists... Done  
Building dependency tree... Done  
Reading state information... Done  
Calculating upgrade... Done
```

```
ubuntu@ip-172-31-20-47:~$ sudo apt -y update  
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble InRelease  
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]  
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports InRelease [126 kB]  
Get:4 http://security.ubuntu.com/ubuntu noble-security InRelease [126 kB]
```

```
ubuntu@ip-172-31-20-47:~$ sudo hostnamectl set-hostname build-server  
ubuntu@ip-172-31-20-47:~$ sudo init 6  
  
Broadcast message from root@ip-172-31-20-47 on pts/1 (Thu 2025-10-16 04:20:25 UTC):  
  
The system will reboot now!
```

3.2 Install Java 17 and Maven

Java --version

sudo apt install openjdk-17-jre-headless

Sudo apt -y install maven

java --version

mvn --version

```
ubuntu@ip-172-31-20-47:~$ java --version
Command 'java' not found, but can be installed with:
sudo apt install openjdk-17-jre-headless # version 17.0.16+8~us1-0ubuntu1~24.04.1, or
sudo apt install openjdk-21-jre-headless # version 21.0.8+9~us1-0ubuntu1~24.04.1
sudo apt install default-jre # version 2:1.17-75
```

```
ubuntu@ip-172-31-20-47:~$ sudo apt install openjdk-17-jre-headless
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
```

```
ubuntu@ip-172-31-20-47:~$ sudo apt -y install maven
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
```

```
ubuntu@build-server:~$ java --version
openjdk 17.0.16 2025-07-15
OpenJDK Runtime Environment (build 17.0.16+8-Ubuntu-0ubuntu124.04.1)
OpenJDK 64-Bit Server VM (build 17.0.16+8-Ubuntu-0ubuntu124.04.1, mixed mode, sharing)
ubuntu@build-server:~$ mvn --version
Apache Maven 3.8.7
Maven home: /usr/share/maven
Java version: 17.0.16, vendor: Ubuntu, runtime: /usr/lib/jvm/java-17-openjdk-amd64
Default locale: en, platform encoding: UTF-8
OS name: "linux", version: "6.14.0-1014-aws", arch: "amd64", family: "unix"
```

3.3 Clone Project Repository

git clone https://github.com/<yourusername>/JavaWebCalculator.git

cd JavaWebCalculator

mvn validate

```
ubuntu@ip-172-31-20-47:~$ git clone https://github.com/mrtechreddy/Java-Web-Calculator-App.git
Cloning into 'Java-Web-Calculator-App'...
remote: Enumerating objects: 33, done.
remote: Counting objects: 100% (33/33), done.
remote: Compressing objects: 100% (23/23), done.
remote: Total 33 (delta 3), reused 33 (delta 3), pack-reused 0 (from 0)
Receiving objects: 100% (33/33), 6.71 KiB | 2.24 MiB/s, done.
Resolving deltas: 100% (3/3), done.
```

```
ubuntu@ip-172-31-20-47:~$ ls
Java-Web-Calculator-App
ubuntu@ip-172-31-20-47:~$ cd Java-Web-Calculator-App/
ubuntu@ip-172-31-20-47:~/Java-Web-Calculator-App$ mvn validate
[INFO] Scanning for projects...
[INFO]
[INFO] -----< com.web.cal:webapp-add >-----
[INFO] Building WebAppCal Maven Webapp 0.0.1
[INFO] -----[ war ]-----
[INFO]
[INFO] BUILD SUCCESS
[INFO]
[INFO] -----
[INFO] Total time: 0.091 s
[INFO] Finished at: 2025-10-15T12:18:23Z
[INFO] -----
```

3.4 Build and Package Application for version 0.0.1:

Check index.jsp for the function which we are going to release using

`vi index.jsp`

`mvn package`

```
ubuntu@ip-172-31-20-47:~$ cd Java-Web-Calculator-App/
ubuntu@ip-172-31-20-47:~/Java-Web-Calculator-App$ cd src/main/webapp/
ubuntu@ip-172-31-20-47:~/Java-Web-Calculator-App/src/main/webapp$ ls
WEB-INF  index.jsp
ubuntu@ip-172-31-20-47:~/Java-Web-Calculator-App/src/main/webapp$ vi index.jsp |
```

```
<br />
<div>
<label>
<input type="radio" name="r1" value="add" />addition
<br />
</label>

</div>
<input type="submit" value="submit" />
</form>
</body>
</html>
```

```
ubuntu@ip-172-31-20-47:~/Java-Web-Calculator-App$ mvn package
[INFO] Scanning for projects...
[INFO]
[INFO] -----< com.web.cal:webapp-add >-----
[INFO] Building WebAppCal Maven Webapp 0.0.1
```

For Version 0.0.2:

```
</div>
<label>
<input type="radio" name="r1" value="add" />addition
<br />
</label>
<label>
<input type="radio" name="r2" value="sub" />subtraction
<br />
</label>
```

Output WAR location:

Edit your project's `pom.xml`:

```
ubuntu@ip-172-31-20-47:~/Java-Web-Calculator-App$ ls
README.md  pom.xml  src
ubuntu@ip-172-31-20-47:~/Java-Web-Calculator-App$ vi pom.xml
```

```
<modelVersion>4.0.0</modelVersion>

<groupId>com.web.cal</groupId>
<artifactId>webapp-add</artifactId>
<version>0.0.1</version>
<packaging>war</packaging>
```

target/webapp-add-0.0.1.war

```
ubuntu@build-server:~/Java-Web-Calculator-App$ ls
README.md  pom.xml  src  target
ubuntu@build-server:~/Java-Web-Calculator-App$ cd target/
ubuntu@build-server:~/Java-Web-Calculator-App/target$ ls
classes          generated-test-sources  maven-status  test-classes  webapp-add-0.0.1.war
generated-sources  maven-archiver        surefire-reports  webapp-add-0.0.1
ubuntu@build-server:~/Java-Web-Calculator-App/target$ |
```

3.5 Configure Maven to Upload Artifacts to Nexus

Edit your project's `pom.xml`:

```
<distributionManagement>
  <repository>
    <id>nexus-releases</id>
    <url>http://<nexus-server-ip>:8081/repository/maven-releases/</url>
  </repository>
</distributionManagement>
```

```
ubuntu@ip-172-31-20-47:~/Java-Web-Calculator-App$ ls
README.md  pom.xml  src
ubuntu@ip-172-31-20-47:~/Java-Web-Calculator-App$ vi pom.xml
```

```
<distributionManagement>
  <repository>
    <id>java-cal-app</id>
    <url>http://54.226.240.217:8081/repository/java-cal-app/</url>
  </repository>
</distributionManagement>
```

Edit maven settings in the etc directory:

`cd /etc/maven`

`Sudo vi settings.xml`

```
ubuntu@build-server:~/Java-Web-Calculator-App$ cd
ubuntu@build-server:~$ cd /etc/maven/
ubuntu@build-server:/etc/maven$ ls
logging  m2.conf  settings.xml  toolchains.xml
ubuntu@build-server:/etc/maven$ sudo vi settings.xml |
```

```
<server>
  <id>deploymentRepo</id>
  <username>repouser</username>
  <password>repopwd</password>
</server>
-->
<server>
  <id>java-cal-app</id>
  <username>admin</username>
  <password>Admin123</password>
</server>
```

Then run:

mvn deploy

```
ubuntu@ip-172-31-20-47:~/Java-Web-Calculator-App$ mvn deploy
[INFO] Scanning for projects...
[INFO]
[INFO] -----< com.web.cal:webapp-add >-----
[INFO] Building WebAppCal Maven Webapp 0.0.1
[INFO] -----[ war ]-----
Downloading from central: https://repo.maven.apache.org/maven2/org/apache/maven/plugins/maven-install-plugin/2.4/m
ninstall-plugin-2.4.pom
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/plugins/maven-install-plugin/2.4/ma
stall-plugin-2.4.pom (6.4 kB at 16 kB/s)
Downloading from central: https://repo.maven.apache.org/maven2/org/apache/maven/plugins/maven-install-plugin/2.4/m
```

4. Nexus Repository Server Setup

4.1 Update & Set Hostname

sudo apt update && sudo apt upgrade -y

sudo hostnamectl set-hostname nexus-server

```
ubuntu@ip-172-31-16-178:~$ sudo apt -y update
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble InRelease
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports InRelease [126 kB]
```

```
ubuntu@nexus-server:~$ sudo apt -y upgrade
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Calculating upgrade... Done
```

```
ubuntu@ip-172-31-16-178:~$ sudo hostnamectl set-hostname nexus-server
ubuntu@ip-172-31-16-178:~$ sudo init 6

Broadcast message from root@ip-172-31-16-178 on pts/1 (Thu 2025-10-16 04:48:19 UTC):

The system will reboot now!
```

4.2 Install Java 17

sudo apt install openjdk-17-jdk -y

java -version

```
ubuntu@ip-172-31-16-178:~$ java -version
Command 'java' not found, but can be installed with:
sudo apt install openjdk-17-jre-headless # version 17.0.16+8~us1-0ubuntu1~24.04.1, or
sudo apt install openjdk-21-jre-headless # version 21.0.8+9~us1-0ubuntu1~24.04.1
sudo apt install default-jre # version 2:1.17-75
sudo apt install openjdk-11-jre-headless # version 11.0.28+6-1ubuntu1~24.04.1
sudo apt install openjdk-25-jre-headless # version 25+36-1~24.04.2
sudo apt install openjdk-8-jre-headless # version 8u462-ga~us1-0ubuntu2~24.04.2
sudo apt install openjdk-19-jre-headless # version 19.0.2+7-4
sudo apt install openjdk-20-jre-headless # version 20.0.2+9-1
sudo apt install openjdk-22-jre-headless # version 22~22ea-1
```

```
ubuntu@ip-172-31-16-178:~$ sudo apt install openjdk-17-jre-headless
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
```

4.3 Download and Install Nexus also net-tools

```
sudo wget https://download.sonatype.com/nexus/3/latest-unix.tar.gz
sudo tar -xvf <name>.tar.gz
cd nexus-3.85.0-03
cd bin/
./nexus ("Run the Script file")
./nexus start
sudo apt -y install net-tools
sudo netstat -nptl
```

```
ubuntu@ip-172-31-16-178:~$ wget https://download.sonatype.com/nexus/3/nexus-3.85.0-03-linux-x86_64.tar.gz
--2025-10-15 12:49:17-- https://download.sonatype.com/nexus/3/nexus-3.85.0-03-linux-x86_64.tar.gz
Resolving download.sonatype.com (download.sonatype.com)... 54.183.175.140, 54.151.8.119
Connecting to download.sonatype.com (download.sonatype.com)|54.183.175.140|:443... connected.
HTTP request sent, awaiting response... 302 Moved Temporarily
Location: https://cdn.download.sonatype.com/repository/downloads-prod-group/3/nexus-3.85.0-03-linux-x86_64.tar.gz [following]
--2025-10-15 12:49:18-- https://cdn.download.sonatype.com/repository/downloads-prod-group/3/nexus-3.85.0-03-linux-x86_64.tar.gz
Resolving cdn.download.sonatype.com (cdn.download.sonatype.com)... 104.18.0.134, 104.18.1.134, 2606:4700::6812:86, ...
Connecting to cdn.download.sonatype.com (cdn.download.sonatype.com)|104.18.0.134|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 456033776 (435M) [application/x-gzip]
Saving to: 'nexus-3.85.0-03-linux-x86_64.tar.gz'

nexus-3.85.0-03-linux-x86_64. 100%[=====] 434.91M 105MB/s in 4.1s

2025-10-15 12:49:22 (106 MB/s) - 'nexus-3.85.0-03-linux-x86_64.tar.gz' saved [456033776/456033776]
```

```
ubuntu@ip-172-31-16-178:~$ tar -xvf nexus-3.85.0-03-linux-x86_64.tar.gz
nexus-3.85.0-03/bin/nexus
nexus-3.85.0-03/bin/nexus.vmoptions
nexus-3.85.0-03/
nexus-3.85.0-03/bin/
nexus-3.85.0-03/deploy/
nexus-3.85.0-03/etc/
```



```

ubuntu@ip-172-31-16-178:~$ ls
nexus-3.85.0-03  nexus-3.85.0-03-linux-x86_64.tar.gz  sonatype-work
ubuntu@ip-172-31-16-178:~$ cd nexus-3.85.0-03/
ubuntu@ip-172-31-16-178:~/nexus-3.85.0-03$ ls
NOTICE.txt  OSS-LICENSE.txt  bin  deploy  etc  jdk
ubuntu@ip-172-31-16-178:~/nexus-3.85.0-03$ cd bin/
ubuntu@ip-172-31-16-178:~/nexus-3.85.0-03/bin$ ls
nexus  nexus.vmoptions  sonatype-nexus-repository-3.85.0-03.jar
ubuntu@ip-172-31-16-178:~/nexus-3.85.0-03/bin$ ./nexus |

```

```

ubuntu@ip-172-31-16-178:~/nexus-3.85.0-03/bin$ ./nexus
Usage: ./nexus {start|stop|run|run-redirect|status|restart|force-reload}
ubuntu@ip-172-31-16-178:~/nexus-3.85.0-03/bin$ ./nexus start
Starting nexus

```

```

ubuntu@ip-172-31-16-178:~/nexus-3.85.0-03/bin$ sudo apt install -y net-tools
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following NEW packages will be installed:
  net-tools

```

```

ubuntu@ip-172-31-16-178:~/nexus-3.85.0-03/bin$ sudo netstat -ntpl
Active Internet connections (only servers)

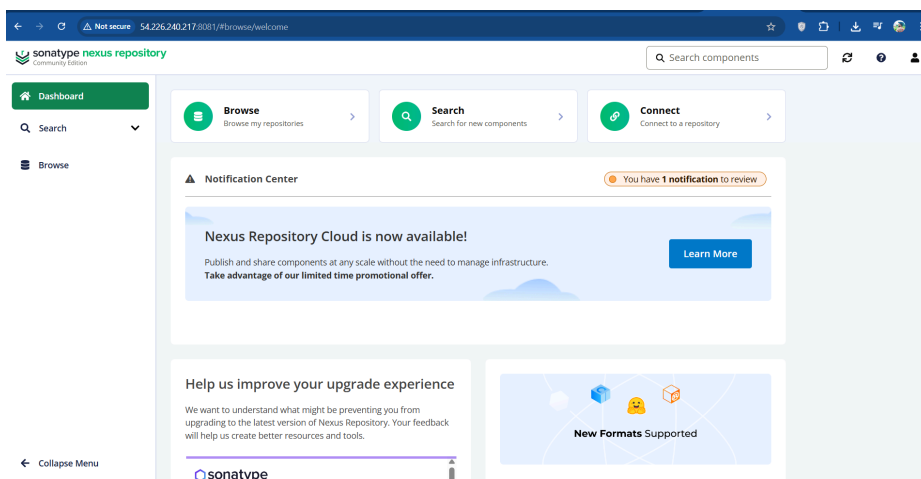
```

Proto	Recv-Q	Send-Q	Local Address	Foreign Address	State	PID/Program name
tcp	0	0	127.0.0.53:53	0.0.0.0:*	LISTEN	327/systemd-resolve
tcp	0	0	127.0.0.54:53	0.0.0.0:*	LISTEN	327/systemd-resolve
tcp	0	0	0.0.0.0:22	0.0.0.0:*	LISTEN	1/init
tcp6	0	0	:::8081	:::*	LISTEN	2912/java
tcp6	0	0	:::22	:::*	LISTEN	1/init

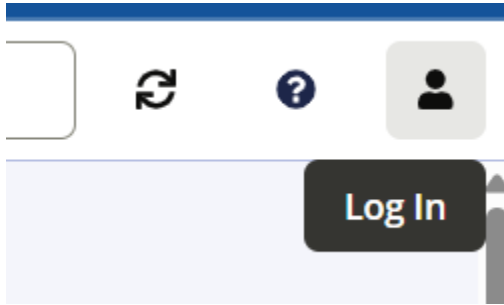
4.4 Access Nexus Repository

Visit in browser:

<http://<nexus-server-ip>:8081>



Go to Login:



Login with default credentials:

A screenshot of a 'Sign In' dialog box. The title bar says 'Sign In' with a close button. The main text reads: 'Your **admin** user password is located in /home/ubuntu/sonatype-work/nexus3/admin.password on the server.' Below this are two input fields: 'Username' and 'Password'. At the bottom are two buttons: 'Sign in' (blue) and 'Cancel' (grey).

Default password path:

```
ubuntu@ip-172-31-16-178:~$ cat /home/ubuntu/sonatype-work/nexus3/admin.password
2604af9c-127c-4921-9d92-e9c65728462dubuntu@ip-172-31-16-178:~$
```

A screenshot of the same 'Sign In' dialog box. The 'Username' field now contains the text 'admin'. The 'Password' field contains a series of dots, indicating a masked password. The 'Sign in' and 'Cancel' buttons remain at the bottom.

Disable Anonymous Access:

Configure Anonymous Access5 of 6

Enable anonymous access means that by default, users can search, browse and download components from repositories without credentials. Please **consider the security implications for your organization**.

Disable anonymous access should be chosen with care, as it **will require credentials for all** users and/or build tools.

[More information](#)

☐ Enable anonymous access

☒ **Disable anonymous access**

BackNext

Dashboard

Search

Browse

Upload

Settings

Browse

Name ↑	Type	Format	Status	URL
maven-central	proxy	maven2	Online - Ready to Connect	copy
maven-public	group	maven2	Online	copy
maven-releases	hosted	maven2	Online	copy
maven-snapshots	hosted	maven2	Online	copy
nuget-group	group	nuget	Online	copy
nuget-hosted	hosted	nuget	Online	copy
nuget.org-proxy	proxy	nuget	Online - Ready to Connect	copy

4.5 Create Maven Repository

1. Navigate to **Settings** → **Repositories** → **Create Repository**
2. Choose **Maven (hosted)**
3. Name it **java-cal-app**
4. Set **Version Policy: Release**
5. Save the configuration

Repository



Repositories

Blob Stores

Data Store

Proprietary Repositories

Content Selectors

Cleanup Policies

Routing Rules



System Status

Repositories

+ Create repository

	Name ↑	Type	Format	Blob Store	Status	URL
	maven-central	proxy	maven2	default	Online - Ready to Co...	copy
	maven-public	group	maven2	default	Online	copy
	maven-releases	hosted	maven2	default	Online	copy
	maven-snapshots	hosted	maven2	default	Online	copy
	nuget-group	group	nuget	default	Online	copy
	nuget-hosted	hosted	nuget	default	Online	copy
	nuget.org-proxy	proxy	nuget	default	Online - Ready to Co...	copy

Recipe ↑
go (proxy)
helm (hosted)
helm (proxy)
huggingface (proxy)
maven2 (group)
maven2 (hosted)
maven2 (proxy)
npm (group)
npm (hosted)
npm (proxy)
nuget (group)
nuget (hosted)
nuget (proxy)
p2 (proxy)

Name ↑	Type	Format	Blob Store	Status	URL
 java-cal-app	hosted	maven2	default	Online	 copy

Copy to clipboard: Ctrl+C, Enter

Use your repository's direct URL (shown below) to connect other tools to your repository. For more information, see our [Maven-specific help documentation](#).

`http://54.226.240.217:8081/repository/java-cal-app/`

Close

5. Deploy Server Setup

5.1 Update Packages & Set Hostname

```
sudo apt update && sudo apt upgrade -y
sudo hostnamectl set-hostname deploy-server
```

```
ubuntu@ip-172-31-17-233:~$ sudo apt -y update
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble InRelease
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports InRelease [126 kB]
Get:4 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 Packages [15.0 MB]
Get:5 http://security.ubuntu.com/ubuntu noble-security InRelease [126 kB]
```

```
ubuntu@ip-172-31-17-233:~$ sudo apt -y upgrade
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Calculating upgrade... Done
```

```
ubuntu@ip-172-31-17-233:~$ sudo hostnamectl set-hostname deploy-server
ubuntu@ip-172-31-17-233:~$ sudo init 6

Broadcast message from root@ip-172-31-17-233 on pts/2 (Thu 2025-10-16 05:35:24 UTC):

The system will reboot now!
```

5.2 Install Java 17 and Tomcat

```
Java --version
sudo apt install openjdk-17-jre-headless
wget <tomcat URL>
tar -xvf apache-tomcat-9.0.111.tar.gz
./apache-tomcat-9.0.111/bin/start.sh
```

```
ubuntu@ip-172-31-17-233:~$ java -version
Command 'java' not found, but can be installed with:
sudo apt install openjdk-17-jre-headless # version 17.0.16+8~us1-0ubuntu1~24.04.1, or
sudo apt install openjdk-21-jre-headless # version 21.0.8+9~us1-0ubuntu1~24.04.1
sudo apt install default-jre # version 2:1.17-75
sudo apt install openjdk-11-jre-headless # version 11.0.28+6-1ubuntu1~24.04.1
sudo apt install openjdk-25-jre-headless # version 25+36-1~24.04.2
sudo apt install openjdk-8-jre-headless # version 8u462-ga~us1-0ubuntu2~24.04.2
sudo apt install openjdk-19-jre-headless # version 19.0.2+7-4
sudo apt install openjdk-20-jre-headless # version 20.0.2+9-1
sudo apt install openjdk-22-jre-headless # version 22~22ea-1
```

```
ubuntu@ip-172-31-17-233:~$ sudo apt install openjdk-17-jre-headless
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  alsa-topology-conf alsa-ucm-conf ca-certificates-java fontconfig-config fonts-dejavu-c
```

```
ubuntu@ip-172-31-17-233:~$ wget https://dlcdn.apache.org/tomcat/tomcat-9/v9.0.111/bin/apache-tomcat-9.0.111.tar.gz
--2025-10-15 14:29:29-- https://dlcdn.apache.org/tomcat/tomcat-9/v9.0.111/bin/apache-tomcat-9.0.111.tar.gz
Resolving dlcdn.apache.org (dlcdn.apache.org)... 151.101.2.132, 2a04:4e42::644
Connecting to dlcdn.apache.org (dlcdn.apache.org)|151.101.2.132|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 13037002 (12M) [application/x-gzip]
Saving to: 'apache-tomcat-9.0.111.tar.gz'

apache-tomcat-9.0.111.tar.gz  100%[=====] 12.43M  --.-KB/s  in 0.04s

2025-10-15 14:29:29 (334 MB/s) - 'apache-tomcat-9.0.111.tar.gz' saved [13037002/13037002]
```

```
ubuntu@ip-172-31-17-233:~$ tar -xvf apache-tomcat-9.0.111.tar.gz
apache-tomcat-9.0.111/conf/
apache-tomcat-9.0.111/conf/catalina.policy
```

```
ubuntu@ip-172-31-17-233:~$ ls
apache-tomcat-9.0.111  apache-tomcat-9.0.111.tar.gz
ubuntu@ip-172-31-17-233:~$ cd apache-tomcat-9.0.111/
ubuntu@ip-172-31-17-233:~/apache-tomcat-9.0.111$ cd bin/
ubuntu@ip-172-31-17-233:~/apache-tomcat-9.0.111/bin$ ./startup.sh
Using CATALINA_BASE:   /home/ubuntu/apache-tomcat-9.0.111
Using CATALINA_HOME:   /home/ubuntu/apache-tomcat-9.0.111
Using CATALINA_TMPDIR: /home/ubuntu/apache-tomcat-9.0.111/temp
Using JRE_HOME:        /usr
Using CLASSPATH:       /home/ubuntu/apache-tomcat-9.0.111/bin/bootstrap.jar:/home/ubuntu/apache-tomcat-9.0.111/bin/tomcat-juli.jar
Using CATALINA_OPTS:
Tomcat started.
```

-find context.xml files and edit them for accessing the tomcat and configure a user:

```
-find -name context.xml
```

```
-vi ./webapps/manager/META-INF/context.xml
```

```
-vi ./webapps/host-manager/META-INF/context.xml
```

-vi conf/tomcat-users.xml


```
ubuntu@ip-172-31-17-233:~/apache-tomcat-9.0.111$ find -name context.xml
./conf/context.xml
./webapps/manager/META-INF/context.xml
./webapps/host-manager/META-INF/context.xml
./webapps/docs/META-INF/context.xml
./webapps/examples/META-INF/context.xml
ubuntu@ip-172-31-17-233:~/apache-tomcat-9.0.111$ sudo nano ./webapps/manager/META-INF/context.xml
ubuntu@ip-172-31-17-233:~/apache-tomcat-9.0.111$ sudo nano ./webapps/host-manager/META-INF/context.xml
```

← → ↻ ⚠ Not secure 3.85.115.82:8080 ☆

Home Documentation Configuration Examples Wiki Mailing Lists Find Help

Apache Tomcat/9.0.111

If you're seeing this, you've successfully installed Tomcat. Congratulations!



Recommended Reading:

- [Security Considerations How-To](#)
- [Manager Application How-To](#)
- [Clustering/Session Replication How-To](#)

Server Status
Manager App
Host Manager

Developer Quick Start

Tomcat Setup	Realms & AAA	Examples	Servlet Specifications
First Web Application	JDBC DataSources		Tomcat Versions

Managing Tomcat

For security, access to the `manager` webapp is restricted. Users are defined in:

```
$CATALINA_HOME/conf/tomcat-users.xml
```

In Tomcat 9.0 access to the manager application is split between different users.

Documentation

- [Tomcat 9.0 Documentation](#)
- [Tomcat 9.0 Configuration](#)
- [Tomcat Wiki](#)

Find additional important configuration information in:

Getting Help

FAQ and Mailing Lists

The following mailing lists are available:

- [tomcat-announce](#)
Important announcements, releases, security vulnerability notifications. (Low volume).

← → ↻ ⓘ 3.85.115.82:8080/manager/html

Sign in

http://3.85.115.82:8080

Your connection to this site is not private

Username

Password

← → ↻ ⚠ Not secure 3.85.115.82:8080/manager/html

401 Unauthorized

You are not authorized to view this page. If you have not changed any configuration files, please examine the file `conf/tomcat-users.xml` in your installation. That file must contain the credentials for the user you are trying to access. For example, to add the `manager-gui` role to a user named `tomcat` with a password of `s3cret`, add the following to the config file listed above.

```
<role rolename="manager-gui"/>
<user username="tomcat" password="s3cret" roles="manager-gui"/>
```

Note that for Tomcat 7 onwards, the roles required to use the manager application were changed from the single `manager` role to the following four roles. You will need to assign the role(s) required for the interface you are trying to access.

- `manager-gui` - allows access to the HTML GUI and the status pages
- `manager-script` - allows access to the text interface and the status pages
- `manager-jmx` - allows access to the JMX proxy and the status pages
- `manager-status` - allows access to the status pages only


The HTML interface is protected against CSRF but the text and JMX interfaces are not. To maintain the CSRF protection:

- Users with the `manager-gui` role should not be granted either the `manager-script` or `manager-jmx` roles.
- If the text or jmx interfaces are accessed through a browser (e.g. for testing since these interfaces are intended for tools not humans) then the browser must be closed afterwards to terminate the session.

For more information - please see the [Manager App How-To](#).

```
-->
<role rolename="manager-gui"/>
<user username="tomcat" password="tomcat" roles="manager-gui"/>
</tomcat-users>
```

← → ↻ Not secure 3.85.115.82:8080/manager/html ☆



Tomcat Web Application Manager

Message: OK

Manager

[List Applications](#) [HTML Manager Help](#) [Manager Help](#)

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
/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

5.3 Download WAR from Nexus Repository

wget

http://<nexus-server-ip>:8081/repository/maven-releases/com/example/javawebcalculator/1.0/javawebcalculator-1.0.war

sonatype nexus repository Community Edition

Search components

Dashboard Search Browse Upload Settings

Browse / java-cal-app

HTML View

- com
 - web
 - cal
 - webapp-add
 - 0.0.1
 - webapp-add-0.0.1.pom
 - webapp-add-0.0.1.pom.md5
 - webapp-add-0.0.1.pom.sha1
 - webapp-add-0.0.1.war**
 - webapp-add-0.0.1.war.md5
 - webapp-add-0.0.1.war.sha1
 - maven-metadata.xml
 - maven-metadata.xml.md5
 - maven-metadata.xml.sha1

Advanced search

/com/web/cal/webapp-add/0.0.1/webapp-add-0.0.1.war

Delete asset

Summary

Repository	java-cal-app
Format	maven2
Component Group	com.web.cal
Component Name	webapp-add
Component Version	0.0.1
Path	/com/web/cal/webapp-add/0.0.1/webapp-add-0.0.1.war
Content type	application/java-archive
File size	3.9 KB
Blob created	Thu Oct 16 2025 13:20:19 GMT+0530 (India Standard Time)
Blob updated	Thu Oct 16 2025 13:20:19 GMT+0530 (India Standard Time)
Last downloaded	has not been downloaded

5.4 Deploy WAR to Tomcat

```
sudo mv javawebcalculator-1.0.war /var/lib/tomcat9/webapps/  
sudo systemctl restart tomcat9
```

The screenshot shows the Sonatype Nexus Repository Community Edition interface. The left sidebar contains navigation links: Dashboard, Search, Browse, Upload, and Settings. The main content area is titled 'Browse' and shows a tree view of the repository structure. The path is: com > web > cal > webapp-add > 0.0.1. The selected artifact is 'webapp-add-0.0.1.war'. The right sidebar shows the 'Summary' of the artifact, including its repository, format, component group, name, version, path, content type, file size, and creation/update timestamps.

Property	Value
Repository	java-cal-app
Format	maven2
Component Group	com.web.cal
Component Name	webapp-add
Component Version	0.0.1
Path	/com/web/cal/webapp-add/0.0.1/webapp-add-0.0.1.war
Content type	application/java-archive
File size	3.9 KB
Blob created	Thu Oct 16 2025 13:20:19 GMT+0530 (India Standard Time)
Blob updated	Thu Oct 16 2025 13:20:19 GMT+0530 (India Standard Time)
Last downloaded	has not been downloaded

```
ubuntu@deploy-server:~$ wget http://admin:Admin123@18.215.155.233:8081/repository/java-cal-app/com/web/cal/webapp-add/0.0.1/webapp-add-0.0.1.war  
--2025-10-16 07:59:45-- http://admin:*password*@18.215.155.233:8081/repository/java-cal-app/com/web/cal/webapp-add/0.0.1/webapp-add-0.0.1.war  
Connecting to 18.215.155.233:8081... connected.  
HTTP request sent, awaiting response... 401 Unauthorized  
Authentication selected: BASIC realm="Sonatype Nexus Repository Manager"  
Reusing existing connection to 18.215.155.233:8081.  
HTTP request sent, awaiting response... 200 OK  
Length: 3951 (3.9K) [application/java-archive]  
Saving to: 'webapp-add-0.0.1.war'  
  
webapp-add-0.0.1.war 100%[=====] 3.86K --.-KB/s in 0s  
  
2025-10-16 07:59:45 (345 MB/s) - 'webapp-add-0.0.1.war' saved [3951/3951]  
  
ubuntu@deploy-server:~$ ls  
apache-tomcat-9.0.111 apache-tomcat-9.0.111.tar.gz webapp-add-0.0.1.war  
ubuntu@deploy-server:~$ mv webapp-add-0.0.1.war apache-tomcat-9.0.111/webapps/  
ubuntu@deploy-server:~$ cd apache-tomcat-9.0.111/  
ubuntu@deploy-server:~/apache-tomcat-9.0.111$ ls  
BUILDING.txt LICENSE README.md RUNNING.txt conf logs webapps  
CONTRIBUTING.md NOTICE RELEASE-NOTES bin lib temp work  
ubuntu@deploy-server:~/apache-tomcat-9.0.111$ cd webapps/  
ubuntu@deploy-server:~/apache-tomcat-9.0.111/webapps$ ls  
ROOT docs examples host-manager manager webapp-add-0.0.1.war
```

Applications					
Path	Version	Display Name	Running	Sessions	Commands
/	None specified	Welcome to Tomcat	true	0	<div>Start Stop Reload Undeploy</div> <div>Expire sessions with idle ≥ 30 minutes</div>
/docs	None specified	Tomcat Documentation	true	0	<div>Start Stop Reload Undeploy</div> <div>Expire sessions with idle ≥ 30 minutes</div>
/examples	None specified	Servlet and JSP Examples	true	0	<div>Start Stop Reload Undeploy</div> <div>Expire sessions with idle ≥ 30 minutes</div>
/host-manager	None specified	Tomcat Host Manager Application	true	0	<div>Start Stop Reload Undeploy</div> <div>Expire sessions with idle ≥ 30 minutes</div>
/manager	None specified	Tomcat Manager Application	true	2	<div>Start Stop Reload Undeploy</div> <div>Expire sessions with idle ≥ 30 minutes</div>
/webapp-add-0.0.1	None specified	Servlet	true	0	<div>Start Stop Reload Undeploy</div> <div>Expire sessions with idle ≥ 30 minutes</div>

5.5 Verify Deployment

Visit in browser:

`http://<deploy-server-ip>:8080/javawebcalculator`

Calculator

first number:
Second number :
☐ addition

Addition

30

Calculator

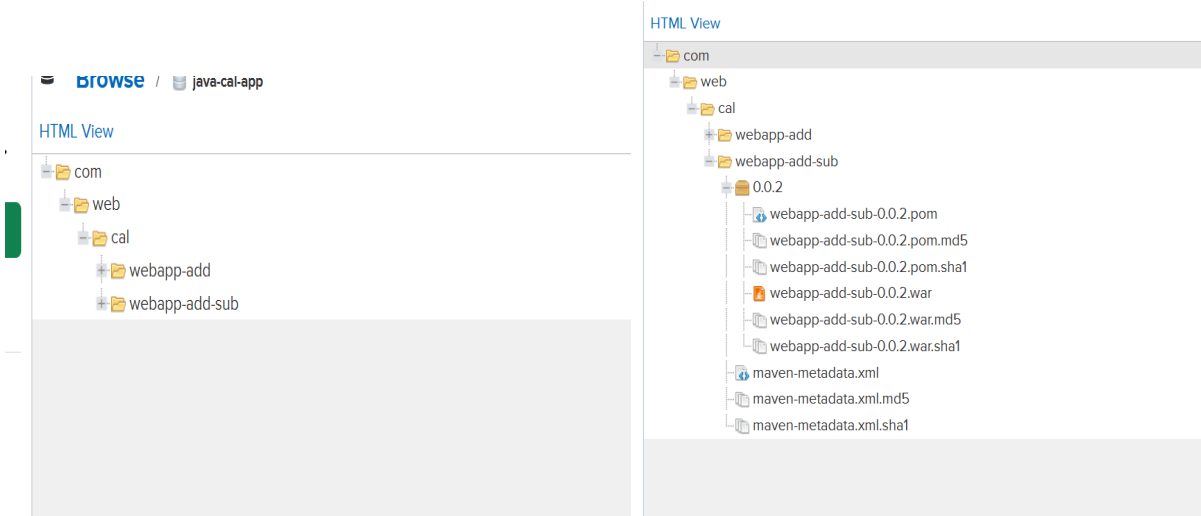
first number:
Second number :
☒ addition

6. Versioning and Continuous Deployment

Each function (Add, Sub, Prod) is packaged as a **new version** of the app:

Version	Feature Added	WAR File Name
1.0	Addition Function	<code>webapp-add-0.0.1.war</code>
1.1	Addition & Subtraction	<code>webapp-add-sub-0.0.2.war</code>
1.2	Addition, Subtraction & Product	<code>webapp-add-sub-prod-0.0.1.war</code>

You can build and deploy new versions like this:



Applications					
Path	Version	Display Name	Running	Sessions	Commands
/	None specified	Welcome to Tomcat	true	0	Start Stop Reload Expire sessions with id
/docs	None specified	Tomcat Documentation	true	0	Start Stop Reload Expire sessions with id
/examples	None specified	Servlet and JSP Examples	true	0	Start Stop Reload Expire sessions with id
/host-manager	None specified	Tomcat Host Manager Application	true	0	Start Stop Reload Expire sessions with id
/manager	None specified	Tomcat Manager Application	true	1	Start Stop Reload Unc Expire sessions with id
/webapp-add-0.0.1	None specified	Servlet	true	1	Start Stop Reload Expire sessions with id
/webapp-add-sub-0.0.2	None specified	Servlet	true	0	Start Stop Reload Expire sessions with id

Addition

30

Substraction

10

Calculator

first number:

Second number :

☒ addition

☒ subtraction

Calculator

first number:

Second number :

☒ addition

☒ subtraction

Browse

/ java-cal-app

HTML View

com

web

cal

webapp-add

webapp-add-sub

webapp-add-sub-prod

0.0.3

webapp-add-sub-prod-0.0.3.pom

webapp-add-sub-prod-0.0.3.pom.md5

webapp-add-sub-prod-0.0.3.pom.sha1

webapp-add-sub-prod-0.0.3.war

webapp-add-sub-prod-0.0.3.war.md5

webapp-add-sub-prod-0.0.3.war.sha1

maven-metadata.xml

maven-metadata.xml.md5

maven-metadata.xml.sha1

Applications					
Path	Version	Display Name	Running	Sessions	Commands
/	None specified	Welcome to Tomcat	true	0	<div>StartStopReloadUndeploy</div> <div>Expire sessions with idle ≥ 30 minutes</div>
/docs	None specified	Tomcat Documentation	true	0	<div>StartStopReloadUndeploy</div> <div>Expire sessions with idle ≥ 30 minutes</div>
/examples	None specified	Servlet and JSP Examples	true	0	<div>StartStopReloadUndeploy</div> <div>Expire sessions with idle ≥ 30 minutes</div>
/host-manager	None specified	Tomcat Host Manager Application	true	0	<div>StartStopReloadUndeploy</div> <div>Expire sessions with idle ≥ 30 minutes</div>
/manager	None specified	Tomcat Manager Application	true	1	<div>StartStopReloadUndeploy</div> <div>Expire sessions with idle ≥ 30 minutes</div>
/webapp-add-0.0.1	None specified	Servlet	true	0	<div>StartStopReloadUndeploy</div> <div>Expire sessions with idle ≥ 30 minutes</div>
/webapp-add-sub-0.0.2	None specified	Servlet	true	1	<div>StartStopReloadUndeploy</div> <div>Expire sessions with idle ≥ 30 minutes</div>
/webapp-add-sub-prod-0.0.3	None specified	Servlet	true	0	<div>StartStopReloadUndeploy</div> <div>Expire sessions with idle ≥ 30 minutes</div>

Addition

30

Subtraction

10

Multiplication

200

Calculator

first number:

Second number :

☒ addition

☒ subtraction

☒ production

submit

7. Troubleshooting

Issue	Cause	Fix
WAR not uploaded	Wrong Nexus URL	Check <code>distributionManagement</code> in pom.xml
Tomcat not deploying WAR	Permissions issue	Ensure <code>/var/lib/tomcat9/webapps/</code> writable
Cannot access Nexus	Port 8081 blocked	Open 8081 in Security Group
Wrong Java version	Default points to old JDK	Set default JDK using <code>sudo update-alternatives --config java</code>

8. Recommendations

1. Enable HTTPS for Nexus and Tomcat (use Nginx reverse proxy).
 2. Integrate Jenkins later for automated build → upload → deploy.
 3. Use version tagging in GitHub for release tracking.
 4. Regularly backup Nexus repository.
-

9. Conclusion

This project demonstrates a **3-tier DevOps deployment workflow** using:

- **Build Server:** Maven-based Java packaging.
- **Nexus Repository:** Artifact management and version control.
- **Deploy Server:** Tomcat-based application hosting.

Each functional update (*Add, Sub, Prod*) is released as a **new version**, showcasing real-world CI/CD principles — **build, store, and deploy** across isolated environments.